

Users' Perception of the Relevance of Big Data Analytics to the Accounting Profession in Nigeria

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Abstract: The paper examined users' perception of the relevance of big data analytics to the accounting profession in Nigeria based on the survey of practising accounting professionals in some selected accounting firms in Lagos State, Nigeria. The study adopted the descriptive survey research design. The sample population was made up of 336 professional accountants from 163 accounting firms in Lagos State. A Google Forms electronic questionnaire was designed and sent to the email address of each selected accounting firm. The hypotheses were tested using chi-square statistics and one-way ANOVA statistics. The findings reveal a high and significant level of awareness of BDA among accounting professionals; the level of usage of BDA tools is low and non-significant at only 16%. The chi-square results show there are significant benefits that accounting firms can derive from the use of BDA, as well as significant challenges embedded with its usage. The ANOVA reveals there are significant differences in the level of awareness with regard to professional accountants' qualifications [$F(4,331) = 9.417$ at $p = 0.000$], while there are no significant differences in the usage of BDA between gender [$F(1,334) = 0.040$, $p = 0.841$], academic qualifications [$F(3,332) = 0.530$ at $p = 0.662$] and different work experiences [$F(2,333) = 1.903$, $p = 0.151$]. The paper recommends the embracing of BDA tools and tech maturity by accounting firms, the closing of accountants' skill gaps through upskilling and reskilling, and the integration of data analytics in the accounting curricula of higher institutions and professional accounting bodies during the training of accountants.

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1. INTRODUCTION

Data analytics is revolutionising the accounting industry. Varmi *et al.* (2021) remarked that the relevance of big data in accounting has grown exponentially because a huge amount of data is being generated, stored and analysed every second in today's economy. All over the world, records show that there is multiplication of produced data every 18 months, while there is an increase of about 35-50% per annum in the volume of data processed by organisations (Bhimani & Wilcocks, 2014). The generation of massive data comes along with the usage of the internet and proliferation of mobile devices, which allows the exchange of data between humans and various electronic devices. Big data has the potential to revolutionise accounting practices by improving the efficiency and accuracy of accounting processes and providing a wealth of information that was not previously available (Thanasas *et al.*, 2023). Professional accountants require big data analytics (BDA) to create value. Today all industries are driven by mobile technologies, social media, cloud computing and big data. Bose *et al.* (2023) posit that "data analytics in accounting is a relatively new skill set that is growing significantly in all areas of the accounting profession". The authors argued that accounting professionals with deep understanding and competency in BDA would rule the 21st-century corporate world.

Herath and Joshi (2023) see big data and data analytics as game-changers in auditing. BDA enhances external auditors' performance in terms of profitability and efficiency during the pandemic (Ghazal *et al.*, 2025). The rapid rise of the information age has led to cloud computing, which has enabled the smooth running of a group of technologies. Kasztelnik and Campbell (2023) corroborated that "the current technological transformation in accounting and taxation shows that companies have a large appetite for increasing complex analytics, even when they cannot adequately perform the basics". Traditional accounting and business analytics are currently insufficient to meet business needs. Moreover, many professional accountants have inadequate technical skills to design algorithms in order to reduce their workload. The accounting profession is found to be slow to implement emerging data technology (Schmidt *et al.*, 2020), even though the accounting profession is best suited to manage and analyse big data

(Cockcroft & Russell, 2018) after some changes in standards, curriculum and training (Gamage, 2016; Hoodlebrink *et al.*, 2021). This rise in technology and information has greatly affected the accounting information provision among accounting firms since firms can now run or outsource applications, services and infrastructure over the internet (Bhimani & Willcocks, 2014).

This is good news, as the accounting profession is undergoing a transformation where traditional roles are shifting to new roles. Therefore, it is imperative that accountants must think beyond their traditional roles due to the rise of big data. There is evidence of change and upskilling by accountants in business due to changes in technology (Bromwich & Bhimani, 1989, 2009). In fact, they are utilising BDA to reposition themselves as strategic business partners (Abd Razak *et al.*, 2021). Herath and Woods (2021) believe that reliance on big data would open new possibilities for accountants. The new role of the accountant is shifting into business advisor, which requires new skill sets like professional scepticism, judgement and critical thinking skills; and with big data and BDA becoming a reality, professional accountants must quickly align with market demand to incorporate data analytics into their business models that will allow them to create more value. They must also have stronger analytical skills and maintain up-to-date knowledge on IT and data management in order to remain competitive and relevant in the “accounting job market” and to their societies (Omitogun & Al-Adeem, 2019). There is strong advocacy to integrate big data and BDA into accounting curricula (Birt *et al.*, 2023), as Tanzloza (2023) identifies three concerns of “standardisation in curricula, qualifications of faculty members, and identification of required skills for students” in the process.

Various researchers have looked into the benefits and challenges of BDA to auditing, but to the best of our knowledge, there is a dearth of empirical studies on the relevance of BDA to the accounting profession in Nigeria. This position is echoed by Omitogun and Al-Adeem (2019), who examined auditors' perceptions of competencies in big data and data analytics in Saudi Arabia. The authors found that auditors lack relevant technical skills and were not familiar with related data analysis tools except Excel. Igbekeyi *et al.* (2023) evaluated the effectiveness of accounting practices in Nigeria with the objective of determining how big data impacts efficiency, transparency, and accuracy of accounting practices. The authors found that big data has improved the

accuracy and transparency of accounting practices in Nigeria despite the challenges of insufficient infrastructure and skills gaps. This paper fills a gap by providing empirical evidence on the users' perception of the relevance of BDA to the accounting profession in Nigeria. Specifically, it examines the level of awareness, usage, benefits and the challenges from the adoption of BDA by accounting firms in a global south and developing country like Nigeria. The paper contributes to extant literature in three ways: One, it examines the perceived benefits and challenges from the use of BDA by professional accountants; two, it investigates the present level of awareness or knowledge and the level of usage of BDA tools among accounting firms; and Three, it considers the impact of professional qualification and work experience on the level of awareness of BDA and the gender, academic qualification and professional qualification on the level of usage of BDA.

Since the adoption and effectiveness of BDA depend on organisational contexts, this study investigates the relevance, awareness and usage of BDA's tools in external auditing from the perspective of the contingency theory because it provides a useful framework for understanding why BDA adoption is not uniform and why its outcome differs across firms, industries and environments. For the purpose of this study, the level of awareness of BDA is defined as the extent of possession of mere information and knowledge by professional accountants about BDA concepts and tools, whereas the level of usage refers to the ability, proficiency and competence of the professional accountants in using BDA tools through their possession of requisite knowledge and technical skills and training. The benefits of BDA are advantages, gains and improvement to the professional accountants' practice "and increase in accounting information and audit quality through their usage of BDA tools" (Younis, 2020).

