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Bridging Skill Gap of Future Accountant that Fits with Industry 4.0

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Abstract

This study investigated accounting students in the year 2022–2023 category, who are mid-career professionals and professional accountants who are working with Non Big audit firms in Nigeria. Semi structure interview were used to ascertain whether or not they are adequately trained to surf in the new world of technology. It was found that, most accounting students reported having improved their skills in all computer skills and IT skill. However, their technical skill gains in accounting were greater than soft skills (emotional thinking, problem solving, analytical skills, and prediction ability and computer skill) needed to surf in the new world of technology. Emotional intelligence and cognitive skill were found to be the most skills needed in the industry 4.0. The study recommends that accounting instructors should focus more on soft skill than technical skills when training their students, so that they can response to the demand of industry 4.0 and remain relevance in the Fourth Industrial Revolution (Industry 4.0).

Keyword: Industry 4.0, Soft Skill, Digital Skill, Accounting, Technology, Nigeria

Introduction

Accounting is important for managing economic and social activities, because it disseminates critical information about company's finances and operations. The pursuit of knowledge about the future of accounting as a profession and its role in society has now become extremely relevant, as the world has shifted from industry 3.0 to industry 4.0 (Ahmad et al., 2022). The emerging work context of

Fourth Industrial revolution, henceforth (IR4) has increased industry demands for future ready graduates who can demonstrate digital literacy, innovative knowledge as well as other behavioural competencies for employability. A critical question to ask is what set of skills and knowledge should be embedded in accounting curricular to prepare a future-ready accountant so that they can respond to the demand of IR4. However, IR4 is frequently referred to as the outcome of the convergence and transition effects of several "exponential technologies," such as Artificial Intelligence, Biotech, and Nanotech. Exponential Technologies, which further include algorithms that allow software to absorb information, reason, and think in ways similar to humans (Molloy & Ronnie, 2021). Machine Learning (ML), Business Intelligence (BI), Big Data (BD) and Cyber-Physical System (CPS), are examples of advanced technologies changing every profession, including finance and accounting (Talha et al., 2022). That, has transformed all features of human endeavour, bringing about unprecedented changes in society's political and socioeconomic structures, and its technologies have had an equal impact on employment that are quite distinct from previous revolutions (Adegbite & Adeosun, 2021). Therefore. IR4 is defined as "the complex integration of physical machinery and devices with sensors and network software used to predict, plan, and control for better business and social outcomes." (Industrial consortium Internet, 2017).

On the other hand, Industry 4.0 is defined as an integrated, adaptable, optimised, service-oriented, and interoperable manufacturing process that is linked to algorithms, big data, and cutting-edge technologies (Lu, 2017). Klaus Schwab recently coined the term to refer to big data that arose from the prior digital revolutions (Mbizi et al., 2022), affecting many professions including accounting profession, hence, predicted to go through significant change in the future. As a result, IR4 has been the driver for global transformation, leading to rapid economic growth and development through vital interaction between human and machine. This transformation result in changes in economy, power, knowledge, and fundamentally how we interact and communicate with one another, live our lives, and work connectively, thus, aided seamless fusion of humans and technology embedded into our physical domain. It appears that technology and accounting have been espoused in industry to the point where manual accounting systems have become obsolete in the formal sector. Ghani & Muhammad, (2019) exposed that electronic devices and machines will replace some human activities, as well as a shift from physical human activities to machines. This transformation is inevitable is all areas of accounting labour division.

Thus a shift from labour division indicates that data entry, bookkeeping, taxation, and asset management will undoubtedly be replaced. Data processing, clerical, and reporting tasks will be automated or replaced by technology (Riadi, 2022). Therefore, developing the necessary skills is unquestionably necessary for a career in accounting,

