



## Audit Reporting Lag Responsivity of Big Data Analytics: Evidence from Nigeria

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### Abstract

Perceived sub-optimal prevalence of big data analytics practice among accounting firms in Nigeria, having allegedly been attributed to lack of empirical validation of its capability in reducing audit report lag, the current study was undertaken to investigate the responsiveness of audit report lag to big data analytics, using listed manufacturing firms in the Nigeria as the study population. A mixed method design was implemented wherein primary data were sourced from the external auditors at firm-level to measure big data analytics, while secondary data were collected from the audited annual reports of the manufacturing firms. Big data analytics was decomposed into voice data analytics, image/video data analytics, and text data analytics. Following analyses, it was found that big data analytics invigorates auditors' confidence in their application of professional skepticism during the audit engagement, leading to elongation of audit report lag. Consequently, it was concluded that deployment of big data analytics among audit firms in Nigeria enhances application of professional skepticism result, resulting more in audit report lag elongation than timeliness. It was therefore recommended that Financial Reporting Council of Nigeria as a regulator should institutionalize big data analytics in auditing practice in Nigeria.

### Keywords:

Big Data Analytics, Audit Report Lag, Nigeria.

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## 1. Introduction

There is no denying that the annual financial report is a valuable information source. Therefore, greater worth of significant financial information is diminished when financial reports are delayed in their public presentation. There is also a risk of information asymmetry if financial reports are not supplied on time. These risks tend to result in increased levels of uncertainty surrounding investment decisions and the dissemination of information among stakeholders. However, the pursuit of shorter audit delay conflicts against another equally important attribute of audit quality, which is professional skepticism. IFAC (2014) asserts that professional skepticism is considered an essential attribute for auditors, and that it improves audit quality. Studies by Liu (2017), Quadackers (2012) and Ghosh (2014) have shown that auditors' observation of professional skepticism leads to elongation of audit report lag (ARL). Therefore, since deployment of big data analytics (BDA) in audit exposes the auditor to greater data volumes, it means that conflicting interplay of 'timeliness' and 'professional skepticism' should be expected in attempting to evaluate ARL's responsivity of BDA. This is because, having access to greater data volumes ignites auditors' professional skepticism, (Barr-Pulliam, Brazel, McCallen & Walker, 2023; and Brazel, Carpenter, & Jenkins, 2016).

At the core of the fabric of connection, the tissue that connects BDA and ARL are the mediating roles of two latent constructs, namely; 'efficiency' and 'professional skepticism'. Shorter ARL indicates timely financial reporting, which is a key aspect of audit quality, and reflects positively on the auditor's efficiency, effectiveness, and ability to meet stakeholders' needs. Shorter ARL indicates that the auditor is able to complete the audit and issue the report in a timely manner, allowing stakeholders to receive financial information in a timely and efficient way. This is crucial, especially given the presumption of agency conflict due to existing state of information asymmetry between agents (management) and principal (shareholders). Also, shorter ARL indicates that the auditor is able to meet regulatory deadlines, such as filing with the Securities and Exchange Commission (SEC) and therefore, mitigating regulatory risk exposure. In this regard therefore, timely issuance of the audit report can enhance stakeholder confidence in the financial reporting process and the auditor's ability to provide high-quality services. By leveraging BDA, auditors can significantly reduce the time spent on audit procedures, analysis, and reporting, leading to a shorter ARL.

One of the factors that strengthens auditors' professional skepticism is competence (Razana, Tarmizi & Sayed, 2022). Deficiency in auditors' expertise may impede appropriate use of professional skepticism. Auditors with decent and respectable knowledge and experience tend to be more skeptical when making judgements and decisions, (Razana, *et. al.*, 2022). The more competent an auditor is, the more he or she can evaluate the proficiency level of evidence with more in-depth and well-defined capability. In the context of the current study, competency here denotes technical (i.e., BDA capability), hence establishing BDA as determinant of ARL. In this way, leveraging on the premise that BDA as a technology, serves as launchpad for auditors to immerse deeper into professional skepticism, a positive relationship can be inferred between BDA and ARL.

Despite the increasing adoption of BDA in auditing, there is a lack of empirical evidence on its impact on ARL, highlighting the need for further research. For instance, BDA may

improve audit efficiency and reduce ARL by enabling auditors to identify and focus on high-risk areas, but empirical validation of this notion is hazy if not nonexistent. It is also true that the use of BDA in auditing may lead to increased ARL due to the complexity of analyzing large datasets, but the extent of this impact is still unknown. Given the plausibility of the nexus between BDA and ARL, empirical confirmation of their link ought not to be rare but is, thus raising curious doubt about the presumed relationships. This paper is aimed at investigating the how ARL responds to the various forms of BDA.