The rest of the paper is structured into five sections as follows. Section two entails a prior literature review and the formulation of the research hypotheses. Section three is the methodology adopted for the study. Section four is the results of the data analyses and discussion while section five is the conclusion and recommendations.

1.1. Theoretical Review

The contingency theory is employed to explain the relationship and relevance of BDA tools to the accounting profession. The theory which posits that there

is no single best way to design systems or practices. Instead, the effectiveness of a system such as the accounting system or BDA tools is dependent on how it fits with contextual factors such as organisation size and structure, environmental uncertainty, technology and infrastructure, regulatory requirements, and human capital and managerial capability (Chenhall, 2003; Otley, 2016). This theory assumes that the effectiveness of an organisation largely depends on the alliances between the type of technology, environmental volatility and market competition (Otley, 2016); the size of the organisation; its structure and information system; and the strategic context.

The contingency theory suggests that the benefits, challenges, awareness and usage of BDA tools by accounting firms depend on organisational and environmental conditions, rather than the technology itself. The theory dictates that BDA adoption is a contingent process where audit firms must align their technology and organisational structure with client characteristics to maximise efficiency (Dagiliene & Kloviene, 2019). The complex and dynamic audit process, together with the desire to use BDA, may be affected by contingent, external and internal factors. Nguyen *et al.* (2025) found the key determinants for implementing BDA within audit firms in Vietnam to include the size of the clients, strategies of the audit firms, and market competition. Moreover, the human contingencies – gender, professional qualification and work experience of professional accountants – influence the individual capacities to recognise the relevance of BDA and promote the ability for effective usage of BDA tools. The framework aligns with the contingency theory, which emphasises the importance of person-technology-environment fit in technology adoption (Otley, 1980).

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Big Data, Big Data Analytics and the Accounting Profession

2.5. Gender, Qualifications and Work Experience of Professional Accountants and the Level of Awareness and Usage of BDA Tools

From a contingency theory perspective, awareness and usage of BDA tools can also be influenced by individual characteristics such as gender, and professional qualifications and work experience. Gender affects BDA awareness through differences in access, confidence, and institutional support. Professional

qualification strengthens relationship between technology availability and effective BDA usage, and work experience condition the extent accountants translates awareness into actual usage, depending on exposure to complex tasks, environment u The adoption of big data in the accounting domain started with the pioneering study of Vasarhelyi *et al.* (2015). BDA is a process whereby big data are inspected, cleaned, transformed and modelled in order to discover and transmit useful information and patterns and make recommendations to support decision-making (Cao *et al.*, 2015) through the use of “smart” algorithms (Davenport, 2014). BDA is an advanced analytics that makes use of complex applications with such elements as predictive models, statistical algorithms and probable analysis, which is powered by high-performance analytics systems. Accountants’ ability to decipher the language of business and extract and interpret raw data into well-structured objectives when combined with BDA will be an invaluable asset to their respective firms. Balios *et al.* (2020) have argued that BDA is a critical tool for the organisation, accountants and enhancement of the auditing process. Accountants are in the right position to ensure that data extracted are qualitative, analysed and presented in such a way that they will be perceived as potential data scientists. Younis (2020) found that big data impacts the traditional roles of accountants by transforming them to perform the new and strategic roles, impacts the accounting profession of the future and improves the accounting information quality. The author tasks accountants to develop the skills and knowledge in order to be value-relevant, play more strategic roles and become important connectors of both data analysts and senior management with strong analytical and information management proficiency.

Theodorakopoulos *et al.* (2024) explored the wide-range implications of big data within the realms of accounting, delineating its potential benefits, challenges and applications of big data in accounting. They found that big data has the “potential to substantially transform accounting practices, offering avenues for superior decision-making and analysis”, and its integration presents challenges for accountants. They concluded that it is the “exploration of specific big data sources and the development of analytical methodologies tailored to these sources that would empower accounting professionals with a deeper understanding of business operations and facilitate their informed decision-making, risk assessment, and strategic planning”. Sun *et al.* (2024)

argued that auditing professionals can become trusted advisors with the ability to provide actionable insights and strategic guidance when they embrace the opportunities offered by big data and also address its inherent challenges. This is because big data creates opportunities and challenges for the accounting profession, integrated into finance, technology, and information (Bialios *et al.*, 2019; Liang, 2020).

2.2. Benefits of Big Data Analytics Tools

From the contingency theory viewpoint, the benefits of BDA tools are context-dependent. These benefits include improved and real-time decision-making, enhanced audit quality and fraud detection (Olanipekun, 2025), and strategic, new roles for accountants. Mohan (2016) identifies two major types of big data benefits, namely, cost savings and competitive advantage. Cost savings simply means that big data tools make it possible for organisations to store massive volume of data at a cheaper rate than the traditional database. The wider big data also provides a greater competitive advantage for businesses by creating the plausibility of new business opportunities. BDA also gives birth to new products, services and business types (Manyika *et al.*, 2011). According to Porres (2013), adopting big data is a blessing in six major accounting areas, as witnessed by company executives, such as better understanding of consumer behaviour, increase in sales, sign-ups and registration, return on investment (ROI), customer satisfaction and sales improvement. BDA provides high-quality financial statements (Meiryani *et al.*, 2022), accounting information (Younis, 2020), and financial reporting quality (Saleh *et al.*, 2023); enables accuracy reporting and sustainability of the firm (Abdelhalim, 2024; Azzam *et al.*, 2024); improves decision-making (Rajoria, 2024); and creates critical contingencies for organisations' survival beyond the pandemic (Saeudy *et al.*, 2022). Accountants are using DA for better risk and business management; process improvement and efficiency; and to uncover valuable insights in their financials. Advanced data analytics and machine learning tools are helping accountants to analyse large datasets in real-time, identify patterns and trends, and make predictions about future financial performance (Aziz, 2023) and take on new roles of business partner and strategy formulators (Elhoushy *et al.*, 2023). Shalhood *et al.* (2024) found that BDA can enhance the detection of fraud and identify anomalies through data integration from multiple sources

and algorithms. Moreover, using the semi-structured questionnaire, Saleh *et al.* (2023) examined the thoughts and perceptions of auditors, financial analysts and accountants regarding BDA in Canadian audit and accounting firms and impacts on the quality of financial reporting. They found that BDA had a significant impact on the financial reporting quality. Dai *et al.* (2019) argued business executives are currently using DA to uncover operational inefficiencies. Therefore, our hypothesis is stated as:

H1. There is no significant benefit of BDA to the accounting profession.