but practitioners and educators are debating on what skills are really being acquired and what is desirable for individuals wishing to pursue an accounting career in the new world of technology (Rebele & St. Pierre, 2019). Berry & Routon, (2020) argue that it might be challenging to develop most needed skills in accounting classes. The need for students to develop their much needed skill to remain relevance in the present industrial revolution such as (cognitive skill, emotional intelligence, and IT knowledge and computer skill) needs professional and academic attention. This is the fact that corresponding gaps in management education programs have been the subject of numerous studies in the field of management (Gunarathne et al., 2021). But little is known about how colleges use a variety of processes in a coordinated manner to help undergraduate accounting students develop their soft skills. To better understand this process, Actor-Network Theory (ANT) (Latour, 1992; 1987) was adopted as theoretical background of the study. According to Latour, (1992) scientists should examine science and technology in use rather than prefabricated science and technology. According to this argument, researchers ought to pay more attention to the processes than just the results. According to the ANT viewpoint, the process of ideas-based technology diffusion can be applied to the development of graduate accountants' soft skills. With the aid of ANT, we can examine how soft skills have become increasingly important in the industry 4.0 in Nigeria. Therefore, this paper aims to contribute to the literature to provide an insight on the emergence of technology disruption in accounting profession and potential benefit that comes with this nascent technology on the development of soft and digital skills among accounting practitioners.

Problem Statement

The major challenge facing accounting profession in the present revolution is the emergence of Financial Technology (FinTech) components; such as, Cyber Physical System (CPS), Blockchain Technology (BT) and Big Data (BD) that are transforming accounting system into digital domain. This paradigm shift transforms accounting professions in the light of competence change and need, that bridges the physical and digital worlds by encoding complex business, financial, and legal arrangements onto the blockchain (PWC el at, 2019). As a result, jobs in the financial sector, such as banking and accounting profession, are prone to advanced technologies (Balliester & Elsheikhi 2018 as cited in Anshari et al., 2021). The major problem that will be faced by the acceptance of IR4 in Nigeria is in ability to cope with emerging digital technology. Because, smart technology, internet of thing, automation, robotics, and algorithms have the potential to replace one-third of today's jobs. Robots will handle 52% of current work tasks by 2025, and the amount may be doubled in near future (World Economic Forum, 2018).

This is the fact that Blockchain is reshaping accounting profession in the sense that traditional book keeping backroom crunch accounting is becoming obsolete due to rapid technological revolution sprouting in various domain (Benson & Bednorova, 2019). As a result accounting profession is predicted to face out in the near future. This represents a challenge for the accounting profession, that evolution of blockchain appears to have the potential to completely eliminate the accounting profession (Karajovic et al., 2019), auditors would no longer be required to inspect a company's accounting records and accounting clerks will no longer require to prepare ledgers, cash book and reconcile bank statement, hence, blockchain system will automatically confirm each party's debit/credit entries in a given transaction (Karajovic et al., 2019). This represents a transition from a double-entry to a triple-entry accounting system. In addition, (Brennan et al., 2019) posit that existing regulatory bodies and market mechanisms will gradually be rendered obsolete due to the emergence of blockchain technology. Because, accounting education appears to have lagged behind these changes, leaving gaps in the skills required of accounting graduates in the IR4 era (Talha et al., 2022). Thus, a lot more research needs to be done concerning the role of technology in accounting practices, as the extant literature appears skewed towards the larger and more vibrant Nigerian accounting practitioners**.** The objective of this paper is to investigate issues surrounding digital and soft skill competency required of accountants in Nigeria in the present era of fourth industrial revolution.

Literature Review

Penetration of technology cut across many disciplines, regardless of area of specialization. Thus, paradigm shift in technological advancements have had an impact on the workplace, both positively and negatively, the negative effect is that society will lose their job to the hand of machine (Mabe & Bwalya, 2022). Middle-class workers that possess medium-level skills are more vulnerable to risk their jobs (Molloy & Ronnie, 2021). On the other hand those who hold the necessary skills, will gain and or maintain their jobs (Anshari et al., 2021). However, digital skill gap among accountants is on the rise, that they might not be able to surf in the new world of technology. Prior study argue that digital competence may impact individual's performance, with digital technology in place of informal learning environments (He & Zhu, 2017), possible to infer competence and skill in the use of technology from the training environment to which professional accountants and aspirants are exposed. Albeit, Higher Education (HE) graduates may not be able to contribute productively to the digital economy and society as a whole, unless they are furnished with digital literacy and IR4 skill sets (Adegbite & Adeosun, 2021). Furthermore, (Jummai, 2021) conducted a study in Nigeria, and confirmed that there is a teaching/learning gap in Nigeria that needs to be filled, the negative consequences of this gap were revealed

when, in the year 2020, there was a breakdown in teaching and learning as a result of the Corona virus pandemic. Jummai's findings highlights the importance of adopting technology in Nigeria's educational sector as a whole.

