

Impact of Fourth Industrial Revolution on Public Sector Accounting: The Nigeria Experience

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Abstract: Some major effects of technological progress such as Fourth Industrial Revolution always create concerns about the future of human labour, and the possibility of substitution of the human factor by machines and robots. This paper is titled *Impact of Fourth Industrial Revolution on Public Sector Accounting: The Nigeria Experience*. The objectives of the paper are to; ascertain the extent to which internet of things impact Public Sector Accounting; determine how way cloud computing impact Public Sector Accounting; and assess the Impact of big data on public sector accounting. The paper is anchored on the game theory propounded by. The methodology is both qualitative and quantitative research. Findings from the research indicate that among other things, that; it is high time organizations aligned Industry 4.0 and accounting with their and overall corporate strategy to ensure that it is in line with the institutional goals and objectives. Fourth industrial revolution has impacted on accounting in the areas of; new job roles (e.g; AI and machine learning specialists, big data experts, data analyst sand scientists, digital conversion specialists, new skill specialists, process mechanization specialists, innovation professionals, ecommerce and social media specialists, robotics specialists and engineers), remote working and job automation. The paper therefore concludes that Industry 4.0 can be used for the benefit of organizations especially in public sector accounting. Thus, it is high time organizations aligned Industry 4.0 and accounting with their overall business policy to ensure that it is in line with the institutional goals and objectives. Based on the findings above, the paper recommends among others that; in the medium to long term, government could partner with technical experts to research on more appropriate AI tools for public sector accounting. The infrastructure needed to enable IoT devices must be in place for accounting departments to ensure that their systems can handle the higher data volumes.

Keywords: Industry 4.0, Cloud computing, Public Sector Accounting, Internet of things.

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Introduction

Given the rapidly changing nature of business, it is necessary to accept the fact that there is need to introduce and adopt changes in organization. Change management is becoming an essential part of public sector accounting as organizations need to keep up with the new, emerging era of industrial digitization. New and smarter ways of accounting practices are discovered, of which one of the most recent discoveries is the cloud accounting (Egiyi and Ude, 2020). These changes apply to everyday life and ways of performing work as organizational systems do not exist without finance (Latham, 2017).

The term fourth industrial revolution coined by Klaus Schwab, initiator and executive chairman of the World Economic Forum, describes a world where people move between digital domains and offline reality with the utilization of connected technology to adjust and manage their lives (Puhovichova & Jankelova, 2020). Industry 4.0 or Fourth Industrial Revolution refers to developing an environment in which disruptive technologies and trends change the way people live and work. It builds on the foundations laid by the first three industrial revolutions. It is a concept regarding the use of automation and both data processing and exchange, as well as the implementation of various new technologies that allow the creation of so-called cyber-physical systems and changes in manufacturing processes. Thus, it requires accounting departments to play a more strategic role as the industry 4.0 is also concerned with the digitization of production, where devices and technological systems are connected with each other- including the Internet of Things, cloud computing, Big Data analysis and artificial intelligence, as well as incremental printing, augmented reality or cooperating robots. The objective is to make for a more flexible and efficient management and the interconnection of companies, that are able to make decisions based on more detailed information (Latham, 2019).

Industrial Revolutions (Latham, 2019) introduce technologies that blur the lines between the physical, digital and biological spheres across all sectors. Technologies like artificial intelligence, nanotechnology, quantum computing, synthetic biology and robotics all significantly supersedes any digital progress made in the past 60 years and creates realities that were beforehand unthinkable. Such deep realities now disrupt and change the business model of each and every industry (Hinton, 2018). Industry 4.0 nowadays is considered as a heart of today's discussions of modern business. It is considered to be a socio-technical system that organizes the relationship among human capital, companies, technologies, production systems, production and consumption, thus creating a new relationship between industry and society in the process of digitalization.

The growing interest in "big data" and a more sophisticated accounting information management system becomes an essential part of modern business, as well as greater responsibility for individual strategies, processes and results (Sulej-Piwowar, 2020). Thus, industry 4.0 in the area of public sector accounting assumes the unification and automation of the processes of data collection, information analysis, evaluation, performance improvement and decision making. It creates a number of new opportunities for organizations in the accounting profession. It has an overall impact on public sector accounting, labor productivity growth, opportunities for creating new industries, shifting different tasks from man to machines and robots. This paradigm shift gives accountants the possibility to increase efficiency through emerging technologies that can automate processes, resulting in smarter and more efficient accounting, using the Smart accounting 4.0 concept as the key motivational driver. But to getting there requires that company leaders to be forward-thinking about their HR strategies, and always mindful of their employees (Nova and Mulya, 2020).