2.3. The Challenges of Big Data Analytics

Contingency theory helps to explain why challenges differ across contexts. Basically, skills and knowledge gaps (Kokina & Davenport, 2017), cost and infrastructure constraints (Oranefo *et al.*, 2024), data security and regulatory environment (Bhimani & Willcocks, 2014), and organisational culture are common risks to BDA adoption. Acharjya and Ahmed (2016) identified four different challenges in BDA to include data storage and analysis, discovery of knowledge and complexities of computation, probability of scaling and visualising data and security of information. Satyanarayana (2015) sees these challenges to include diversity and incompleteness; high-dimensional data; models with large-scale, imperfect handling; management of energy, human instruments and manpower; and the lack of high management accounting talents (Yan, 2022). In a BD environment, data storage and analysis remain a major concern. There may be challenges connected to hardware infrastructure, one-sidedness in data, data quality, data integration, data at occurrence, and the source origin of data. There are also challenges of selecting data samples, filtering data and profitable use of data, all as a result of unlimited amounts of data available (Tan *et al.*, 2015). Hazen *et al.* (2014) emphasised that a major challenge in BD usage is verifying the reasonableness, accuracy, immediacy, completeness and format of the used data.

Privacy and data security are considered the most important issue within the BD analytics form, yet another major challenge (Chun *et al.*, 2015). Security issues can arise in the use of networks in the area of implementing instrumentation for every management and failure in handling legal ramifications. Another major challenge of cloud computing is the risk associated with information security. The biggest errors or faults identified from security

include confirmation of mechanisms and unavailability of secure channels to information, like the use of encryption, which makes information vulnerable in terms of exclusion, inclusion and modification. Moreover, ensuring a high rate of system operation can be a challenge. In Nigeria, studies indicate limited data analytics competence significantly affects the effective utilisation of BDA in accounting practice (Raji & Dagundaro, 2025). Given these challenges, Kechen (2024, p. 37) concludes that financial accounting must “strengthen data security and privacy protection, invest in big data-related technologies and train professionals, and improve data quality and processing methods to ensure continuous progress in the era of big data”. Thus, we hypothesise as follows:

H2. The use of BDA does not pose any significant challenge to accounting firms.

2.4. Awareness and Usage of Big Data Analytics Tools

Contingency theory explains that awareness and usage of BDA tools vary based on institutional and organisational contingencies. BDA usage is not universal but contingent on organisational needs and environmental demands. Okeke and Eze (2025) found that despite the growing importance of BDA, its adoption and usage among accounting professionals vary considerably across organisations and developing economies such as Nigeria. Accountants in multinational firms and large audit practices show higher awareness due to exposure to global standards and technologies (IFAC, 2020), whereas many Nigerian accountants in SMEs and the public sector have limited awareness of advanced BDA applications (Okeke & Eze, 2025). The differences in level of awareness are due to training, professional development, and organisational priorities. BDA tools are used across accounting such as audit and assurance (Olanipekun, 2025), financial reporting and management accounting (Appelbaum *et al.*, 2017), forensic accounting and risk management (Kabara & Aliyu, 2025), and tax audit, among others. The BD analytics differ depending on the nature of the application. Each type uses a peculiar type, volume and velocity of data. While some applications function well with batch processing, others require real-time data processing (Khan *et al.*, 2017).

There are three types of BDA processing tools—batch, stream and interactive. In batch processing, various types of jobs are performed on batch-by-batch inputs. The best and most effective and practicable solution for batch processing

is MapReduce programming. A MapReduce implementation identified as Hadoop is the commonest and the strongest big data processing platform. It has the capability of running applications on systems with thousands of nodes and terabytes (Sowmya & Sravantti, 2017). According to Khan *et al.* (2017), stream processing is about the future generation computing method for BD in that data streams are adequately processed and recorded. Interactive processing tools are instruments that facilitate smooth communication between big data applications and users. It presents the data in a way that users are allowed to do their own personal breakdown of information in real time. Data can be analysed in various ways either with tabular or graphic formats or both.

H3. There is no significant level of awareness of BDA tools among accounting firms.

H4. There is no significant level of usage of BDA tools among accounting firms.

Certainty, training opportunities, and innovation-friendly environments (Olanipekun, 2025). Male professionals often report higher technology self-efficacy and greater exposure to advanced analytical tools, leading to higher usage levels (Venkatesh *et al.*, 2012). In Nigeria, accountants with advanced degrees or professional certificates demonstrate higher awareness and usage of digital accounting and analytics tools compared to those with basic qualifications (Okeke & Eze, 2025). Less experienced may be more adaptable and receptive to new technologies than highly experienced ones who resist change (Bhimani & Whillcocks, 2014).

H5. There is no significant difference on the level of awareness based on based on professional qualification and work experience.

H6. There is no significant difference on the level of usage based on gender, academic qualification and professional qualification.

3. METHODOLOGY

3.1. Population and Sample Size

The descriptive survey research method was employed to gather information from respondents on users' perception of the relevance of big data to the accounting profession. The primary data was collected through the use of a well-structured questionnaire from accountants and auditors working in middle and higher levels in the selected accounting firms, and it was based on their level of awareness, the present level of usage of BDA and the probable

challenges that may likely inhibit the adoption of BDA as well as the potential benefits to be derived from the use of BDA in selected accounting firms in Lagos State. The selected accounting firms will comprise both the Big 4 and the non-Big 4. The population consisted of all accounting firms that registered with the Institute of Chartered Accountants of Nigeria (ICAN). From the available data of ICAN, there were 276 registered accounting firms in Lagos State as of February 2020. The primary data was sourced from professional accountants in three classes of accounting firms, namely, the Big Four, the medium-size and the small-size firms in Lagos State, Nigeria. The choice was based on the fact that Lagos State is the foremost commercial centre and where most of the top accounting firms are located in Nigeria. The sample size was derived using “Taro Yamane Formula as follows:

$$n = N/1+N (e^2)$$

where n = Sample size ; N = population e = level of significance 0.05

$$n = 276/1+276(0.05)^2 \text{ or } n = 163$$

Therefore, a total of 163 accounting firms were used as the sample size of the study. The purposive sampling method was employed to select the 163 accounting firms from the total population of 276 accounting firms in Lagos State. This sample represented approximately 61% of the population. Moreover, the selected accounting firm must have a functional e-mail address and/or WhatsApp phone number. Three (3) respondents were purposively drawn from the top management and senior officers (managing partner(s), managers, and accountants) of each selected accounting firm, making a total of 498 respondents.

3.2. Construction and Administration of the Research Instrument

The questionnaire was closed-ended and a 5-point Likert scale from Strongly Agree (SA) to Strongly Disagree (SD). It was divided into five sections. Section one covered the socio-demographic characteristics such as gender, academic and professional qualifications and work experiences of the respondents; section two contained information on the source, training and level of awareness of BD functions; section three comprised information on the proficiency, duration and usage of batch processing, stream processing and interactive analysis BDA tools by accounting professionals. The application of contingency theory to BDA is context-dependent, benefits, allowing for flexibility and adaptability,

enabling data-driven decision-making and promoting competitive advantage. Therefore, section four on the benefits of the use of BDA tools by accounting professionals consisted of 9 items of possibilities, such as competitive advantage, support decisions, etc. Section five on probable challenges of adopting BDA contained 9 items on data security, data/personal privacy, data storage, data capture, data quality and management of data, high cost, technical skills and infrastructure.