The remainder of this paper is structured as follows. Section 2 describes the theoretical framework and relevant literature on the main study variables. The research findings are presented in Section 3 while Section 4 outlines the study's conclusion.

## **2. Literature Review**

### **2.1 Theoretical Background**

There is currently no agreed-upon theory that explains BDA. The technology acceptance model (Davis, 1989), the theory of planned behavior (Ajzen, 1991), the diffusion of innovation theory (Rogers, Singhal, & Quinlan, 2014), the institutional theory (Tina Dacin, Goodstein & Richard Scott, 2002), and the agency theory are just a few examples (Ibrahim, Blamer & Ezat, 2022). For many reasons, we use agency theory to explain our model. First, agency theory has been widely used in accounting research, and it has both applicability and explanatory ability for our specific context. Specifically, we endeavor to align a single theory to justify the relationship between BDA as an independent variable, and ARL as a dependent variable. Second, the widely used theories at the organizational level for the usage of BD are the technology-organization-environment framework, which serves as a foundation to identify the determinants of social media usage (Srivastava & Teo, 2009), and the resource-based view theory (Zhu & Kraemer, 2005), which is considered a foundation for linking BD and corporate value. Thus, unlike other theories, agency theory does not rely on other factors as environmental, technological, organizational, and social factors as political and/or social pressure, pressure from competitors, which hurdles to empirical investigation.

From agency theory perspective, Vera-Baquero *et al.* (2015) hypothesized that BD solutions could enable monitoring the business processes performance. The companies that adopt BD solutions will find it easy to disclose high-quality information in real-time because managers will satisfy mandatory disclosure requirements and provide more voluntary disclosure that can mitigate information asymmetry and agency costs. Additionally, BD solutions can help managers disclose a lot of processed valuable, and free from error data through different sources and in different formats (variety) and in real-time (velocity). Consequently, BDA is more likely to mitigate agency costs. Agency theory can be developed and extended to incorporate BD technology to improve monitoring outcomes, and disclosure quality, thus reducing information asymmetry. However, this needs empirical evidence. At a theoretical level, adoption of BD can be explained by the agency theory where corporate disclosure is considered as a mean to controlling the agency costs arising from conflicts of interests. Therefore, for the purpose of the current study, agency theory is the most theoretical foundation to anchor the study.

## 2.2 Conceptual Review

The current study is hinged on two variables, namely; Big Data Analytics, being the predictive variable, and audit report lag, being the response variables. Following in the lead provided by Warren, Moffitt & Byrnes (2015), we operationalise big-data in terms of image/video data, voice data and text data.

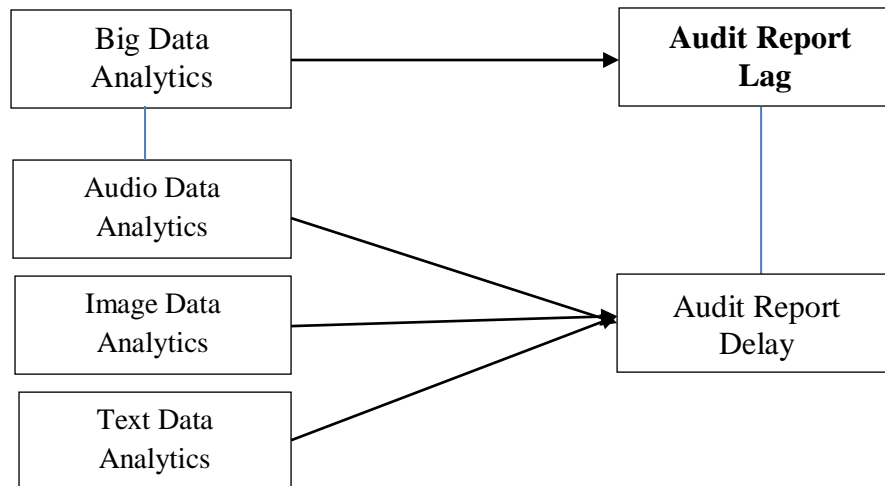


Figure 1: Conceptual Framework of Big Data Analytics and Audit Report Lag  
Source: Warren et al. (2015)

## 2.3 Hypothesis Development: Big Data Analytics and Audit Report Lag

### 2.3.1 Audio Data Analytics and Audit Reporting Lag

Empirical studies on voice data are still at infancy but potential implications of voice data analytics (VDA) on audit practice have some intriguing prospects. Frontline studies on voice data analytics include those by Mayew and Venkatachalam (2012), Amicis, Falconieri, and Tastan (2020), and Fu, Wu and Zhang, (2021). Although the respective objectives of these prior studies on VDA have no direct bearing on the objective of the current study, they indirectly do by affirming auditors' accessibility to vast volume of information when VDA is deployed in an audit. Naturally, application of VDA stretches the reach of the auditor to greater volumes and varieties of data than would have been available under traditional audit procedures. Access to more data volume means less rigor on substantive tests, hence quicker resolution in establishing audit evidence and ultimately, timelier audit report. Based on the agency theoretical leaning, it is expected that a timelier audit report would lead to speedier resolution of existing agency conflict due to information asymmetry, hence a negative relationship should be expected between ARL and BDA.