As the world moves deeper into the fourth industrial revolution, organizations around the world are polarizing towards the transformation and adoption of the advanced technologies of Industry

4.0. Organizations that have embraced fourth industrial revolution attest to the fact that it has significantly affected the public sector accounting and changed how they operate. The current and traditional accounting practices, procedures and method are gradually becoming irrelevant in the digitalized business environment. Most accountants have now embraced the automation of current accounting practices inline with the agenda of Industry 4.0 (Sivathanu and Pillai, 2018). There is a real need for the application of 4IR technologies in the public sector such as AI. Unlike the private sector, the business of the public sector is mainly the supply of public goods and services. A prevalent issue in public entities is irregular expenditure and fruitless and wasteful expenditure. Public entities in Nigeria have to comply with the financial and treasury regulations in reporting and accounting for that supply of goods and services. In this paper, we examine the impacts of Industry 4.0 on public sector accounting. Thus, the focus of analysis include to ascertain the extent to which internet of things impact Public Sector Accounting and to determine how way cloud computing impact Public Sector Accounting.

Conceptual Review

Fourth Industrial Revolution

The Fourth Industrial Revolution focuses mainly on the digitization of all physical assets and the integration of digital ecosystems with value chain partners (Grinevica, Rivza, and Rivza, 2022). Building on the first Industrial Revolution which used water and steam power to mechanize production, the second Industrial Revolution which used electric power to create mass production and the third, which used electronics and information technology to automate production; the 4th Industrial Revolution is taking automation to new levels, blurring the lines between the physical, digital, and biological spheres and using technologies to perform tasks previously carried out by humans, ranging from piloting vehicles to 'rules-based' jobs in different areas.

Industry 4.0 refers to the rising digitization of the entire value chain, as well as the ensuing interconnection of people, devices, and systems via real-time data exchange (Mohelska & Sokolova, 2018). The Fourth Industrial Era emerged when machines began to control themselves and their processes without human intervention. Sivathanu, and Pillai (2018) state that the concept of Industry 4.0 refers to recent technological advancements that use the Internet and supporting technologies to connect physical objects, human involvements, intelligent machines, production processes within an organization to create a new sort of intellectual, interacted, and agile value chain. The fundamental goal of Industry 4.0 is to meet unique client needs in areas such as order management, research and development, factory commissioning, delivery, and product reuse and recycling (Nova and Mulya, 2020). Industry 4.0 is about reinventing how the entire organization functions and grows, not merely investing in new technology and tools to boost industrial efficiency. In terms of production, this concept entails a revolutionary loss of human labor, as robots will take over a more significant portion of the work that people could only do. Devices and products and even semi-finished items will be fitted with chips that store critical information such as how they will be processed when they will be processed, and so on. Robotics, Big Data Analytics, Internet of Things (IoT), Cloud Computing, and Additive Manufacturing are the

five key drivers of Industry 4.0, which aid in the transformation of industrial processes into completely digitized and intelligent ones (Nova and Mulya, 2020).

The opportunities of the fourth industrial revolution are incontrovertible. According to Sivathan and Pillai (2018) in this revolution, emerging technologies and broad-based innovation are diffusing much faster and more widely than in previous ones, which continue to unfold in some parts of the world. The fourth revolution is distinguished from the third revolution by velocity, breadth, depth, and systems impact. The fourth industrial revolution is a fundamental shift in the way technology, communications, data, and analytics impact almost all aspects of society and the economy: businesses, governments and people. Disruptive technologies (Grinevica, Rivza, and Rivza, 2022) offer great opportunities for growth given their transformational impact on companies' products, processes and business models, as well as on the public sector. It will affect people's identity, sense of privacy, ownership, consumption patterns, work and leisure, careers and skills. History indicates that consumers have gained the most from industrial revolutions, as a lot of activities can now be carried out remotely. For example, organizing transport, booking restaurants, buying groceries and other goods, making payments, listening to music, reading books or watching films—these tasks can now be done instantly, at any time and in almost any place. In the words of Ozawa (2019) "in the future, technological innovation will also lead to a supply-side miracle, with long-term gains in efficiency and productivity.

Throughout the ages, technological innovations have tended to raise labour productivity by replacing existing workers with technology, and they also usher in new products and processes that open up new sources of growth (Ozawa, 2019). In digitalized, robotic and automated factories, much of the work is performed by equipment and robots, and humans only monitor them—this is the reality of many companies in the world. While there are many benefits of the fourth industrial revolution, there are several key challenges that come with it. In 2025, analytical thinking, creativity, and flexibility will be among the most sought-after skills (Whysall, Owtram and Brittain, 2019; Valeriy, 2020). The most competitive businesses will focus on upgrading their workers' skills. Thus, today it is obvious that due to technological innovations, labour market changes can take place quite rapidly, and under such circumstances not everyone has been able to benefit. Low-skilled jobs will be replaced by automation technologies (Valeriy, 2020). With robot technologies, goods and services can be produced and delivered with little or no human interaction (Ugur, Churchill and Solomon, 2018). Robots are typically designed to perform repetitive activities so that workers can focus on other vital activities.