The Google-constructed questionnaire was administered electronically through emails and WhatsApp to 489 respondents in the selected 163 accounting firms. 336 copies of the questionnaire were completely filled and retrieved, representing 68.30% of the total electronic questionnaire administered. These were used for data analysis.

3.3. Validity and Reliability of Research Instrument

To ensure the validity of the research instrument, two accounting professionals helped to review the questions in the survey instrument before the questionnaire was administered to the respondents. This is to ensure the content validity of the research instrument. The reliability test was through the conduct of a pre-test. The survey instrument was administered in a pilot study to forty knowledgeable professional accountants in accounting firms different from our sample firms in Lagos. The results of the reliability test based on the Cronbach's Alpha scores were the level of awareness of BDA (0.943), the level of usage of BDA (0.889), the perceived challenges of BDA (0.904) and the perceived benefits of BDA (0.944). The overall Cronbach's alpha of the survey instrument was 0.920. The scores of over 0.70 show the instrument is reliable.

3.4. Method of Data Analysis

The data collected was analysed using descriptive statistics, the Chi-Square test and one-way Analysis of Variance (ANOVA). The chi-square test shows how expectations compare to observed data, in which data are random, mutually exclusive independent variables drawn from a large enough sample. The chi-square test for independence tests whether the distribution of categorical variables differs from each other. It is used to analyse association and independence aspects for qualitative data. It is the best applicable data

analysis tool for solving business decision-making problems, especially when data is measured at Likert scales (Kohatri, 2007). Chi-square analysis was used to test hypotheses 1 to 4. The analysis of variance (ANOVA) assesses potential differences during a scale-level variable by a nominal-level variable having two or more categories. ANOVA can be one-way or two-way. One-way ANOVA has only one independent variable with two levels, while two-way ANOVA means that there are two or more independent variables which may have multiple levels. The one-way ANOVA was used to test hypotheses 5 and 6. It was suitable to analyse hypotheses 5 and 6 with one-way ANOVA because it allows us to determine whether there is a significant difference between the means of two or more levels of a variable (Moore *et al.*, 2013).

4. RESULTS AND DISCUSSION

4.1. Demographic Data of the Respondents

Table 1 shows the demographics of the sampled population in terms of gender, highest academic qualifications, professional qualifications and work experience.

Table 1: Demographics of Respondents

<i>S/no</i>	<i>Categories</i>	<i>N</i>	<i>%</i>
1	Gender		
	Male	238	71
	Female	98	29
2	Higher Academic Qualification		
	Higher National Diploma (HND)	65	19
	Bachelors	214	64
	Masters	45	13
	Doctorate	12	4
3	Professional Qualifications		
	ICAN (ACA)	198	58.9
	ANAN (CAN)	6	1.8
	Others	66	19.7
	None	66	19.6
4	Work Experience		
	1-5 years	186	55.4
	5-10 years	72	21.4
	Above 10	78	23.2

Source: Field Survey

From Table 1 it can be observed that majority of the gender make up are male with 71%; female respondents has 29% indicating wide disparity in gender. On academic qualification, HND holders respondents are 19.35% of the total respondents, BSc holders with 64% has the highest percentage while MSc holders are 13% and PhD holders are 4%. This implies an educated and knowledgeable sampled population that can take decisions on the subject matter regarding the relevance of BDA to the accounting profession. On professional qualification, majority of the respondents or about 58.9% possessed ACA, ANAN (CNA) holders are 1.80%. Others with other professional qualifications represents 19.70% while those without professional qualification are 19.60% of the total respondents. Respondents who have worked for less than five (5) years represent 55.40% of the total respondents, between five to ten (5-10) years are 21.4% and those respondents with 10 years and above in practice are 23.2%. Those above 10years work experience are 76.80%, their contribution and response are considered very vital and reliable since BDA is recent.

4.2. Analysis of Surveyed Responses

4.2.1. Benefits of BD and BDA

Table 2 shows that most of the respondents (78.9%) agree that BDA helps accountants to collect relevant information to support their decision-making. The percentage of respondents that disagree that BDA can be of help to accountants in decision-making is 12.2%, while 8.9% are undecided as to whether BDA can be of any help to accountants. This shows the respondents perceived that BDA would help the accountant to generate data for decision-making. Similarly, 73.2% of respondents agreed that BDA reduces the probability of misstatements, as auditors are able to analyse evidence more thoroughly, and that the use of BDA will optimize the detection of imperfect anomalies. Though most of the respondents (71.7% and 71.2%) agree that BDA helps companies value their data through stewardship and quality control and enables real-time assessing of the databases, respectively, about 12.2% and 14% disagree, while another 16.1% and 14.1% of the respondents were undecided. In terms of using BDA to formulate business strategy, only 54.3% agree BDA can be used to formulate business strategy, whereas 15.8% disagree and 19.9% are undecided.

Table 2: Benefits of BD and BDA

<i>S/N</i>	<i>Statements</i>	<i>SD</i>	<i>D</i>	<i>U</i>	<i>A</i>	<i>SA</i>	<i>Mean</i>	<i>Ranking</i>
		No (%)	No (%)	No (%)	No (%)	No (%)	3.8304	
1	Big Data help accountants to generate appropriate and usable information to support decision making	23 (6.8)	18 (5.4)	30 (8.9)	187 (55.7)	78 (23.2)	3.8304	1 st
2	Big Data is used to formulate our business strategy	17 (51)	36 (10.7)	67 (19.9)	144 (32.9)	72 (21.4)	3.6488	7 th
3	The use of Big Data optimizes the detection of imperfect anomalies	11 (3.3)	36 (10.7)	43 (12.8)	180 (53.6)	66 (19.6)	3.7560	4 th
4	Big data tools enable Accounting Firms to store data at a much cheaper price than a traditional database	29 (8.6)	37 (11.0)	60 (17.9)	132 (39.3)	78 (23.2)	3.5744	8 th
5	Big data reduces false positives insight	18 (5.4)	55 (16.4)	59 (17.6)	168 (50.0)	36 (10.7)	3.4435	9 th
6	Big Data reduces probability of misstatements as auditors are able to analyse evidence more thoroughly	23 (6.8)	36 (10.7)	31 (9.2)	162 (48.2)	84 (25.0)	3.7381	5 th
7	Big Data has brought about a competitive advantage in the organisation	17 (5.1)	37 (11.0)	48 (14.3)	168 (50.0)	66 (19.6)	3.6815	6 th
8	Big data enables real-time handling of immense rapidly growing databases	17 (5.1)	30 (8.9)	48 (14.3)	163 (48.5)	78 (23.2)	3.7589	3 rd
9	Big Data helps companies value their data through stewardship and quality control.	13 (3.9)	28 (8.3)	54 (16.1)	153 (45.5)	88 (26.2)	3.8185	2 nd

Source: Field Survey

4.2.2. Challenges to the Use of BDA

In Table 3, the perceived challenges of BDA tools are categorized into five major areas: data security issues, data privacy issues, data storage, data capture and quality of data, and cost, technical skills, and infrastructure. Each of these major categories is further broken down into more specific variables. The responses received are analyzed using a bar chart: 62.5% of respondents agree, 32.1% disagree, and 5.2% are indecisive. This indicates that respondents perceive high investment costs as a major challenge preventing accounting firms from adopting BDA. Similarly, 62.5% of respondents agreed that personal

privacy data might be compromised during storage, transmission, and usage, while 55.4% agreed that the large size and high dimensionality of data make its management difficult. It is observed that the number of respondents who either agree or strongly agree with the statements is greater than those who strongly disagree or disagree.