On the other hand, auditors' exposure to greater volume of data and the theoretical existence of agency conflict reinforces imperativeness for auditor's professional skepticism. Therefore, in line with empirical evidence; that access to bigger data volume elongates ARL, VDA is likely to relate positively with ARL (Barr-Pulliam, et al, 2023; and Brazel, et al, 2016). Thus, with respect to how ARL responds to VDA, there is no certainty as either positive or negative impact is likely, thus necessitating test of the following hypothesis:

**H<sub>01</sub>:** Voice data analytics does not significantly influence audit report lags of accounting firms in Nigeria

### ***2.3.2 Enterprise's Image/video Data Analytics and Audit Reporting Lag***

Invocation of persuasive clarity and conviction, which is a distinctive attribute of video-based evidences, is very important factor that accounts for audit time-savings. Combining evidence source such as image/video analytics with traditional source can expedite resolution, enhance reliability and adequacy of audit evidence, hence potentially fulfilling reporting deadlines (Kend & Nguyen, 2020). The underlying tenet here is video evidence having unique ability to capture the subtleties of human behavior, thus providing a more immersive experience thatenablespeedy identification and resolution of audit risk areas.On this premise therefore, a negative relationship should be expected between VDA and ARL.

On the other hand, this distinctive attributeof video-based evidence (i.e. capturing ofnonverbal behaviors like body language, and facial expressions which can convey deception or evasiveness) can trigger auditors' skepticism.Exercising professional skepticism means lengthier ARL. Thus, with no prior studies on this nexus, it is uncertain which direction the pendulum is likely to swing, hence the following hypothesis was suggested for evaluation:

**H<sub>02</sub>:** Image/Video data analytics does not significantly affect audit report lags of accounting firms in Nigeria.

### ***2.3.3 Text Data Analytics and Audit Reporting Lag***

Study by Rezaee *et al.* (2017) indicates that text data analytics can affect audit reporting lag, since the extraction of text data requires the amalgamation of various data sources (e.g., emails, web pages, Facebook, WhatsApp, etc.) into conventional accounting information systems, thereby broadening the range of audit evidence acquisition beyond traditional source documents. This unequivocally reinforces the sufficiency criterion of audit evidence, hence facilitating a reduction in audit reporting delays.

On the other hand, using TDA expands the auditor's reach by giving him access to more types and volumes of data than he would have using conventional auditing methods. It is anticipated that having access to greater data volumes and at the same time exercising professional skepticism will result in a longer ARL, especially given the existence of agency conflict. Therefore, there is uncertainty regarding the *a priori* anticipation of the expected influence of TDA on ARL, as both positive and negative effects are possible, thus necessitating test of the following hypothesis:

**H<sub>03</sub>:** Text data analytics does not significantly impact audit report lags of accounting firms in Nigeria

## **1. Methodology**

A survey method was used in conjunction with *ex post facto* design. The study was based on examination of the causal relationship between Big Data Analytics and Audit Report Lag of listed manufacturing firms in Nigeria.

The population of interest to the current study is listed manufacturing firms in Nigeria. According to Nigerian Exchange Group (2024), there are a total of fifty-eight (58) listed manufacturing companies in Nigeria, falling under consumer goods and industrial goods manufacturing subsectors. Manufacturing sector was selected because it has the highest pool of reporting entities among the sectors of the Nigerian Exchange Group, and also because manufacturing business process is heavily information-intensive due to inherent dynamism of the operating environments. Hence, all the manufacturing firms listed on the Nigerian Exchange Group (2024) constitute the population of the study.

A judgmental technique, which is a form of non-probabilistic sampling method, was used because of the need for every sample member to meet certain inclusion criterion. The inclusion criterion was contingent on being quoted on the floor of the Nigerian Exchange Group as at 31<sup>st</sup> December 2023, having full 12-months accounting year that ended on or before the same date, and having annual report audited.

The sampling procedure began with a census of all the quoted manufacturing firms that published their annual reports for 2023 which disclosed the audit/accounting firm that produced the audit report on the financial statement. For the 2023 fiscal year, a total of thirty-seven (37) listed manufacturing companies were audited by eighteen (18) audit firms. Of these numbers, thirty-three (33) listed manufacturing companies which were audited by fourteen (14) audit firms eventually made up the sample of the study.