Nevertheless, Yucheng, Shan, Long, and Mengxi, (2021) opine that robots can execute extremely repetitive or mathematical jobs with a far narrower margin of error than human labor. Equipped with cutting-edge software, AI, sensors and machine vision, these robots are capable of performing difficult and delicate tasks, and can recognize, analyse, and act on information they receive from their surroundings (Yucheng, Shan, Long, and Mengxi, 2021). Advanced robotics has the potential to create new types of jobs, improve and change the quality of people's lives in the near future. The research studies done by the McKinsey Global Institute discovered that between 2016 and 2030, the impact of automation change in hours worked by 2030 for the United States is expected to increase by 60% and for 14 Western European countries by 52%, and the highest demand will

be observed for advanced IT and programming skills, as well as for basic digital skills, which could grow as much as 90 and 70 percent between 2016 and 2030.

Big data (Degryse, 2016) can capture all of the data that flows into a company's operations, which they can use analytics to extract tremendous value. Big data analytics are the advanced analytic techniques to analyze extensive data sets containing structured, semi-structured, and unstructured data and data from many sources and sizes. Big Data are collected to obtain more information from a wide range of sources, from factory equipment and Internet of Things (IoT) devices, to ERP and CRM systems, to weather and traffic apps (Degryse, 2016). The value of the use of big data in the production process is based on the fact that the data can be used in the automation, visualization and analysis of industrial processes. Artificial intelligence (AI), mobile devices, social media, and the Internet of Things are driving data sources to big data, and they are more complicated than traditional data sources. Additive manufacturing, also known as 3D printing, creates three-dimensional solid items from a computer-generated file. According to Iryna (2022) an object is built via additive technique where one layer of material lays down on previous layers of material until the product is finished. Each of these layers can be viewed as lightly sliced. Subtractive manufacturing, which involves cutting out a chunk of steel or plastic with a milling machine, is the opposite of 3D printing. Since the late 1990s, businesses have been using 3D printers to make prototypes, commonly known as "Rapid Prototyping," as part of their design process. 3D printing brings together computational design, manufacturing, materials engineering and synthetic biology, reduces the gap between makers and users and removes the limitations of mass production (Iryna, (2022).

There has being impressive progress in artificial intelligence (AI) driven by exponential increases in computing power and by the availability of vast amounts of data. AI-based systems can be purely software-based, acting in the virtual world, or embedded in hardware devices (Maryam, Muhammad, and Salman, 2021). Artificial intelligence is already all around us, from self-driving cars and drones to virtual assistants and software that translate or invest (Nagwn, Roselna, Mohd, Yukthamarani, Nik, Mohd and Ramayah, (2023). The artificial intelligence (AI) provides new forms of work and organization. A block chain is essentially a network of computers and one of the key emerging technologies that can help to make interaction between individuals, enterprises and public organisations more efficient, reinforce trust and enable each party to retain control of their own data. Blockchain technology has been mainly linked to financial services and cryptocurrencies, and it is now expanding into other sectors, such as media and telecommunications, healthcare and government services. According to Schwab (2017), 10% of global gross domestic product (GDP) is based on blockchain technology (Veronika, Liva, Baiba, and Peteris, 2022). Engineers, designers, and architects are combining computational design, additive manufacturing, materials engineering, and synthetic biology to pioneer a symbiosis between microorganisms, our bodies, the products we consume, and even the buildings we inhabit.

Public Sector Accounting

The main objectives of public sector accounting are to determine the legitimacy of transactions and their compliance with the statues and accepted norms. Public sector disbursement strives to

accord with the provisions of the appropriation Acts and Financial Regulations (Aziza and Reajmin, 2018).. Several ideas of defining public sector accounting abound. Public Sector Accounting is an information system designed to measure financial information (transactions) of public sector organizations for purposes of the planning, appraisal, reporting, evaluation and management of the organizations. It is a financial system designed to capture all transactions involving government funds, allow for comparison of actual and budgeted results, give government timely information about revenue and expenditure, and provide information useful to assess the efficiency of government programmes. It therefore involves the totality of methods and procedures necessary for accounts keeping to produce the desired results of the objectives of government programmes and activities. Hence most accountants see it as a set of methods and procedures adopted by public sector organization so as ns to manage the financial business of the organizations. One can rightly infer that public sector accounting is concerned with recording, controlling, analyzing, classifying, summarizing, measuring and reporting the financial flows of government. It involves the receipt, custody and disbursement of public and trust monies as required by law (Aziza and Reajmin, 2018).

The purpose of public sector accounting is to demonstrate fiduciary stewardship so as to show that government resources have been approved and handled properly by ensuring that government monies are applied honestly, using proper procedures, within budgeted levels and legal limits. Thus, public sector accounting is a dynamic financial information system based on laws, rules, regulations, policies, methods and procedures. Several developments in recent decades have made the subject of Public Sector Accounting an important part of accounting studies the world over. Firstly, the size of the government budget and the contribution of public expenditure to the Gross Domestic Product (GDP) are very huge, especially in Nigeria. Again, accounting as an information system is very dynamic and its transformation, storage, retrieval and reporting very much depends on new and emerging technologies and information systems. These new computerized systems are developed to apply to both general commercial accounting organizations and public service organizations with virtually very little or no modifications. For example, several ledger systems, payroll systems, and pension administration vary little. Also worthy of note is the fact that governments throughout the world have quasi-commercial or sometimes purely commercial, state-owned enterprises.