The mean scores reveal the five major challenges of BDA: cleaning data for reliability and investment in both infrastructure and analytics technologies (Mean = 3.393), risk of personal privacy data breaches during storage, transmission, and usage (Mean = 3.385), high cost of capturing and creating valuable data (Mean = 3.375), diverse and weak sources of big data (Mean = 3.357), and the difficulty of managing large, high-dimensional data (Mean = 3.286).

Table 3: Challenges in the Use of BD and BDA

S/N	Statements	SD	D	U	A	SD	Mean	Ranking
		No (%)	No (%)	No (%)	No (%)	No (%)		
1	Big Data faces intrusion detection challenge.	48 (14.3)	54 (16.1)	102 (30.4)	108 (32.1)	24 (7.1)	3.018	8th
2	Diverse source of Big Data with weak security can result in financial losses.	36 (10.7)	60 (17.9)	54 (16.1)	120 (35.7)	66 (19.6)	3.357	5th
3	Personal Privacy data might discharge during storage, transmission and usage.	30 (8.9)	78 (23.2)	18 (5.4)	150 (44.6)	60 (17.9)	3.385	3rd
4	Big Data management requires cleaning data for reliability	6 (25.0)	84 (25.0)	60 (17.9)	150 (44.6)	36 (10.7)	3.393	1st
5	BDA challenges lies in the complex data analytics required to understand the relationships among data features	36 (10.7)	48 (14.3)	78 (23.2)	168 (50.0)	6 (1.8)	3.179	7th
6	The large size and high dimensionality makes the management of BD difficult	24 (7.1)	60 (17.9)	66 (19.6)	168 (50.0)	18 (5.4)	3.286	6th
7	Investment in both infrastructures and analytics technologies is expensive	30 (8.9)	78 (23.2)	18 (5.4)	150 (44.6)	60 (17.9)	3.393	1st
8	Capturing and creating valuable data is done at a high cost	6 (1.8)	84 (25.0)	60 (17.9)	150 (44.6)	36 (10.7)	3.375	4th
9	BD has enough professionals or qualified personnel	48 (14.3)	54 (16.1)	102 (30.4)	108 (32.1)	24 (7.1)	3.018	8th

Source: Field Survey

4.2.3. Awareness, Sources of Awareness, and Training in BDA

In Table 4, 270 respondents, representing 80.36% of the total sample, affirmed that they are already aware of BDA, while only 66 respondents (19.64%) indicated that they are not aware of BDA. The majority of respondents (about 60.71%) gained awareness of BDA through personal discovery, 32.14% through training programs organized by their organizations, and 7.15% via other means.

The proportion of respondents who have not attended training on data analytics is 80.2%, compared to 19.8% who have attended training, indicating that only about one-fifth of the sampled respondents have received formal training on data analytics. The highest percentage of respondents who have not attended training is in Data Visualization and Data Mining, at 91.1%.

This finding aligns with Omitogun and Al-Adeem (2019), who found that accountants in Saudi Arabia lack relevant technical skills and are unfamiliar with data analysis tools beyond Excel. Their study revealed that approximately 64.71% of sampled accountants had not attended any training on big data and data analytics, while 31.37% planned to enhance their related knowledge. They recommended that auditors obtain training on substantive audit risk assessments using big data and BDA.

Similarly, Vanbutsele (2018), in research on the impact of big data on financial statement auditing in Belgium, found that some organizations are

Table 4: Awareness, Sources of Awareness and Training on Big Data Analytics

S/N	Programmes		Yes (%)	No (%)
1.	Awareness of BDA		270 (80.36%)	66 (19.64%)
2	Sources of BDA awareness	Personal discovery	(60.71%)	-
		Training programme organised by their organisations	(32.14%)	-
		Other means	(7.15%)	-
3	Training attended on data analytics		Yes (%)	No (%)
A		Data Aggregation	54 (16.1%)	282 (83.9%)
B		Data Interpretation	99 (29.5%)	237 (70.5%)
C		Data Analysis	102 (30.4%)	234 (69.6%)
D		Data Visualization	30 (8.9%)	306 (91.1%)
E		Data Mining	30 (8.9%)	306 (91.1%)
F		Data Modelling	84 (25.0%)	252 (75.0%)
		Average		

Source: Field Survey

not yet convinced about BDA and full population examination. He also noted that auditors need to expand their knowledge in IT analytics and pattern recognition.

4.2.4. Level of awareness of BDA Concepts or Functions

From Table 5, the majority of the respondents have moderate or little awareness of most of the BDA concepts or functions given the low mean values. The respondents have a high level of awareness in cloud computing and the Internet of Things, with the mean scores of 3.21 and 3.60, respectively. All the other concepts or functions have means that range between 2.09 and 2.84, indicating a low level of awareness of these concepts or functions.

Table 5: Level of awareness of BDA Concepts or Functions

<i>S/N</i>	<i>Concepts/ Functions</i>	<i>NA</i>	<i>LLA</i>	<i>MLA</i>	<i>HLA</i>	<i>VHLA</i>	<i>Mean</i>	<i>Rank</i>
1	Cloud computing	38 (11.3%)	36 (10.7%)	132 (30.3%)	77 (22.9%)	53 (15.8%)	3.21	2
2	Internet of Things	18 (5.4%)	36 (10.7%)	91 (27.1%)	107 (31.8%)	84 (25.0%)	3.60	1
3	Blockchain	66 (19.6%)	48 (14.3%)	139 (41.4%)	53 (15.8%)	30 (8.9%)	2.80	4
4	Javascript	60 (17.9%)	54 (16.1%)	148 (44.0%)	72 (21.4%)	2 (0.01%)	2.70	5
5	SQL stream/S-Server	84 (25.0%)	54 (16.1%)	120 (35.7%)	66 (19.6%)	12 (3.6%)	2.61	6
6	IPython	84 (25.0%)	60 (17.9%)	144 (42.9%)	42 (12.5%)	6 (1.8%)	2.48	7
7	PHP	108 (32.1%)	60 (17.9%)	137 (40.8%)	19 (5.7%)	12 (3.6%)	2.30	9
8	Jaspersoft B suite	126 (37.5%)	72 (21.4%)	118 (35.1%)	18 (5.4%)	2 (0.01%)	2.09	12
9	SAP	60 (17.9%)	66 (19.6%)	107 (31.8%)	73 (21.7%)	30 (8.9%)	2.84	3
10	Splunk	114 (33.9%)	67 (19.9%)	131 (39.0%)	18 (5.4%)	6 (1.8%)	2.21	11
11	Pentaho Business Analytics	102 (30.4%)	67 (19.9%)	119 (35.4%)	42 (12.5%)	6 (1.8%)	2.35	8
12	Cloudera Impala	108 (32.1%)	67 (19.9%)	122 (36.3%)	36 (10.7%)	3 (0.01%)	2.26	10