With respect to data collection method, data on audit opinion accuracy were sourced from the 2023 annual financial statement of listed manufacturing firms. Collections were mostly done via electronic means through the internet from the websites of the sampled firms. On the other hand, Likert-type questionnaire instrument was used to collect primary data on Voice Data Analytics through the assistance of online-based research assistant (Monkey survey). Table-1 presents a summary of operational measurement of variables.

**Table 1: Summary of Operational Measurement of Variables**

| Variable             | Operational Constructs Used  | Operationalization           |
|----------------------|--|------------------------------|
| Voice Data Analytics | <ul style="list-style-type: none"> <li>• Reliance on internet-sourced audit evidence in audio form</li> <li>• Resolve to develop capability in audio evidence extraction from archived audio database</li> <li>• Accordance of priority to sourcing for audio-based audit evidence in audit program</li> <li>• Preference for clients' oral over written management representation in response to audit queries</li> </ul> | Principal Component Analysis |
| Image/Voice          | <ul style="list-style-type: none"> <li>• Reliance on internet source audit evidence in</li> </ul>  | Principal Component          |

| Variable               | Operational Constructs Used   | Operationalization   |
|------------------------|---|--|
| Data Analytics         | video form <ul style="list-style-type: none"> <li>• Reliance on client's live streaming transaction data for audit evidence in video form</li> <li>• Resolve to develop capability in audit evidence extraction from archived video database</li> <li>• Accordance of priority to sourcing for video-based audit evidence in audit program</li> <li>• Clients' annual reports' image authentication capability</li> </ul> | Analysis   |
| Text Data Analytics    | <ul style="list-style-type: none"> <li>• Reliance on internet sourced audit evidence in text form</li> <li>• Reliance on client's live streaming transaction data for audit evidence in text form</li> <li>• Resolution to develop capability in textual evidence extraction from online</li> <li>• Accordance of priority to sourcing for textual evidence in audit program</li> </ul>                                   | Principal Component Analysis   |
| Audit Report Lag (ARL) | Total time delayed between financial year-end and audit report certification Date<br>Where:<br>N = number of days between audit report certification date and balance sheet date;<br>TA = book value of total assets, standing in for size;<br>TL = total liabilities, representing leverage, and<br>AF = audit fee, standing in for operational complexity   | $= \text{Ln} \left[ N \left( 1 - \frac{AF}{TA - TL} \right) \right]$ |

In empirical form, ARL is modeled as follows:

$$ARL_i = b_0 + b_1VDA_i + b_2IDA_i + b_3TDA_i + e \quad (1)$$

where  $b_0$  is the intercept of the regression equation,  $b_1, b_2$  and  $b_3$  are ARL response coefficient of VDA, IDA and TDA respectively; and  $e$  is error term. In line with the agency theory, our *a priori* expectation for the coefficients are such that:

$b_1 > 0$ ;  $b_2 > 0$  and  $b_3 > 0$  in which case the 'professional skepticism' argument is upheld, otherwise the 'efficiency' argument is confirmed.

## 4. Results

### 4.1 Field Report

Out of the 37 copies issued, 33 representing 89.2% were returned and four (4) were not returned. The 33 returned questionnaire copies retained for analyses came from 14 audit firms, as responses were based on clients-specific experiences.

**Table 2: Questionnaires Response Statistics**

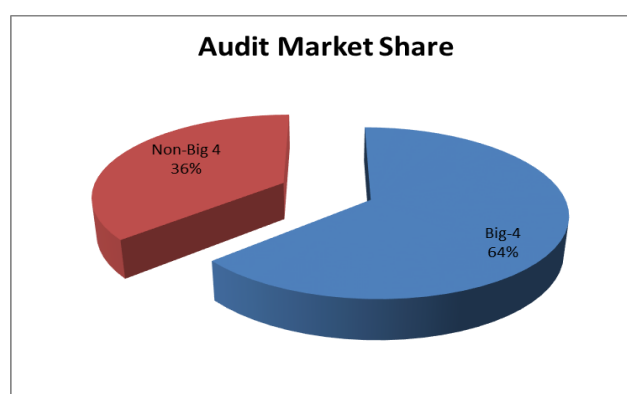
| Respondent's Category | Quest. Issued | Returned  | Response Rate (%) | No Returned | Discarded | Retained for analyses |
|-----------------------|---------------|-----------|-------------------|-------------|-----------|-----------------------|
| Big-Four              | 21            | 21        | 100               | 0           | 0         | 21                    |
| Non-Big Four          | 16            | 12        | 75                | 4           | 0         | 12                    |
| <b>Total</b>          | <b>37</b>     | <b>33</b> | <b>89.2</b>       | <b>4</b>    | <b>0</b>  | <b>33</b>             |

Source: Field Survey (2024)

The configuration of 'clients-to-auditors' ratio frequency of the 33 respondents was such that the mean score was 2.4 and the standard deviation was 2.2. Thus, based on 95% confidence interval, there was a 'clients-to-auditor' ratio of between 1 to 4 on the average, indicating how the audit market is concentrated.

