

Auditors Independence and Audit Quality of Industrial Goods Firms in Nigeria

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Abstract:

This investigation looks at the impact of Auditor Independence (AI) on Audit Quality (AQ) at twenty Nigerian industrial goods companies over ten-year (2011 - 2020). Adopting an ex-post factor design, the secondary data collected were subjected to some preliminary data tests such as descriptive analysis, Pearson moment correlation matrix and multi-collinearity analysis using Variance Inflation Factor (VIF). Using logistic regression and a firm-random effect model, the study analyzed a sample of 200 firm listed in the Nigeria Exchange Group for ten years (2011 – 2020), measuring auditor independence based on audit fee, auditor education level, auditor busyness and joint provision of audit and non-audit services (JPANS). As a result, this study found that audit fee and auditor education level positively and significantly affect audit quality of industrial goods corporations in Nigeria at 1% and 5% levels of significance respectively while auditor busyness and JPANS negatively affect audit quality and this simply implies compromise of auditor independence. The study concludes that auditor independence in the industrial goods companies in Nigeria is compromised via auditor busyness and provision non audit services during the period covered by the study. Grounded on the outcomes above, it is recommended that Regulatory agencies in Nigeria should increase surveillance on audit practices with regards to fees charged while JPANS by the same audit firm should be discouraged.

Keywords: *Audit quality, auditor busyness, audit fees, auditor education level, joint provision of audit and non audit services*

Introduction

As a result of various corporate crises, corporations are placing a greater focus on the supposed freedom of external auditors. Take for instance, in Nigeria, crises such as the cases of Cadbury Nigeria Plc and African Petroleum, Savannah Bank and African International Bank (Odia, 2007); Wema Bank, Nampak, Intercontinental Bank Plc., Bank PHB; Oceanic Bank Plc. and AfriBank Plc, Finbank and Spring Bank (Ekwueme, Anichebe, & Orjinta, 2020); and more recently, Diamond bank. The cases mentioned above were openly publicized and culminated in false financial reporting. As a result, there is concern over the integrity of accounting profits and its link with the auditing procedure, which has been perceived to improve over time in the aftermath of recurring cluster of corporate failures, frauds, and litigations. The audit function's authenticity, integrity, efficacy, and relevance have all been questioned in the wake of recent corporate financial catastrophes. As a result, there is concern over the integrity of accounting profit and its link with the auditing procedure, which has been perceived to improve over time in the aftermath of recurring groups of corporate collapses, scams, and law suits.

In Nigeria, there have been a slew of defaults and breakdowns in the industrial products industry linked to management, with the majority of these problems going unreported by auditors. This has called into doubt the accuracy and reliability of Nigerian industrial enterprises' audited financial accounts, as well as the auditors' independence from management manipulation via audit fees, auditor busyness, educational level, and *JPANS*. These numerous company downfalls, audit let-downs, and the worldwide financial disaster aforementioned have endangered the trustworthiness of the audit role thereby creating room for more research on whether auditor independence can help sustain audit quality.

Given the difficult obstacles that the audit role faces, several studies like Ekwueme, Anichebe, and Orjinta, (2020); Piot and Janin, (2005) have tried to establish connection of auditor tenure, fees, size, AI and earnings management. They also attempted to show how this link affects the quality of earnings reported by quoted firms in a variety of nations. Yuniarti (2011) found a substantial positive link of audit fees (AF) and AQ in previous research. The AI; anomalous AF variation rate is inversely connected with AQ (Nozarpur, 2014). According to Enofe, Ngbame, Okunega, and Ediae (2013), AQ improves AQ. AI has a beneficial impact on AQ (Abdul, Sutrisno, Rosidi, & Achsin (2014). According to Babatolu, Aigienohuwa, and Uniamikogbo (2016), audit fee, audit firm rotation, and audit quality all have a favorable association. Furthermore, Zayol and Kukeng (2017) found a high link between AI and AQ.

Nevertheless, considering the kind of research plan, sample size, data collection method, and research methods used, these previous findings were inconclusive; due to the kind of research design employed, sample size, data collection devices, and analysis procedures utilized, certain researches revealed a positive link while others revealed the opposite. Besides, these researches were done prior to the mandatory adoption of IFRS and may not give a complete description of the current situation. In addition, most of the studies on this nature were centred on few of the threats and mostly done in overseas. Moreover, the research reveal that audit quality is predicted to reduce the occurrence of a company's declared income adjustments, but the bulk of the data indicate a conundrum of discrepancy and disagreement.

It is therefore evident from the above studies (Zayol & Kukeng, 2017; Enofe, Ngbame, Okunega & Ediae, 2013; Abdul, Sutrisno, Rosidi & Achsin, 2014) that the existing work has heightened the necessity for more research to confirm the nature of the association between AI and AQ. This however forms the significant reasons and justification for this article, hence the need to re-examine the influence of AI on AQ. As a result, this document is separated into five pieces, one of which being this introduction. The study of related literature is covered in part 2, the technique is covered in section 3, and the analytical results are presented and discussed in section 4. Finally, in section 5, we reach a conclusion and make policy recommendations.