This is a new challenge for accounting professional bodies and regulatory authorities, for the need of upskilling and reskilling as a mandatory standard for Nigerian professional accountants (Ifeanyichukwu, 2019). Hence, it will open up a lot of new opportunities for those who want to learn new skills as well as those who have just graduated (Kruskopf et al., 2020). As such, companies estimates that 40% of workforce will require a six month reskilling programme, and 94% of business leaders anticipate that employees will learn new skills on the job, up from 65% in 2018 (World Economic Forum, 2020). Jarosz et al., (2020) discovered that activities associated with accounting work, such as data collection and data processing, are at high risk of future automation. Currently, 54% of financial departments in companies are already using cloud solutions, 11% are using robotics, and 25% are using advanced data analytics (Farrar, 2020). This shift in technological adoption indicates a gradual increase of technology acceptance as a solution in the financial sector; as well as a threat to accountant long life career in the near future. This is the fact that, development of big data analytics will gain control over basic works of accountant (Riadi, 2022). Therefore, demand for middle work will deteriorate sooner or later, because the machine can perform all these function swiftly and conveniently with a degree of accuracy. As a result human and machine time spent on current tasks at work will be equal by 2025. In the next few years to come, a significant proportion of businesses expect to change their present locations, value-chains, and workforce dimensions due to factors other than technology (World Economic Forum, 2020). In terms of education level, (Anshari et al., 2021) predicted that workers with a primary education or less are more likely to be replaced by robots, whereas those with a doctorate degree or higher are less likely to be replaced. There relevance could be due to their ability to apply emotional intelligence in making professional judgement. However, both emerging and advanced economies have reported deficits in Graduates' Work Readiness (GWR) (Prikshat et al., 2020)These deficiencies were linked to a lack of cognitive abilities, key business skills and governance, systems thinking competencies, and IT knowledge. Mbizi et al., (2022), suggest that African accountants, primarily require computer skills and critical thinking abilities to effectively navigate in the technology-driven era. Furthermore, (Adepoju, 2022) discovered that most developing economies suffer from a scarcity of skilled man power, which is a defined factor that drives economic growth and development. As such accountants in Africa are in a dilemma as they try to strategize corporate functions in a rapidly changing economic landscape (Asuquo et al., 2020). Oben et al., (2022) discovered that due to a lack of professional experience, technical expertise

gained through academic programmes, and limited technology and technological skills, graduate accountants face a variety of obstacles in the workplace in South Africa. Albeit, falls short of meeting their minimal skill requirements. The findings of these study cannot be generalised to all nations in Africa, thus there is need for a study to investigate the scenario in Nigeria as this study is timely to investigate skills needed of accountants in Nigeria in the present era of fourth industrial revolution. Therefore, our first research question has been on current trend of digital and soft skills needed for the development of accounting professions in Nigeria.

Digital skill, Soft Skill and Labour Market

According to the World Economic Forum (WEF), a shift in the labour division in both humans and machines may result in the displacement of 85 million jobs by 2025, while 97 million career opportunities may appear that are preferable to the new labour division among people, machines, and algorithms (WEF, 2020). However, these scenarios raise questions about how humans can remain relevant and add value in the financial service landscape with exponential growth in new era of technologies and innovations. Molloy and Ronnie, (2021) argue that to remain relevant in the IR4, organisations must embrace and adapt to a rising wave of technological innovation, thus, who clinch to IR4 demands are likely to prosper, while those who do not are likely to perish. Although, the accounting profession will remain indispensable, but it will be carried out in a nearly completely different manner. However (Kruskopf et al., 2020) argued that bookkeepers and auditors will play a crucial role in the paradigm shift, because the machine lack human abilities, such as the ability to improvise and use imagination. Cognitive abilities, and emotional intelligence can never be automated, therefore cannot be replaced by technology, although, their educational background and career development can be affected by the paradigm shift.

Adegbeti & Adoye, (2021) posit that lack of competencies and skill sets expected of future employees affects their career development. This is in line with the findings of (Pitan, 2017) that, Nigerian universities have not adequately adapted the contents of their curricula to the modern-day requirements of the labour market in terms of the skills needed by graduates to perform and be productive in their jobs. Ofoegbu et al., (2018) shows concern about the current university education in Nigeria's in ability to produce future accountants who are ready for the labour market and the profession. Higher education is criticise of coaching students to pass exams rather than teaching them to think critically and solve problems. Inadequate and obsolete infrastructure and equipment, as well as a large student population and scarce consumables, may result in ineffective and inadequate accounting student training in many Nigerian higher education (Okunuga & Ajeyalemi, 2018). Ezeagba and Abiahu, (2018) suggest that, in order to prevent generating "unqualified professional

accountants," which may harm the standard and development of the accountancy profession in Nigeria, their curriculum and training schools or methods should be closely evaluated.