## 4.2 Demographic Data Analysis

With regards to the respondents' category, there is strong evidence of market concentration in the Nigerian audit industry. This is a confirmation of market dominance by the big-four audit firms as captured in the pie chart presented as Figure-1.



**Figure 1: Structure of the Nigerian Audit Industry**

The respondents whose opinions we eventually used mostly fall within youthful age brackets. The implication of this demography is that, a reasonable degree of reliance can be placed on their judgment concerning ICT and data analytics. None of the respondents is older than 45 years as reported in Table-3.

**Table 3: Respondents' Demography: Ages**

|       | Frequency    | Percent   | Valid Percent | Cumulative Percent |
|-------|--------------|-----------|---------------|--------------------|
| Valid | 20 – 25      | 5         | 15.2          | 15.2               |
|       | 26 – 35      | 12        | 36.4          | 51.5               |
|       | 36 – 45      | 16        | 48.5          | 100.0              |
|       | <b>Total</b> | <b>33</b> | <b>100.0</b>  | <b>100.0</b>       |

Source: IBM SPSS Statistics 20



More so, a good proportion of the respondents are on senior manager cadre, meaning their opinions on the subject of inquiry are reliable. This position is valid based on the premise that staffs at higher strategic apex have greater access to company information than those at lower level. Table-4 presents distribution of respondents' designations, indicating their ranks/statuses and accessibility to prime information about the practices of their employers.

**Table 4: Respondents' Demography – Designations**

|       |                  | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------------|-----------|---------|---------------|--------------------|
| Valid | Audit Manager    | 21        | 63.6    | 63.6          | 63.6               |
|       | Audit Supervisor | 7         | 21.2    | 21.2          | 84.8               |
|       | Junior Auditor   | 5         | 15.2    | 15.2          | 100.0              |
|       | Total            | 33        | 100.0   | 100.0         |                    |

Source: IBM SPSS Statistics 20

As a further tribute to the credibility of their collective opinion on the subject at hand, each of the respondents has adequate educational qualification related to the subject of study. In fact, the adequacy of their educational qualification is skewed in the direction of higher degree of learning as lucidly demonstrated in Table-5:

**Table 5: Respondents' Demography - Educational Qualification**

|       |         | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|---------|-----------|---------|---------------|--------------------|
| Valid | BSc/BA  | 12        | 36.4    | 36.4          | 36.4               |
|       | MSc/MBA | 13        | 39.4    | 39.4          | 75.8               |
|       | PhD     | 8         | 24.2    | 24.2          | 100.0              |
|       | Total   | 33        | 100.0   | 100.0         |                    |

Source: IBM SPSS Statistics 20

The general notion that, gender plays a role in shaping the preferences and usage patterns of individuals when it comes to technology, implicates an imperativeness for balanced gender representation in text data analysis discuss. As reported in Table-6, there is fair gender representation among the respondents, hence lowering the risk of one-sided perspective on the subject-matter.

**Table 6: Respondents' Demography - Sex/Gender**

|       |       | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------|-----------|---------|---------------|--------------------|
| Valid | F     | 8         | 24.2    | 24.2          | 24.2               |
|       | M     | 25        | 75.8    | 75.8          | 100.0              |
|       | Total | 33        | 100.0   | 100.0         |                    |

Source: IBM SPSS Statistics 20

Overall, all factors that contribute to a good credibility score for testimonies and opinions from survey participants—namely, maturity, experience, knowledge quotients, and accessibility of information on the subject of the opinion—show high scores, attesting to the validity and reliability of sampled opinions as attested to by the following tabulated indicators:

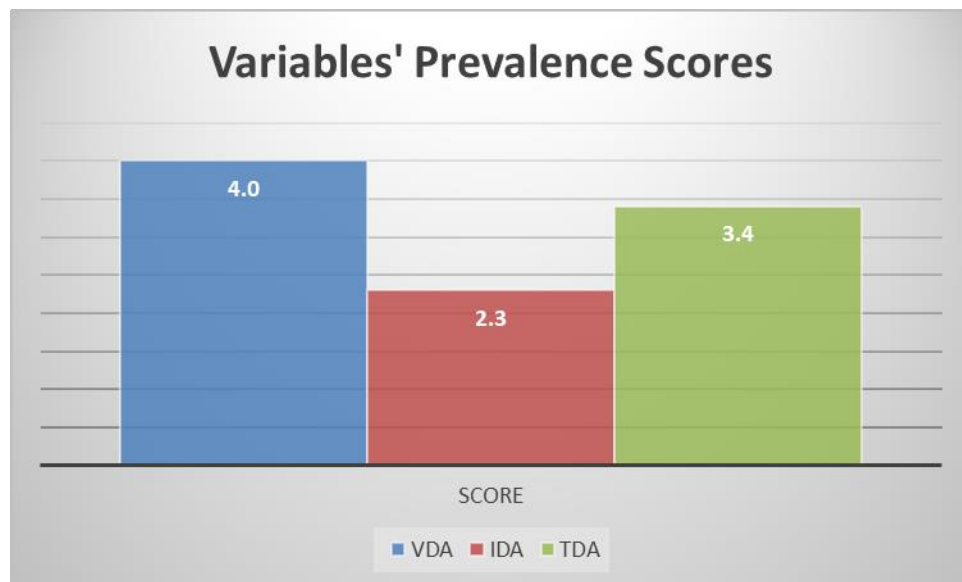
**Table 7: Reliability & Validity of Measurements of Variables**