Fourth Industrial Revolution and Public Sector Accounting

The accounting role has seen substantial modifications because of Industry 4.0. The accounting industry has been significantly impacted by Industry 4.0. A larger skill set, including an understanding of IT, automation, and data analytics, is increasingly demanded of accountants. Data analytics are being increasingly widely used in accounting, offering useful insights into company performance and fraud prevention. Thus, the development of blockchain technology has the potential to transform the way firms conduct financial transactions, lowering the risk of fraud and expediting accounting procedures Anna (2021). The accounting industry will probably change as the public sector embraces Industry 4.0.

The newly revamped accounting profession under Industry 4.0 will deal with real-time accounting which requires up-to-date information and less reliance on periodic data. The analysis of data will no longer focus on historical data but towards big data produced by the system. Big data is characterized by the high volume of updated and unstructured data in a complex set of software (Dayanti, 2019). The ability to work with AI-based and Big Data technology will help accountants to utilize data produced by the system and generate meaningful information for users to use in decision making (Wahyuni, 2020). The accounting profession will not merely generate and report numbers but will expand towards interpreting the numbers for the creation of meaningful financial information in forming an ethical judgement and justified decision for users. Hence, this will lead to data quality improvement due to accuracy, higher detail and better timeliness. Creation of meaningful and improved data information will increase the service quality of an accountant indefinitely. Nevertheless, the introduction of these technological innovations will not eliminate the role of accountants entirely. An accountant is needed in choosing the right and high quality data to be processed by these smart technologies. Validity and reliability of the data used will be supervised by accountants (Surianti, 2020). The output generated from the data processed will be analyzed by accountant as only humans are capable of making professional judgement. Valuable decision making are derived from human knowledge and experience and this cannot be replaced by technology (Omar & Hasbolah, 2018).

Furthermore, Rosi and Mahyuni (2021) suggest that accountant is the supervisor for the task performed by these advanced and smart technologies. They are responsible in monitoring and identifying the error made by the system. Suggesting a solution requires human intervention and judgement. Besides, Leitner-Hanetseder et al. (2021) and Losbichler and Lehner (2021) believe that human-machine collaboration is crucial in task that requires human involvement in making decision and judgement. The technologies and human exist as a co-actor working together in certain processes that is impossible to be conducted by technologies solely. Therefore, human machine collaboration exists to accomplish certain accounting task. Accountants will have to deal and move together with the technology innovation in order to thrive in this digital era. Without a doubt, the inclusion of technology in accountant's everyday work and task will bring to light the need for development of new knowledge and skills in the accounting sector (Rosi & Mahyuni, 2021; Wahyuni, 2020). Thus, development of knowledge in accounting field should be aligned with development in Industry 4.0. Refinement to current accounting skills will help the accountant to survive in the fast-paced Industry 4.0 era. Provision of training and education might help the development of suitable skills and knowledge that suit the Industry 4.0 requirement. In fact, producing a qualified human capital and intellectual resources are the ascent of Industry 4.0 (Li, 2020). As the role and job scope of an accountant are changing, hence the right competencies and skills to fit the new roles must be in place as well. The future accountant will encounter bigger challenges as to fulfill the accountants' qualification under the Industry 4.0 (Stancheva-Todorova, 2019a). The accountants' skill profile will set to change and consequently affecting the education system in producing future accountants for the markets (Jarosz et al., 2020). The impact is undeniably consequential to the accounting graduates and the future labour market.

With the rise of smart technology in Industry 4.0, the capabilities of working with these technologies become the main concern of the employers in the market. Most of accountant's works are being replaced by machines and devices. As reported by Raporu (2016) the spread of smart technologies, globalisation of business and profession, the change in regulation and governance as well as the change of public expectations towards business and accounting profession become the driver of change towards accounting profession. Consequently, Stancheva Todorova (2019b) has outlined the knowledge and skills profile for future accountants in Industry 4.0 which encompasses knowledge and skills related to digital technologies, big data and data analytics, robotics and Artificial Intelligence, cyber security, tax implications as well as legal and regulatory requirements. A revision to the accountant's skills emphasizing on solid technical skills and ethics supported by strong communication skills is a condition to work in Industry 4.0 spheres (Raporu, 2016). Khanh (2018), Purnamasari et al. (2019), Rhodes and Rhodes (2019) strongly believed that acquisition of knowledge and skills in IT is increasingly important as we move towards the digital age. Advantages are given to accountants who can work with IT tools. Moreover, the right combination of technical and soft skills relevant to Industry 4.0 is crucial to be instilled in young accounting graduates. Kruskopf et al. (2020) listed relevant technical and soft skills suitable for Industry 4.0 employment. The technical skills are recognized as analyzing, understanding and having sufficient knowledge on the function and capabilities of software and data security. These skills will enable young accountants to interact and work well with smart technologies.