Ifeanyichukwu, (2019) investigated a sample of ICAN members in Rivers state, and generalised that the accounting job in Nigeria is affected by digitization positively, and recommend that accountant should acquaint themselves with digital skills to remain balance in the profession. However, the findings of this study cannot be generalised, there is need for study in other part of the country to investigate graduate students as well as other accounting professional in the country. Moreover, (Ofoegbu et al., 2018) discovered, among other things, deficient university accounting curricula, poorly motivated Nigerian accounting lecturers, and poor collaboration between professional accounting bodies and academia are among factors influencing digital skill deficiency among scholars and students as well. This is in line with the findings of (Adegbite & Govender, 2022) that Higher Education (HE) graduates face challenges getting employment in the present era of IR4, as jobs availability in the 21st century require applicants with IR4 competencies. Indication that many graduates are not set up to succeed in the new world of work.

A growing concern in accounting education is the future role of professional accountants and the impact that machines and artificial intelligence (AI) will have on job security (Adegbite & Govender, 2022). As repetitive activities and duties of accountants have now become increasingly automated, the real value of the accountant has switched to higher-order thinking skills, which include critical thinking, problem-solving and analytical skills (Terblanche & De Clercq, 2021). Thus, accounting graduates do not possess the needed skills and attributes to the level required by employers (Asonitou & Hassall, 2019). This presents enormous challenges for the educational system, which must equip aspiring graduates with the necessary Information Technology skill so that those entering the labour market are not only aware of, but also capable of meeting the challenges that await them. Despite the fact that acquisition of digital skills and other important soft skills requirements due to technological paradigm shift will improve employability and work preparedness (Adegbite & Adeosun, 2021).this is the fact that accountants' roles were discovered to be changing, which resulted to a shift in the hard and soft skill, an accountant expect to possess (Surianti, 2020). However, this study identified soft skill gap among accountants thus, focused on a soft skill required of accountants as a, contribution to the body of knowledge. This raise to second research questions of the study. Do graduate accountants in Nigeria possess the necessary skills required to respond to the demand of Industry 4.0?

Skills required of accountants in IR4

The emergence of industry 4.0 came with unprecedented shifts in human life, the speed of current breakthrough has no historical precedent (Garanina., 2022). In which almost all aspect of human life is connected and there is no going back. However, humans will continue to be an integral part of the process, their critical thinking abilities will make them requisite in the implementation of 4IR as "cobots," working closely with developed technologies to supplement the system processes (Karsten et al 2020). What makes us human, such as creativeness, emotional intelligence, and the adaptable and flexible mind sets of ours, will provide us with the intellectual agility to navigate in this flexible world. Therefore, the use of exponential technology to organise, process, and evaluate financial data will greatly benefit accounting and audit work, thus increases productivity (Kruskopf et al., 2020). The issue at hand is how human can develop those skills to keep pace with ever-changing technology. Kruskopf et al., (2020) documents that, employers believe that critical thinking, problem solving, self-management skills such as active learning, resilience, stress tolerance, and flexibility will become more important in the years leading up to 2025. This unprecedented shift pose a challenge to accounting professionals. However, Artificial Intelligence (AI) will never entirely replace accounting, accountants must actively respond to its impact. Professional ability, management skills, computer skills, analytical capability, decision-making ability, prediction ability, and thinking ability are all important components of the requirements of Industry 4.0. (Riadi, 2022). In response to the demand of industry 4.0, accounting practitioners believe that developing their soft skills is essential to fulfilling their skill gap. As such, developing soft skills is best accomplished during a college education.