Source: Field Survey

Note: NA=No Awareness, LLA= Low Level of Awareness; MLA= Moderate Level of Awareness; HLA = High Level of Awareness; VHLA= Very High Level of Awareness

4.2.5. Level of Usage of BDA Tools

Table 6 shows that 64.88% of the respondents admitted that their organisations are using BDA tools, and 35.12% of the respondents said their organisations are not using BDA tools. 264 respondents, representing 73.2%, have never attended training on the usage of BDA tools; this means that only 26.8% of the respondents have attended training on the use of BDA tools. If this is compared with 71.7% who admitted that their organisations have been using BDA tools, one may likely conclude that these accountants are unlikely to be the ones using the BDA tools for analysis in these organisations. Out of the 264 respondents who have not attended training before on the usage of BDA tools, only 70.08% (185) have plans to attend training in the nearest future, unlike the remaining 29.02% (79) without any plan.

Table 6: Level of Usage of Big Data Analytics Tools

S/N	Programmes	Yes (%)	No (%)
1.	Does your organisation work with Big Data Analytics Tools?	218 (64.88%)	118 (35.12%)
3.	Have you attended training on the use of Big Data Analytics?	102 (26.8%)	264 (73.2%)
4.	Do you plan to get professional training on BDA soon?	79 (29.92%)	185 (70.08%)

Source: Field Survey

On number of years in which their organisation has been using BDA tools, 35.12% says their organisation has not been using BDA; this corresponds to the earlier variable measured on whether or not organisations are working with BDA tools. 25% of respondents agreed that their organisation has been working with BDA tools for less than a year, 7.1% for between 1-2 years, 13.1% for between 3-4 years and 19.68% have been using BDA tools for more than 5years.

4.2.6. Level of Usage of Batch Processing, Stream Processing and Interactive BDA Tools

Table 7 shows that the majority of the respondents are not using the BDA tools in their organisation. On average, 80.35%, 79.17% and 83.9% of respondents are not using most of the batch processing, stream processing and interactive analysis BDA tools, respectively. This implies that only a small proportion of

the respondents, between 12% and 29%, are using any of the BDA tools in the accounting firms. The most used BDA tools are Tableau and Pentaho Business Analytics (Batch Processing), SQL stream S-Server, Apache Storm (Stream Processing) and Google Dremel and Apache Drill (Interactive Analytics).

Table 7: Level of Usage of BDA Tools

S/N	Batch Processing Big Data Tools	Not in use	In use	Ranking
1	Apache Spark	87.5%	12.5%	9 th
2	Jaspersoft B/suite	85.7%	14.3%	7 th
3	Pentaho Business Analytics	76.8%	23.2%	3 rd
4	Tableau	71.4%	28.6%	1 st
	Mean value	80.35%	19.65%	
	Stream Processing Big Data Tools			
1	Apache Storm	76.8%	23.2%	3 rd
2	SQL stream S-Server	75.0%	25.0%	2 nd
3	IBM Biginsights	85.7%	14.3%	7 th
	Mean value	79.17%	20.83%	
	Interactive Analysis Big Data Tools			
1	Google dremel (Melnik, 2011)	82.1%	17.9%	5 th
2	Apache Drill:	82.1%	17.9%	5 th
3	Cloudera Impala	87.5%	12.5%	9 th
	Mean value	83.90%	16.10%	

Source: Field Survey

4.3. Test of Hypotheses

4.3.1. Hypotheses One to Four

The Chi-Square test was conducted for Hypothesis One (H1), which posits that there is no significant benefit of BDA to the accounting profession. Given a calculated Chi-square value of 20.554 and a critical value of 9.488 at d.f. = 4 and p = 0.000 (see Table 8), the null hypothesis is rejected. Therefore, it can be concluded that there are significant benefits of BDA to accounting firms/ profession. Moreover, Hypothesis Two (H2) proposes that the use of BDA does not pose any significant challenges to accounting firms. The result, a calculated Chi-square value of 47.585 and a critical value of 9.488 at d.f. = 4 and p = 0.000, indicates that the null hypothesis is rejected. Therefore, the use of BDA comes with some challenges for accounting firms.

With regard to Hypothesis Three (H3), which states that there is no significant level of awareness of BDA among accounting firms, the calculated Chi-square value of 34.692, compared with a critical value of 9.488 at d.f. =

4, leads to the rejection of the null hypothesis. This indicates that there exists a high degree of awareness of BDA among accounting firms.

The Chi-square test statistic was used to test Hypothesis Four on the significant level of usage of BDA among accounting firms in Nigeria. From Table 8, the calculated Chi-square value is 0.800, while the critical value is 11.070 at d.f. = 5 and $p = 0.977$. Therefore, the null hypothesis is accepted, indicating that there is no significant level of usage of BDA among accounting firms in Nigeria.

Table 8: Calculated Chi-Square (X^2) Values for Hypotheses 1-4

<i>S/N</i>	<i>Null Hypotheses</i>	<i>Calculated X^2</i>	<i>df</i>	<i>Asymptotic Significance</i>
1	There is no significant benefit of BDA to the accounting profession	20.554	4	0.000
2	The use of BDA does not pose any significant challenge to accounting firms	47.554	4	0.000
3	There is no significant level of awareness of BDA among accounting firms	34.692	4	0.00
4	There is no significant level of usage of BDA among accounting firms	0.800	5	0.977

Source: SPSS 23.0

4.3.2. Hypothesis Five

H₅: There is no significant difference on the level of awareness based on professional qualification and work experience

In Table 9, a one-way ANOVA between groups conducted to compare the level of awareness of BDA among professional qualifications – ACA, ANAN, others and those with no professional qualifications (none) – showed that there is a significant difference in the level of awareness at $[F(4,331) = 9.417$ at $p = 0.000]$ for all ranks (see Table 9). On the level of awareness and work experience, the one-way ANOVA conducted to test whether there is a statistically significant difference between the level of awareness and the different work experiences showed the test result $[F(2,333) = 1.903$, $p = 0.151]$. (See Table 9) The null hypothesis is therefore rejected, and it is concluded that there is a statistically significant difference between the level of awareness of BDA based on professional qualifications and work experience.