The soft skills consist of communication, conflict solving, leadership, risk management, creativity and strategic decision making, emotional intelligence, sales knowledge, adaptability and customer service orientation. Moreover, De Villiers (2010) has identified five essential skills that are relevant in dealing with complex and constantly changing business environment. The skills are known as communication skill, leadership and teamwork skills, problem solving and thinking skills, ethical and moral values, and self-management skill. Another study conducted in search of the right skills that are compatible with Industry 4.0 employment was carried out by Tsiligiris and Bowyer (2021) in which they listed four important skills that will help accountants in facing technological disruption in accounting and business. The skills are related to ethics, business, digital and data, and soft skills. These are said to be the skills for success. Possession of these skills will help accountants to adapt to changes in their job function and role as an accountant. Mastering the non-financial skills like analytical skills, information technology skills as well as leadership skills (Surianti, 2020) will help future accountants to work well with technologies as well as to cope with great pressures from business and society. In fact, these skills are beneficial as the role of an accountant now move towards strategic and far-sighted vision that is aligned with Industry 4.0.

Apart from the aforementioned skills identified in previous studies, The World Economic Forum (2016) has outlined ten critical and vital skills for Industry 4.0. These skills would help accountants face the challenge of Future of Work. The recognized skills are complex problem solving, critical thinking, creative thinking, people management, coordinating with people, emotional intelligence, judgment and decision making, orientation towards service, negotiation ability, and cognitive flexibility (World Economic Forum, 2016). Undoubtedly, these skills are the accent of Industry 4.0.

It is crucial for accountants to develop these skills and create a strong skills profile before embarking Industry 4.0 employment. The application of AI in the accounting industry is an inevitable trend and this will bring a positive development and innovation to the industry (Luo et al., 2018). Industry 4.0 is capable in turning the conventional practices into a modernized and smart practice. Financial data will be organized and processed digitally by the system and the role of public accountant is to evaluate the data produced by the system (Kruskopf et al., 2020). According to Leitner-Hanetseder et al. (2021), the current accounting processes which are characterized as repetitive and routine tasks will be replaced by AI-based technologies and business intelligence (BI). Zheng (2019) explained that the use of financial robot will reduce the burden of public accountants as the nature of work is normative and repetitive with innumerable data and information. The Robotic Process Automation is designed to automate few functions and works in accounting by replacing the traditional and basic financial work, hence improving the efficiency of financial management. Identification of smart technologies like cloud computing and blockchain technology in accounting will result in an immense change on the existing tasks and roles of the accountants.

One recent development from the application of e-Accounting Applications is the Electronic Financial Reporting Project where the audited financial reports are processed independently in a computerized environment and the results used in financial analyses. Within the scope of Industry 4.0, the e-Accounting Application is capable of transforming the accounting processes into a cloud based electronic environment. The modernized accounting processes and procedures will influence accountants in completing accounting task differently. A new way of workings for accountants will navigate a new direction for accountants under Industry 4.0. Repetitive and routine tasks like data processing will be performed completely by AI-based technology. Less involvement in manual activities will allow accountants to revisit their job function and focus more on other strategic and visionary tasks. As such, accountants will be able to shift their focus towards data analytics, judgmental and creative analysis and financial advisory activities (Akhter & Sultana, 2018). Accountants will engage more in managing activities and less on accounting matters (Jarosz et al., 2020) as to create value for the business by looking at the big-picture strategies (Ghani & Muhammad, 2019). As a result, accountants will take on bigger responsibilities in proposing and measuring critical business decisions which will bring business to another level (Wadan et al., 2019). Hence, a shift in an accountant's role is substantial.

A key benefit of technological developments is the removal of the need for slow, manual processes, enabling accountants to spend more time on adding value to the business of government. Also, cloud technology has lowered the infrastructure support costs for organisations. New technology allows a greater analysis of business drivers, using insight an actionable analytics to achieve a competitive advantage. Accountants are therefore moving away from bookkeeping and stewardship to become strategic business partners.

The internet of things and Public Sector Accounting

The Internet of Things (IoT) is a network of physical things that have sensors, software, and other technologies built in. These things connect to other devices and systems over the internet to

exchange data. Through enhancing client experiences, operational efficiency, and corporate insights, the IoT is quickly changing a number of industries, including accounting. The IoT can provide useful data to support accounting procedures for gathering, analysing, and reporting financial data. Smart devices and sensors have made it possible for the IoT to automate accounting procedures, increase data accuracy, and improve decision-making (Wadan et al., 2019). Inventory management is one area of accounting where the IoT is very helpful. Inventory objects can have smart sensors attached to them so that their movement and location can be monitored in real-time. Real-time information on inventory levels is now available to accounting departments, which can be used to optimise stock levels, cut waste, and avoid stockouts. Moreover, automated inventory replenishment made possible by the IoT ensures that stock levels are maintained without the need for human involvement (Kruskopf et al., 2020). Financial reporting is another area of accounting where the IoT is changing operations. The time and effort needed for data entry and analysis can be decreased by the IoT by providing real-time data on financial activities. Moreover, the IoT can increase financial data accuracy, reducing the possibility of mistakes brought on by human entry. Additionally, the IoT can offer insightful data on consumer behaviour, which can aid in public sector accounting in better understanding their citizens and their requirements. Smart devices have the ability to record client interactions with goods and services, which can be used to create more specialised marketing campaigns, enhance citizen experiences, and improve citizens' support.