Devices, software, and algorithms are becoming more sophisticated, accounting practise is expected to change and become more automated and integrated with technological processes (Alhtaybat, & Alhatabat, 2018). As a result, the IR4 trend may result in wage disparities between employees, and also providing a high level of autonomy for qualified employees (Park, 2018). However, there is currently a gap between the competencies sought by employees and those taught from undergraduate curriculum (Brewer et al., 2014). It has been widely stated that universities concentrated more on technical knowledge while ignoring the development of soft skills in accounting professionals, which are critical for securing employment and advancing their careers (Asonitou & Hassall, 2019). The difficulty in retaining high-quality students has a direct impact on accounting programmes' ability to graduate students who are well-prepared to enter the workforce. This scenario is a reflection of disruption that come with IR4, Higher Education Institution (HEI) and relevant authorities have not adequately respond to the demand of the new world of work that will allow graduates of higher institution to participate fully in the new world of

technology (Anshari et al., 2021). This issue deserves academic attentions to come up with policy recommendation on how to bridge soft skill gap among graduate's accountants. Despite the issues surrounding needed skill of accounting professionals, there remain unanswered questions as to what constitutes soft and digital skills competencies of accountants to surf in the new world of technology.

Technology Shift in Accounting Profession

The AICPAs and the Big Four convened in 2016 to form a consortium to investigate blockchain applications in accounting and auditing (Kokina., 2017). Following the 2017 Accounting Blockchain Coalition Conference, working groups were established to assist in developing accounting standards to govern the use of blockchain technology in conjunction with standard setters (Del Castillo, 2017). Following the coalition, the Big Four accounting firms (Big 4) have stated that they are considering using blockchain. Consequently, a number of projects have been started. Numerous initiatives to investigate the potential of this technology for accounting and auditing have been spawned by collaboration between major financial and professional institutions (Bonsón & Bednárová, 2019) For instance, Rubix, the first blockchain-based software platform developed by Deloitte, enables users to create personalized blockchains and smart contracts. Customers can use this platform for a variety of purposes, including real-time financial statement assurance, land registry or loyalty point programs, and automating financial reconciliations between internal departments and business partners. Business is always trying to automate some of the processes involved in auditing for its clients. In 2017, Deloitte asserted that it had completed a blockchain audit successfully, analysing a permissioned blockchain application using current auditing standards (Das, 2017 as cited in Bonsón & Bednárová, 2019). KPMG has also seized the opportunity presented by blockchain technology, asserting that it lowers costs, automates back-office functions, and permits faster and more secure transactions (KPMG, 2017). Ernst & Young is also associated with Libra, a distributed ledger start-up, which is another blockchain-based venture. Furthermore, it has created EY Ops Chain, an integrated digital contract integration platform that addresses payments, invoicing, inventory information, and pricing (Prisco, 2017). A report on blockchain and energy-related issues was released by PWC (PWC, 2017). Additionally, it developed the De Novo platform, which focuses on integrating blockchain technology into supply chains. Thus, technology is causing an intriguing change in auditing, and the Big Four's involvement in blockchain projects only serves to highlight how significant this concept is for accounting and auditing(Bonsón & Bednárová, 2019). Base on this development, the paper is keen to investigate whether or not non big audit firms in Nigeria are set to compete with Big 4 in providing professional services to their clients in the era of technological shift (industry 4.0)

Research Methodology

Qualitative approach was employed through interview session with accountants. An in depth interview was carried out with a sample of 22 professionals accounting serving their career in some of the Non Big audit firms in Nigeria. However, Focus Group Discussion (FGD) with 20 graduates accountants who are yet to become professionals was conducted to obtained their view and challenges they are facing in their new place of work. This selection was carried out to allow the researcher understand perceptions and views of accountants of different categories (Professional and Non-professionals) about the future of accounting profession in Nigeria.

Population and Sample selection

The population of the studies includes all accounting professionals and undergraduate accountants who in Northern Nigeria. Due to the nature of in depth interview approach, non-probability sampling was carried out in this research. This type of sampling denotes that not all individuals in the population will have an equal opportunity to be chosen (Sekaran & Bougie, 2010). Therefore, sample of the respondents was based on the availability of interviewees. Formal letter was sent in advance notifying them of the request to conduct and interview. Question related to soft skills and digital literacy were critical during the interviews, that critical thinking, problem solving, self-management skills such as active learning, resilience, stress tolerance, and flexibility were discussed. Professional ability, management skills, computer skills, analytical capability, decision-making ability, and prediction ability are also discussed during a Focus Group Discussion with graduating accounting students.