Table 9: Summary of One Way-ANOVA Test Statistics Result on Level of Awareness

Variables		Between Groups	Within Groups	Total
PROFESSIONAL QUALIFICATION	Sum of Squares	31.556	277.283	308.839
	Df	4	331	335
	Mean Square	7.889	.838	
	F	9.417		
	Sig.	.000		
WORK EXPERIENCE	Sum of Squares	3.490	305.348	308.839
	Df	2	333	335
	Mean Square	1.745	.917	
	F	1.903		
	Sig.	.151		

Source: SPSS 23

4.3.3. Hypothesis 6

H₆: There is no significant difference on the level of usage based on gender, academic qualification and professional qualification.

There is no statistically significant difference between the level of usage of BDA between genders, as demonstrated by one-way ANOVA [F (1, 334) = 0.040, p = 0.841]. The one-way ANOVA conducted on whether there is a statistically significant difference in level of usage between academic qualifications showed F (3,332) = 0.530 at p = 0.662; this implied that there is no statistically significant difference in level of awareness at p = 0.662 among the academic qualifications (See Table 9). A one-way ANOVA between groups was conducted to compare the level of usage of BDA among professional qualifications – ACA, ANAN, Others and those with no professional qualifications. It showed that there is no statistically significant difference in the level of usage [F(4,331) = 0.383 at p = 0.820 for all ranks. (See Table 9). Therefore, the null hypothesis is accepted.

4.4. Discussion of Findings

4.4.1. Benefits of BDA Tools

The calculated Chi-square test (20.554) on whether BDA possesses any significant benefit or poses any significant challenge is greater than the critical value (9.49) at a significance level of .000. This supports Aziz (2023) and indicates the use of BDA by accounting firms results in significant benefits, such as helping accountants to

Table 10: One Way -ANOVA Test Statistics Result Level of Usage

<i>Variables</i>		<i>Between Groups</i>	<i>Within Groups</i>	<i>Total</i>
GENDER	Sum of Squares	.002	19.388	19.391
	Df	1	334	335
	Mean Square	.002	.058	
	F	.040		
	Sig.	.841		
ACADEMIC QUALIFICATION	Sum of Squares	.092	19.298	19.391
	Df	3	332	335
	Mean Square	.031	.058	
	F	.530		
	Sig.	.662		
PROFESSIONAL QUALIFICATIONS	Sum of Squares	.089	19.301	19.391
	Df	4	331	335
	Mean Square	.022	.058	
	F	.383		
	Sig.	.820		

Source: SPSS 23

generate reliable data to assist their decision-making through real-time assessing of dynamic databases, as well as reducing the probability of misstatements as auditors are able to analyse whole evidence, form business strategy and become business partners with new roles and tasks (Elhoush *et al.*, 2023), among others. According to the contingency theory, the benefits of the use of BDA by accounting firms are context-dependent and depend on organisational fit – that is, fit with accounting processes to enhance accuracy, fraud detection, and effective integration for accountants to get the maximum benefits. The finding also agrees with Satyanarayana (2015) that accountants derive a lot of benefits from the use of BDA, and BDA increases financial reporting quality (Saleh *et al.*, 2023). Al Rob *et al.* (2024) found that the actual use of BDA positively impacted professional scepticism and potentially “enhanced audit quality through improved identification of risks and better evaluation of audit evidence”. Similarly, Riadi and Ginting (2025) found that BDA and auditor experience significantly bolster fraud detection and forensic auditing.

4.4.2. Challenges of BDA Tools

Despite the numerous benefits that can be derived from the use of BDA, it also poses some challenges, as earlier identified by Vanbutsele (2018). The

analyses of the responses reveal the challenges of BDA to include data security issues, data privacy issues, data storage, data capture and quality of data, cost and technical skills and infrastructure. The respondents agreed that BD faces intrusion detection, personal privacy issues, data discharge during storage, transmission and usage, and high investment costs in both infrastructure and analytics technologies. The chi-square test statistics have a calculated chi-square value of 47.585 with a critical value of 9.488 at d.f. 4 ($p = 0.000$), showing that there are significant challenges embedded in the use of BDA by accounting firms in relation to the challenges in the usage of BDA tools. This result supports the application contingency theory, which highlights the challenges of accountants in the use of BDA tools to include the skill gaps, cybersecurity risks, data accuracy and reliability. However, Musunuru (2025) finds that the moderation of BDA with risk and security has a positive and insignificant influence on auditing practice, but the moderation with fraud is negative and insignificant.

4.4.3. Level of Awareness

The first concern of this study was to appraise the level of awareness of BDA by accounting firms. Findings revealed that there is a significant level of awareness of BDA among accounting firms, though the level of awareness lies between low and moderate. The means of each of the BDA concepts or functions tested lie between 2.0893 and 2.842 except in two concepts – cloud computing and IoT, which have means of 3.2113 and 3.6042, respectively. Also, the result of the Chi-square test of 34.692 and a given critical value of 9.488 at d.f. 4 implies that there is a significant level of awareness of BDA among accounting firms. This result agrees with the findings of Padashetty and Kishore (2016) that about 58% of the respondents have awareness of BDA.

4.4.4. Level of Usage

On the level of usage of BDA by accounting firms, findings revealed that there is no significant level of usage of BDA by accounting firms. Ten (10) BDA tools were looked into; two of the tools, Cloudera Impala (interactive analysis BDA tool) and Tableau (batch processing and interactive analysis BDA tool), have the highest percentage of usage at 30.36%. All the tools have a very low level of usage (see Figure 4.2). The low-level usage of BDA tools can

be attributed to low investment and commitment by the accounting firms to the training of accounting professionals despite the high awareness. Unlike Chu and Yong (2021), who find audit firms are keen to use machine learning software and predictive analytics tools, the low usage from our study supports earlier findings by Omitogun and Aldeem (2019) that the majority of their sampled accountants have not attended any training on BD and DA. Although Sithole (2023) found that social influence and hedonic motivation were key drivers of BDA adoption, the author agreed with Wibowo *et al.* (2022) on the importance of managers' full commitment to the adoption of BDA tools through investment in end-user support and the provision of current information through training and other similar means. The Chi-square result in Table 8 showed a calculated value of 0.800 with the critical value of 11.070 at d.f. 5 and $p = 0.977$. This showed that there is no significant level of usage of BDA among accounting firms. This result agrees with Musunuru (2025) that BDA technologies and the implications (blockchain and AI) have a positive and insignificant impact on auditing practices.

In summary, the percentage of those firms where BDA tools are in use is 16.10%, leaving a huge percentage of 83.90% to accounting firms where BDA tools are not in use (Table 4.5). 73.2% of respondents have also not attended any training on how to use BDA tools; surprisingly, 70.08% of these respondents are not planning to attend training.