| Variables            | Eigenvalues     | Cronbach Alpha | KMO Test |
|----------------------|-----------------|----------------|----------|
| Voice Data Analytics | 2.988 (74.699%) | 0.875          | 0.829    |
| Image Data Analytics | 3.731 (74.617%) | 0.913          | 0.843    |
| Text Data Analytics  | 3.107 (77.671%) | 0.900          | 0.810    |

Source: IBM SPSS Statistics 20

Cronbach's Alpha was calculated to evaluate the test instrument's internal consistency and reliability while Principal Component Analysis (PCA) was utilized to convert the responses from ordinal to interval scale and also to ascertain the unidimensionality of the items. The rationale that justifies the use of PCA is the imperativeness of scale congruence since the measurement basis of the dependent variable is on interval scale. In all, the test results strongly confirm the suitability of carrying out PCA given the high values of the KMO statistics which generally indicate that factor analysis is useful with the data.

#### 4.2 Descriptive Analysis

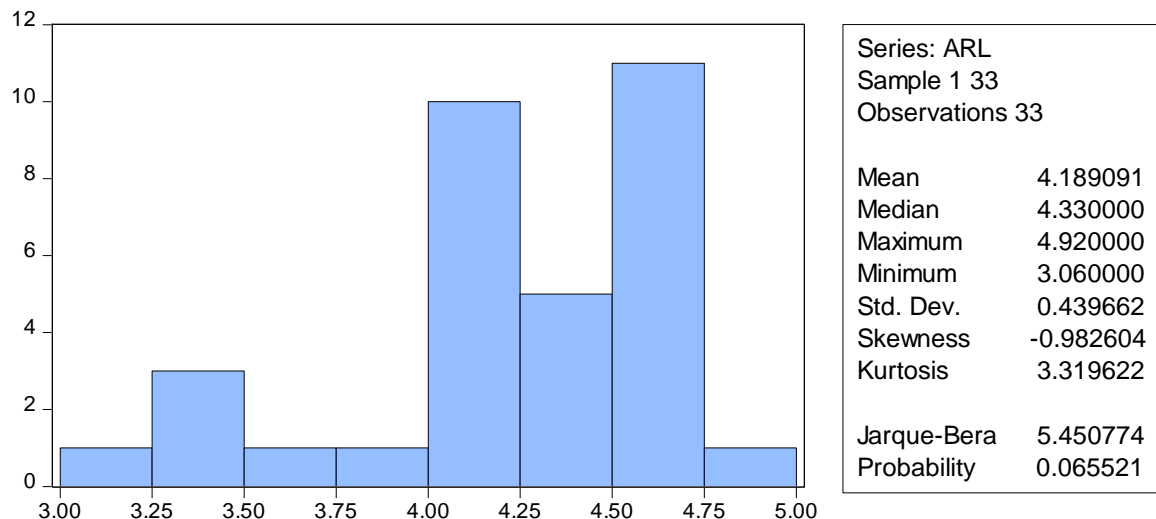


**Figure 2: Big Data Analytics Prevalence Scores**

Responses on the prevalence intensities of the respective variables were used to arrive at mean and standard deviation scores. The mean scores are presented in Figure 2. The results show that with VDA at 4.0; IDA at 2.3; and TDA at 3.4 on a scale of 1 to 5, there is more prevalence of VDA than any other form of analytics in use among manufacturing firms in

Nigeria. As for TDA, its prevalence is almost in the boundary of uncertainty while IDA is almost non-prevalent among manufacturing companies in Nigeria.

For ARL, the maximum and minimum length of lag are approximately 137 days (i.e.,  $e^{4.92}$ ) and 21 days (i.e.,  $e^{3.06}$ ) respectively. The average is approximately 66 days (i.e.,  $e^{4.1891}$ ) in terms of mean, or approximately 76 days (i.e.,  $e^{4.3300}$ ) in terms of median score, with a standard deviation of 1.6 days (i.e.,  $e^{0.43966}$ ). Given the near-equality of the two measures of central tendency, and despite the slight skewness (-0.9826), ARL distribution is fairly normal, as the Jarque-Bera statistic (5.451) and its probability value (0.0655) indicate.