To safeguard against data breaches and online dangers, accounting departments must make sure companies have strong cybersecurity safeguards in place. Integration of IoT devices with current accounting systems presents another difficulty for the IoT in accounting. Many accounting systems aren't built to handle the massive amounts of data that IoT devices produce. The IoT may also expose accounting departments to new dangers. For instance, smart sensors can provide vital information on inventory levels, but if they break down or provide false data, this might result in inaccurate financial reporting and improper management of inventory levels. To handle these risks and guarantee that they have access to accurate and trustworthy data, accounting departments must have backup procedures in place. Notwithstanding its difficulties, the IoT assists accounting departments in a number of ways (Kruskopf et al., 2020). The key advantage is improved effectiveness. Several accounting procedures can be automated by the IoT, saving time and effort on data entry, analysis, and reporting. As a result, accounting employees may have more time to devote to strategic tasks like company analysis and decision-making

Additionally, the IoT can deliver real-time data that can facilitate decision-making. Real-time data can be used by accounting departments to make better judgements about inventory levels, financial reporting, and client requirements. Accounting departments may be able to react more swiftly to shifting business situations, such as market swings and supply chain disruptions, by using real-time data. The consumer experience can be improved with IoT. Accounting departments may create more specialised marketing plans, enhance client experiences, and improve customer service by gathering data on customer interactions with goods and services.

The IoT can also increase data accuracy. The potential for human error in data entry and analysis can be eliminated with the introduction of smart sensors and devices, leading to more accurate financial reporting and inventory management. This might lessen the possibility of financial losses brought on by

mistakes and enhance the organization's overall financial health. Through the provision of real-time data, increased operational effectiveness, and improved decision-making, the IoT is revolutionizing several industries, including accounting. The advantages of the IoT outweigh the risks, even if it has some drawbacks, including data security and interaction with current systems. Accounting departments may use the IoT to automate procedures, increase the accuracy of data, and boost client satisfaction. The IoT will become a more crucial tool for accounting departments as it continues to develop, allowing them to adjust to shifting business conditions and maintain their competitiveness in the market. The Internet of Things (IoT) is an appropriate solution for combining any type of object into a single digital network through which the connectivity of modern devices, systems and services takes place, which will provide automation in almost all areas. In this way (Degryse, 2016, devices and parts are integrated into the virtual environment in a real environment. Cloud computing servers guarantee complete security to all data over the cloud storage. Thus, public sector, accountants can work via the use of software without the risk of hacking the corporate's or clients' data or even losing confidential information. With cloud computing services, government and other users can access all the services' data elements and tools over the internet using simple software.

Empirical Review

Muhammed, Rabi, and Ramatu (2023) researched on digitalization of international public sector accounting in Nigeria: a literature review. The study evaluates the problems and prospect of digitalization of public sector accounting in Nigeria. Secondary data such as internet, book, articles and website are used in obtaining the information for the research. The study discovers that adoption of (IPSAS) increase the level of accountability and transparency in public sector of Nigeria. The level of usage of big data analyst can reduce to some extent so as to cut cost of operation, human resource till date remains the most vital resource in an organization, replacing them with robotics could have devastating effect on the organization. It therefore recommends that the public should avoid using artificial intelligence to perform all its accounting activities. The study concluded that establishment of the tasks and activities of accountants require critical thinking and creativity, so it would be not so easy to automate those tasks and activities. The study recommends that organizations should try to improve on their information technology since it is capable of contributing positively to the accounting information system.

Oluwaseun, Sokfa and Bongani, (2023) studied exploring the capabilities of the Fourth Industrial Revolution for Improved Public Service Delivery in Nigeria. This article sought to determine the existing level of the public sector's service delivery in relation to innovation and technological advancements. It further investigated how the 4IR can influence and harness improvement in the delivery of public services in Nigeria. A review of secondary sources from reports, government documents and extant scholarly literature was undertaken and data were analysed thematically. The paper concluded that while the Nigerian government has made some effort to provide the public sector with innovative technology, it that it is essential to improve on this provision to maximise the opportunities and strengths of the 4IR. Therefore, this article recommends the intensification of technological and digitalisation capabilities by providing suitable human and financial capital, necessary to improve service delivery, particularly in Nigeria.