4.4.5. Test of Significant Difference on the Level of Awareness Based on Professional

Qualifications and work experience: A one-way ANOVA between groups was conducted to compare the level of awareness of BDA among professional qualifications – ACA, ANAN, Others and those with no professional qualifications. It showed that there is a significant difference in the level of awareness at the $p < .05$ level for the four categories of professional qualifications [$F(4,331) = 9.417$ at $p = 0.000$ for all ranks. A post hoc test was conducted because of the significant differences between professional qualifications using the Tukey HSD test. The result indicated that the mean score for ACA (mean (M) = 2.330, standard deviation (SD) 1.02585, $p = 0.004$) was significantly different from the means of ANAN ($M = 1.0000$, SD 0.000, $p = 0.000$), Others ($M = 2.9091$, SD 0.79377, $p = 0.0000$) and None ($M = 2.553$, SD 0.66869, p

= 0.115). Taken together, these results suggest that professional qualifications do have a significant effect on the level of awareness of BDA. Specifically, the result suggests that holders of an ACA have a higher level of awareness than holders of other professional qualifications. On the level of awareness of BDA and work experience, the one-way ANOVA conducted to test whether there is a statistically significant difference between the level of awareness and the different work experiences showed the test result of $[F(2,333) = 1.903, p = 0.151]$. (See Table 4.9). This implies that there is no statistically significant difference between groups on work experience. Therefore, a post hoc multiple comparison test using Tukey HSD was not conducted.

4.4.6. Test of Significant Difference Between Level of Usage Based on Gender, Academic and Professional Qualifications

There was no statistically significant difference between the level of usage of BDA and gender as demonstrated by one-way ANOVA $[F(1, 334) = 0.040, p = 0.841]$. A Tukey HSD (Honestly significant difference) could not be conducted because there were fewer than three groups. The one-way ANOVA conducted on whether there is a statistically significant difference in level of usage between academic qualifications showed $F(3, 332) = 0.530$ at $p = 0.662$; this implies that there is no statistically significant difference in the level of awareness at $p = 0.662$ among the academic qualifications of respondents. A one-way ANOVA between groups was conducted to compare the level of usage of BDA among professional qualifications – ACA, ANAN, Others and those with no professional qualifications (None) – and showed that there is no statistically significant difference in the level of usage $[F(4,331) = 0.383$ at $p = 0.820$ for all ranks. There is no need for further comparison since there is no significant difference; hence Tukey post hoc test was not conducted.

5. CONCLUSIONS, RECOMMENDATIONS AND DIRECTION FOR FUTURE RESEARCH

5.1. Conclusions and Recommendations

The paper concludes that accountants have a high level of awareness of BDA mostly through personal discovery. This level of awareness is highly likely due to the fact that the world has predominantly become that of information, where connection and information have become very common; there is a rapid

rise in the usage of the internet and a high proliferation of mobile devices, which allows the exchange of data between humans and various electronic devices. However, the study found that the level of usage of BDA tools among accounting firms is very low. This lack of usage of BDA tools does not match the high level of awareness. The low level of usage of BDA is due to the low disposition of most accounting firms towards BDA training and innovations and the fact that current professional examinations and even most accounting programmes or courses in our universities have not laid much emphasis on these skills. The findings also revealed that the level of awareness differs among different professional qualifications, while the level of usage of BDA does not differ between gender, academic qualifications and work experience of professional accountants.

Since contingency theory emphasises that BDA impacts and benefits vary with an organisation's environment, tech readiness, regulatory demands, and size, the following recommendations are suggested for accounting firms to reap maximum benefit from the use of BDA tools:

- (i) **Accountants' Skill Gap:** Accounting firms can bridge the BDA skill gap of professional accountants by allocating more organisational resources to the training programme of the majority of untrained accounting professionals on the usage of BDA tools. They can enhance their knowledge and expertise through upskilling and reskilling and through the integration of BDA tools to the existing systems. Practising accountants should be trained on how to make effective use of BDA to process and communicate financial information to both internal and external users and for prompt, real-time decision-making. In addition, BDA should be integrated into the accounting curricula of universities by addressing the concerns of standardisation of the curriculum, upgrading the qualifications of faculty members, and identifying the needs required by students (Tanzola 2023) and prioritising BDA knowledge and skills in their curriculum as well as the accounting professional bodies (Zin *et al.*, 2022) due to the relevance and insights from using BDA tools to equip professional accountants with the necessary BDA skills and capabilities relevant in the world of data analytics and to respond to market needs (Balios *et al.*, 2020).

- (ii) **Accounting Firm Size.** Since the benefits of BDA hinge on organisational context such as size, accountants should not only be sensitised to the use and importance of BDA to improve audit quality given the opportunity to collect audit evidence from the entire population and not rely on the samples. Moreover, accounting firms must get leadership buy-in to BDA and enhance their size for greater BDA benefits by partnering with tech providers to access cloud-based BDA tools and expertise without heavy investment, upskilling key accounting staff on BDA basics and data interpretation, collaborating with other firms, and focusing on niche areas like forensic accounting and tax analytics, and expand their client base by targeting SMEs that need BDA advisory services.
- (iii) **Technology Maturity.** Accountants can boost technology maturity for BDA benefits through upskilling by learning DA, SQL, and BDA tools such as Power BI, Tableau, etc.; collaborate with IT on data integration and security; support data governance to ensure data accuracy; ensure compliance with regulations; focus on insights for strategic decisions, risk management and compliance reporting; and stay updated on local regulations and tech trends. To leverage BDA for audit analytics and advisory services, accounting firms should invest in training and upskilling of accounting staff on BDA tools, adopt cloud solutions to enhance data accessibility and collaboration, and leverage compliance tools for audits and tax compliance and align financial reporting with Nigerian regulations.

5.2. Contributions to Knowledge and Directions for Future Research

This study is among the first empirical studies to examine users' perceptions of the relevance of BDA to the accounting profession in Nigeria. It also examines the benefits and challenges and how level of awareness and usage are affected by gender, academic and professional qualifications, and work experience of the professional accountants by using ANOVA. However, the generalisation of the results of this study is limited by, firstly, the restriction of the study to only Lagos State and, secondly, the use of a single data source such as professional accountants and uniform measurement, which can introduce social desirability and consistency bias. Therefore, it is suggested that future studies should expand the scope of study and examine specific areas within the accounting

profession such as tax and internal auditing, the implications on audit standards of auditors using BDA to analyse an entity's entire data, how BDA fits into a financial statement audit and its suitability over the traditional audit method of gathering audit evidence, the development of organisational strategies that can quell the problems of BDA adoption, and the impacts of organisational contexts such as type, age, structure, leadership style, and culture, among other factors, on the adoption of BDA. Besides, other researchers should employ diverse data sources and measurements, such as path analysis, to mitigate common method variance in future studies.

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