**Figure 4.3: Audit Report Lag in Nigeria**

### 4.3 Tests of Research Hypotheses

The test results of the variables and hypotheses on the influence of BDA on ARL are explained in this section. The F value of the model is 19.448. The significance level is 0.000. The value of  $0.000 < 0.05$  means that the model parameters are statistically significant.

| ANOVA <sup>a</sup> |                |    |             |        |                   |
|--------------------|----------------|----|-------------|--------|-------------------|
| Model              | Sum of Squares | Df | Mean Square | F      | Sig.              |
| 1 Regression       | 4.132          | 3  | 1.377       | 19.448 | .000 <sup>b</sup> |
| Residual           | 2.054          | 29 | .071        |        |                   |
| Total              | 6.186          | 32 |             |        |                   |

a. Dependent Variable: ARL

b. Predictors: (Constant), Text Data, Voice Data, Image Data

The explanation ratio of the model is 0.634, meaning that all three components of BDA jointly account for 63.4% of audit report lag of manufacturing companies in Nigeria.

| Model Summary <sup>b</sup> |                   |          |                   |                            |               |
|----------------------------|-------------------|----------|-------------------|----------------------------|---------------|
| Model                      | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1                          | .817 <sup>a</sup> | .668     | .634              | .26612                     | 2.403         |

a. Predictors: (Constant), Text Data, Voice Data, Image Data

b. Dependent Variable: ARL

With respect to diagnostics of the model, the reported Durbin-Watson statistic indicates that the presence of autocorrelation is slightly on the fringes of unacceptable tolerance level, hence there is need to worry over autocorrelation. Also, the VIF statistics in Table 4.10b are respectively above the 10-point rule-of-thumb, hence justifying the need to worry over multicollinearity and its distortionary effects on the estimated standard errors of the respective coefficients. We therefore interpret the coefficients based on the standardized values.

| Coefficients <sup>a</sup> |                             |            |                           |        |      |                         |        |
|---------------------------|-----------------------------|------------|---------------------------|--------|------|-------------------------|--------|
| Model                     | Unstandardized Coefficients |            | Standardized Coefficients | T      | Sig. | Collinearity Statistics |        |
|                           | B                           | Std. Error | Beta                      |        |      | Tolerance               | VIF    |
| 1 (Constant)              | 4.189                       | .046       |                           | 90.427 | .000 |                         |        |
| Voice Data                | .420                        | .212       | .955                      | 1.976  | .058 | .049                    | 20.381 |
| Image Data                | .575                        | .397       | 1.307                     | 1.448  | .158 | .014                    | 71.148 |
| Text Data                 | .621                        | .249       | 1.413                     | 2.495  | .019 | .036                    | 28.022 |

a. Dependent Variable: ARL

The equation coefficient of the VDA, IDA and TDA are 0.955, 1.307 and 1.413 respectively and they are all positive with VDA and TDA being statistically significant while IDA is statistically insignificant at 5% level. As shown in Tables 8, the variables have an increasing effect on ARL. We therefore reject H<sub>1</sub> and H<sub>3</sub> while we failed to reject H<sub>2</sub>.

#### 4.4 Discussion of Findings

##### 4.4.1 Voice Data Analytics and Audit Report Lag

Results from the foregoing analysis indicate that VDA can stimulate strong ignition effect on auditors' professional skepticism. Through voice data analytics, tone and sentiment analysis are made possible. Analyzing the tone and sentiment of voices during interviews or meetings helps auditors detect potential biases, nervousness, or evasiveness, thereby indicating areas that require further scrutiny. In this way, VDA enables auditors' ability in emotion detection: Identifying emotions like anxiety, fear, or aggression in a client's or witness's voice can suggest potential fraud or concealment, hence, prompting auditors to investigate further. Thus, VDA facilitates speech patterns and cadence analyses. Analyzing speech patterns and cadence can reveal potential deception or hiding of information, enabling auditors to probe deeper. Also, keyword and phrase detection are made possible by VDA. Identifying specific keywords or phrases that are related to fraud or risk can alert auditors to potential issues that can ignite their professional skepticism. Therefore, VDA facilitates risk assessment as it can help auditors assess the risk of material misstatement or fraud, enabling them to focus their skepticism on high-risk areas. In a nutshell, by leveraging VDA, auditors can complement their traditional audit procedures with data-driven insights that exerts significant ignition effect on their professional skepticism that is likely to elongate ARL but ultimately improving audit quality.