Awotomilusi, Dagunduro, Muyiwa, & Osaloni, (2022) studied adoption of cloud computing on the efficacy of accounting Practices in Nigeria. The study assessed the adoption of cloud computing on the efficacy of accounting practices in Nigeria. In order to achieve this, the study distributed a well-structured questionnaire among deposit money banks in Nigeria. The data were analyzed using frequency and ordinary least square regression. From the findings, the study discovered that cloud computing exhibited a significant positive relationship with the efficacy of accounting practices in Nigeria. In addition, other variables employed in the model also revealed that technological advancement and security efficiency depicted a significant relationship with the efficacy of accounting practices in Nigeria. Cost-effectiveness revealed a significant negative relationship. In line with these findings, the study recommended that for more benefits of cloud computing to be harnessed, internet services should be adequately provided and this should be supported by training and retraining of staff in the usage of information systems.

In the same vain, Fatin, Mohd, Shafinaz, and Naqiah (2022) researched on the Impact of Industry 4.0 towards Accounting Profession and Graduate's Career Readiness: A Review of Literature. The paper observed that Industry 4.0 creates a turning point to the businesses and professions across industries and maintained that accounting profession is not excluded as it is not immune to the technological disruption caused by the recent industrial revolution. It was the view of the paper that the adoption of smart technologies under the realm of Industry 4.0 is affecting the normal way of work performed by accountants. Hence a revision to the current roles of accountants is needed to accommodate the change in traditional practices, processes and methods of performing work in accounting field. This study aimed to review the literature on the impact of Industry 4.0 towards the accounting profession and graduate readiness for Industry 4.0 employment and subsequently update the skills requirement of future accounting graduates. Skills mismatch and the skills relevant for longterm career fulfillment are among issues discussed. The study is beneficial for higher academic institutions as they assimilate Industry 4.0 in their agenda to be able to produce graduates that are ready and competent.

Anna (2021) studied internet of things in the accounting field: Benefits and challenges. The main objective of this paper is to identify the benefits and challenges of the Internet of Things (IoT) application in the accounting field of organisations. The study adopts a questionnaire and an interview technique in a company from the road transport sector. The questionnaire research sample includes 151 accounting practitioners and students. Data are collected through the use of an online survey. A principal axis factor analysis with the Promax rotation is conducted to assess the underlying structure for the items of the questionnaire. The research outcomes indicate that, in the opinion of accountants and students, the IoT adoption enables the organisation to perform enhanced reporting analysis based on a large amount of data gained through sensors (mean = 3.98), access to data through cloud computing (3.97), and accounting process automation (3.95). From the point of view of managers, the most important benefit is the increase in employee productivity and asset management. The respondents indicate the following aspects as challenges: the creation of infrastructure for the adoption of new technology, which accounted for 40.22% of the variance, and cyber security, loss of privacy (7.23% of the explained variance). The findings reveal benefits and challenges for IoT adoption and could support managers in deploying new technology in their organisations.

Akintoye (2020) investigated the Effect of Information Communication and Technology Services on the Private Sector Practices: Evidence from the Nigerian Manufacturing, Trade and Financial Sectors. This paper examined the effect of Information and Communication Technology Services in the private sector of Nigeria using a time series data covering 1983 to 2020. During the COVID-19 pandemic while movement is restricted and lockdown across the nation, some businesses were still able to work due to the availability of ICT services, so to what extent has ICT affected the Nigerian Private sector. The data used for this study are secondary data sourced from the National Bureau of Statistics. ICT Services contribution to the Nigeria GDP is used as a proxy to ICT Services while Manufacturing, Trade and the Financial Sector contribution to GDP is used as a proxy for the private sector. The data were analyzed using Least Square Regression Model while the unit root test was conducted using the Augmented Dickey Fuller test (ADF). The result shows that ICT Services in Nigeria do not have a significant effect on the Nigerian Private Sector. However, it shows a significant effect on the Financial Service sector. It, therefore, recommends that other sectors of the Nigerian private sector like manufacturing should be supported through favourable policies on investment in ICT with less impact on their profit.

Aziza and Reajmin (2018) studied Sustainability of Accounting Profession at the Age of Fourth Industrial Revolution. The objective of the paper was to study the future prospects of the accounting profession in a global and local context of Bangladesh. The paper observed that at present, technologies are automating regular accounting activities resulting in job cut around the world. But the advanced study reveals that technology cannot substitute emotional brainpower and accepted wisdom abilities of a human in near future. As technology is spreading the scope of the profession, knowledge of trending technologies along with some survival skills are required for accountants. This paper tried to present the future trends of the accounting profession, at the same time discusses the required skills to become accustomed to the technological changes. After observing 18 companies of Bangladesh, the paper found that soft wares are not affecting accounting employment yet

Furthermore, Abdullah (2017) studied the Effect of Cloud Computing on Elements of Accounting Information System. The Purpose of this paper was to identify the impact of cloud computing on the elements of the accounting information system represented by: Establishment "Accounting Entity.", Financial Operations, Documents, Accounting Books, Financial Reporting, Users, Procedures, Software, Physical Devices. Descriptive approach was adopted in the study through the collection of previous literature on cloud computing and information technology and their impact on accounting information systems. Results revealed that cloud computing leads to reducing the size of the enterprise in terms of the building and the offices because they allow property anywhere without management commitment to a specific location, Improving operational performance in terms of facilitating the completion of operations and accurate accounting operations, The cloud has now occupied a place for the completion of operations and dialogue between employees or customers with enterprise system, Dispensing the documents to ensure they are self-service to customers, reduce the number of salespeople because it enables customers to check out the established products and offer sales orders electronically from a variety of geographical locations without the need to delegate sales to travel between clients and Finally It allows individuals and firms to use software and physical equipment without the need to buy the software and install it on their computers.