Table 3.1 Sample of the study

Interview Location	Audit Firms (Interviewees)	Higher Education Students (Interviewees)	Total Interviewees
A	6	5	11
B	5	5	10
C	7	5	12
D	4	5	9
	22	**20**	**42**

Nvivo has been widely used in qualitative researcher as a tool for data analysis. The software was thematically used in analysis of the findings, after transcribing the major themes, coding was initiated to further categorise the views and opinion of the interviews.

Fndings

Based on the interview conducted with accountants in various location, majority of the interviewees confirm that their ability to responds to the demand of industry 4.0 is more or less connected to skills necessary to be able to surf in the technological era. Skills needed to work and become relevance in the accounting profession include both soft and digital skills. Majority of the interviewees (20%) as reported in table figure 4.1 are of the opinion that computer skill is much needed, however, soft skills such as analytical capability is the second most important skills needed, furthermore the result further indicated that soft skills (management skill, critical thinking and problem solving skills) are the skills needed to surf in the new world of technology. The fact that computer skills has the highest percentage, this is connected to the premise that manual accounting systems have become obsolete in the formal sector, that electronic devices and machines will replace some human activities, as well as a shift from physical human activities to machines. This is similar to the findings of (Ghani & Muhammad, 2019). That data entry, bookkeeping, taxation, and asset management will undoubtedly be replaced. Data processing, clerical, and reporting tasks will be automated or replaced by technology (Riadi, 2022). Albeit soft skills appears to be more important and necessary in the accounting profession. This is in line with notion that machine cannot replace human emotional intelligence. . Developing the necessary skills is unquestionably necessary for a career in accounting, but practitioners and educators are debating on what skills are really being acquired and what is desirable for individuals wishing to pursue an accounting career in the new world of technology (Rebele & St. Pierre, 2019). To aid easy understand of the outcome of the interviews, charts were used to explain more of the category and degree of skill needed for accountants to surf in the new world of technology. Interview findings were further explain in figure 4.1 and 4.2. That the shift in technological advancement can be accomplished

Figure 4.1 Skill Needed of Professionals

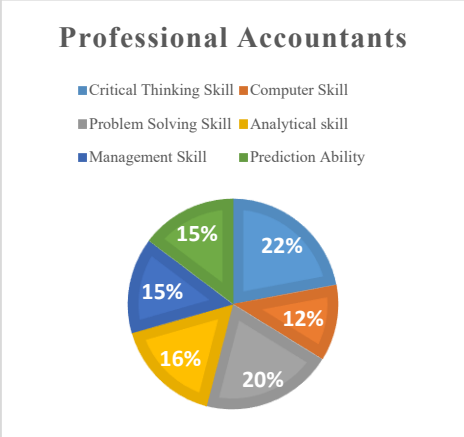
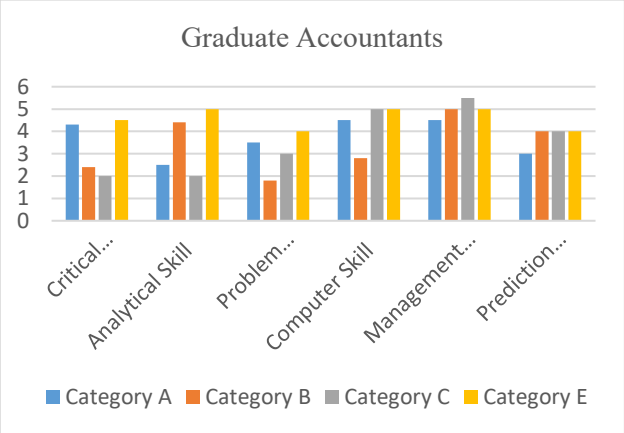


Figure 4.2 Skill Needed of Students



in two ways: 'by inserting topics into existing subjects or by creating new courses. While accounting graduates have more knowledge than is required for work in accounting firm industries, their soft skill level (emotional intelligence and cognitive ability skill) is lower compared to digital skills.

Conclusion and Recommendations

This study concludes that soft skills are the most needed skill for accountants to response to the demand of industry 4.0 and remain relevance in the fourth industrial revolution in Nigeria. Higher Education curriculum should be restructured to responds to latest technological development. In conclusion, for Nigerian universities to produce graduates with relevant skills, there is a need for them to address the development of generic skills in their curricula. The study further recommends that accounting instructors should focus more on soft skill than technical skills when training their students, so that their graduate work readiness response to the demand of industry 4.0.

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