Therefore, result of the study evidently corroborates earlier study by Mayew and Venkatachalam (2012), Fu, *et al.* (2021) and Amiciset *al.*, (2020) where emotional tone

analysis, keyword phrases and language were used during earnings conference calls to assess litigation risks and other predictive analyses. Although the objectives of these prior studies are somewhat different from the current study, they demonstrate the possibility that by analyzing voice data, analysts can gain insights into emotional states, intentions, and decision-making processes, ultimately igniting professional skepticism of auditors, leading to elongation of audit report lags.

#### **4.4.2 Image Data Analytics and Audit Report Lag**

Although video evidence has a unique ability to capture the subtleties of human behavior and provide a more immersive experience, which makes it more likely to trigger professional skepticism in auditors, it was found that video data analytics exerted an insignificant positive influence on audit quality. This might not be unconnected with the high-tech savvy it requires and the attendant cost implication for audit firms. It often requires more data sources, such as cameras and sensors, which can add to the overall cost, making its commercial viability unattractive. Video data analytics requires more hours of analysis and support due to the complexity of video data. It requires more robust infrastructure, such as storage and processing power, to handle large video files, more cloud services, such as cloud storage and processing, which can add to the overall cost.

While the statistical insignificance of this coefficient is evident, the potential for voice data analytics to exert positive effects on ARL cannot be ignored. The result tends to align with the argument that auditors can have a deeper grasp of how businesses operate, spot possible threats, and use professional skepticism more skillfully by utilizing video data analytics. It records nonverbal cues including body language and facial expressions that can indicate dishonesty or evasiveness and raise suspicions in the minds of auditors. The result further corroborates the argument that video-based evidences give auditors a visual proof of events, assets, and processes, which makes it simpler for them to corroborate or refute client claims. Therefore, due to its nature by default in evoking auditor's professional skepticism, greater tendency of image/video data analytics elongates ARL. However, the results of the current study did not support a significant effect of image data analytics on ARL, in contrast to the suggestion made by Brown-Liburd and Vasarhelyi (2015) and Kend and Nguyen (2020).

#### **4.4.3 Text Data Analytics and Audit Report Lag**

Regarding how text data analytics influence audit quality, this study has produced empirical evidence that supports existence of positive impact of text data analytics on audit report lag. Results also showed that text data analytics exerted positive influence on the likelihood of audit opinion accuracy, though the degree of impact was found to be statistically insignificant at 5% level. Results appear to confirm that auditors' use of text data analytics expands their reach by giving them access to more types and volumes of data than they would have, using conventional auditing methods. Having access to greater data volumes kindles auditors' professional skepticism, especially given the widespread use; especially given the widespread use of electronic platforms that enables text data analytics among businesses of contemporary era. This line of thought runs in tandem with several studies (e.g. Barr-Pulliam et al., 2023; Brazel *et al.*, 2016; and Gefen *et al.*, 2020) that have investigated the effect of data analytics

on auditors' professional skepticism, with some suggesting that the use of data analytics can improve professional skepticism.

## 6. CONCLUSION

This study has established empirical proof of the underlying relationship involving big data analytics and audit report lag, through the mediating influence of professional skepticism. The aim of the study has been to show that this technology (BDA) can be used to ignite auditors' professional skepticism, thereby demonstrating the fact that in the current era, with the pervasive influence of technology, particularly in information technology and computing within business, the significance of big data applications has become paramount. Ultimately, the study has shown that, integration of big data applications provides value to auditing, particularly by invigorating professional skepticism, though at the risk of elongating audit report lag. Therefore, it is the recommendation of this paper that Financial Reporting Council of Nigeria should take steps to institutionalize the use of big data analytics in auditing practice. To this end, they should establish guidelines and standards for the use of big data analytics in auditing, including data quality, privacy, and security requirements. In addition, they should offer training and resources to help auditors develop the necessary skills to effectively leverage big data analytics.

This study is not without limitations. The study's limitations also present opportunity for future investigation. Firstly, prospective research may focus on comprehending client perspectives regarding the application of Big Data Analytics in financial statement audits. To date, the IAASB has gathered client perspectives on BDA in audits in response to its solicitation for opinion on BDA incorporation into audit standards. Several clients have articulated apprehensions with BDA concerning data security and integrity. This issue may be intriguing as it portends new era in audit practice and academics could investigate this topic utilizing either qualitative or quantitative methodologies for data collection. An additional area of investigation may involve executing a longitudinal study on BDA. Considering that audit firms assert that BDA improves audit quality, this assertion might be empirically evaluated by developing proxies (De Fond and Zhang, 2014) that effectively measure audit quality in a data-driven context. The research may entail evaluating auditors' capacity to identify concerns such as fraud risks (ISA 240) and to communicate the results to pertinent stakeholders (DeAngelo, 1981; De Fond and Zhang, 2014).

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