Theoretical Framework

This paper is anchored on the Technology Acceptance Model. The Technology Acceptance Model (Davis, 1989), or simply referred to as TAM, posits that there are two factors that determine whether a computer system will be accepted by its potential users viz perceived usefulness, and perceived ease of use. The key feature of TAM is its stress on the sensitivity of the potential user. That is, while the creator of a given technology product may believe the product is useful and user-friendly, it will not be accepted by its potential users unless the users share those beliefs.

Marikyan, and Papagiannidis, S. (2023) opine that the primary objective of TAM was to shed light on the processes underpinning the acceptance of technology, in order to predict the behaviour of and provide a theoretical explanation for the successful implementation of technology. The practical objective of TAM was to inform practitioners about measures that they might take prior to the implementation of systems. To fulfil the objectives of the theory, several steps were carried out (Davis, 1989; Davis, 1993). Davis embarked on the development of the model of technology acceptance by framing the processes mediating the relationship between IS characteristics (external factors) and actual system use. The model was based on the Theory of Reasoned Action, which provided a psychological perspective on human behaviour and was missing in the IS literature at that time (Davis, 1989; Davis, 1993).

The second step was to identify and define variables and validate measures that would highly correlate with system use. Based on prior empirical literature on human behaviour and the management of information systems, multi-item scales for perceived ease of use and perceived usefulness were developed, pre-tested, and validated in several studies. It was hypothesised that the two constructs were fundamental determinants of user acceptance, due to evidence in previous research. The research suggested that an individual's decision to perform a behaviour is the result of the analysis of the benefit that they expect to receive from the behaviour compared to the effort/costs they put in to perform the behaviour (Johnson & Payne, 1985; Payne, 1982). This means that the use of the information system is determined by an evaluation of the trade-off between the perceived usefulness of the system and the perceived difficulty of using it (Davis, 1989). Perceived usefulness was defined as the individual's perception of the extent to which the use of a given technology improves performance. The conceptualisation of this construct stemmed from Bandura's concept of outcome judgement, which refers to an individual's expectation of a positive outcome triggering behaviour (Bandura, 1982). Perceived usefulness was operationalised based on evidence confirming the effect of system performance expectancy on system usage (Robey, 1979). Perceived ease of use was defined as the degree to which a person believes that using a particular system is free of effort (Davis, 1989). This construct derived from the self-efficacy concept, which refers to a situation-specific belief about how well someone can execute actions for the prospective task (Davis, 1989; Bandura, 1982). It was suggested that self-efficacy had a predictive role in decision-making about technology use (Hill, Smith & Mann, 1987).

Conclusion and Recommendations

Fourth industrial revolution refers to Industry 4.0 which involves the use of smart technologies such as IoT, artificial intelligence and machine learning to optimize human resource functions, production and supply chain processes. In this era of digitalization, the merits and demerits of emerging technologies are to be anticipated; therefore, companies will need to adjust to these developments while assisting with the workers transition by upskilling and reskilling the available talent. This study has succeeded in lending credence to the debate that with fourth industrial revolution change is inevitable, but with proper communication, the effective application of Industry 4.0 and the ability to exploit its potential, Industry 4.0 can be used for the benefit of organizations especially in public sector accounting. Thus it is high time organizations aligned Industry 4.0 and accounting with their overall corporate strategy to ensure that it is in line with the institutional goals and objectives. Fourth industrial revolution has impacted on accounting in the areas of; new job roles (e.g; AI and machine learning specialists, big data experts, data analyst sand scientists, digital conversion specialists, new skill specialists, process mechanization specialists, innovation professionals, ecommerce and social media specialists, robotics specialists and engineers), remote working, easy recruitments, staff augmentation and job automation.

It goes without say that the costs associated with the 4IR will be high. In order to reduce the capital required for some AI tools, the government could use AI tools that already exist or are in use in the short term, such as software that has been created by Amazon and can be customized. In the medium to long term, government could partner with technical experts to research on mor appropriate AI tools for public sector accounting. The infrastructure needed to enable IoT devices must be in place for accounting departments to ensure that their systems can handle the higher data volumes. Cloud technology is also secure and allows seamless updates to be performed. Cloud technology is a game-changer for accountants. One tangible benefit of cloud technology specifically is mobile working. People can access their data anytime, anywhere, which has fundamentally changed the way the public sector operates. The ability to perform real-time financial reporting has also transformed the public sectors. More information can be pushed directly to the public in the format they want it

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