2.2 THEORETICAL CONSTRUCTS AND HYPOTHESIS DEVELOPMENT

Audit Quality (AQ)

According to Aliu, Okpanach, and Mohammed (2018), one of the most popular meanings of quality audit is the market estimate of the probability that the auditor detects substantial distortions of the financial statements or employers accounting system and (ii) reports significant distortions. Arens, Elder, Beasley, and Fielder (2011) said the AQ is determined by wellness of detecting and reporting frauds in financial statements. Discovery is an image of auditor competence, whereas reporting is an indication of ethical or honesty of auditor, especially freedom. Audit quality is defined as an auditor's detection and reporting of material distortion of facts in financial statements, which shows the auditor's competence (De Angelo, 1981). Audit quality, according to Enofe Mgbame, Efayena, and Edegware (2014), is defined as an auditor's capacity to protect the views of financial statement users by detecting and revealing false statements and information irregularity between financial statement users and management. This implies that AQ can be seen when a financial report has no imbalance of details. The size of the audit company was utilized as a measure for AQ in this investigation.

Audit Fees (AF) and Audit Quality (AQ)

AF is the aggregate amount in monetary terms received for a particular audit service. The pay for auditors for their job are known as AF. It represents the cost of the public accountants' labor as well as the danger of lawsuit (Choi, Kim, Liu, & Simunic, 2009). The AF is defined by Chersan, Robu, Carp, and Mironiuc (2012) as the monies paid or due to be paid to the auditor for the services provided to the auditee. Researchers such as (Okolie, 2014; Babatolu et al, 2016) argue that the pay-out for an audit service can be as an obstacle to auditor freedom, contending that increased AF will probably improve financial connection of the auditor to the auditee, consequently hampering the AI (Okolie, 2014), whereas audit firms that charge low fees may be caused by establishment management who may choose to give extra cash for the auditor to compromise. Thus, the link of AF fees and AI in assessing AQ is considered a source of worry for stakeholders for certain period, particularly, ever since the case of Enron. As a result of this inconclusive nature of the arguments, this paper does not forecast any indication for the consequence of AF on AQ but suggest that *there is a significant link of AF and AQ (Hypothesis I)*

Auditor Education Level (AEL) and Audit Quality (AQ)

One of the most important characteristics that improves AQ is AEL (Yan & Xie, 2016). The procedure of informing, teaching, and raising awareness about the auditor's legislative obligations to users of financial info and the public at large with the goal of increasing their degree of comprehension of the operations of auditing; and, as a result, closing the disparity

between community requirements and auditor performance. Since they have more understanding (Cahan & Sun, 2015; Che, Langli & Svanström, 2017), are more capable and competent, and put more effort (Bröcheler, Maijor, & van Witteloosetuijn, 2004; Che et al., 2017; Ye, Cheng, & Gao, 2014), auditors with a higher degree offer greater better audit work than auditors with a lower degree. The procedure of informing, coaching, and raising awareness about the auditor's legal responsibilities to users of financial info and the public at large with the goal of increasing their degree of comprehension of the operations of an auditing; and, as a result, closing the disparity between public demands and auditor achievement. Since they have more understanding (Cahan & Sun, 2015; Che, Langli & Svanström, 2017), are more qualified and competent, and put more exertion (Bröcheler, Maijor, & van Witteloosetuijn, 2004; Che et al., 2017; Ye, Cheng, & Gao, 2014), auditors with a higher degree offer greater and better services than those with a bachelor's degree. When completing audit jobs, educated auditors are more cautious because of their qualifications. However, because there were some contradictions in the earlier research, the current study will not propose any sign for auditor education level; rather, the research will hypothesis that there is a substantial link between AEL and AQ (Hypothesis 2).

Auditor Busyness (AB) (Workload) and AQ

AB is thought to have an impact on audit quality and earnings management. In recent studies, auditor busyness has been calculated with the aggregate of clients served by the auditor. Some researches, such as Goodwin and Wu (2016); Gul, Ma, and Lai (2017); Lai, Sasmita, Gul, Foo, and Hutchinson (2016); Sundgren and Svanström (2014); Suzuki and Takada (2016), look at the effect of an auditor's client count on AQ. Others, like Balsam, Krishnan, and Yang (2003); Che, Langli, and Svanström (2017); Hardies, Breesch, & Branson (2016); Karjalainen (2011); Karjalainen, Niskanen, and Niskanen (2013), used the parameter, AB as a control variable in their AQ research. In several advanced and emerging economies, the influence of auditor activity on AQ is described as unrestricted accruals, audit opinion, and minor incomes in all of these recent studies. The primary reasons in favor of auditor workload having a detrimental impact on AQ are that it does. It's though since preoccupied auditors don't always have enough time to learn about their clients' businesses and financial statements, and they don't always have enough time to build up client data (Gul et al., 2017; Sundgren & Svanström, 2014), or due to a loss of concentration induced by a wide client portfolio, they may neglect earnings management methods (Gul et al., 2017; Sundgren & Svanström, 2014). (Suzuki & Takada, 2016; Lai et al., 2016). In reality, based on the foregoing discussion and the findings of previous studies, this study does not seek to forecast any indicator of auditor workload; rather, hypothesize that there is a strong association of audit workload and audit quality (hypothesis 3).

Provision of Audit and Non Audit Services (PANS) and Audit Quality

Every services that auditors give not related to auditing, such as management advice services and compliance-related services, are classified as non-audit services (accounting and tax services). The current audit company or other ones can offer these services. Non-audit income is mostly derived from non-audit activities. It is any other function supplied to a client that is not connected to the examination and giving of a professional opinion on accounting records. This is a scenario where one auditor provides auditing work, audit services and other management consultancy services to the client. Okafor and Okaro (2014) looked at how the business for non-audit services (NAS) has changed in recent years, with a special emphasis on the JPANSs and the potential impacts on audit independence and quality. Similarly, Jibril (2014) believes that non-audit activities give-out AI because future quasi-rents (non-audit fee) are given to the

auditors. Changes in audit procedures in larger organizations, Cristina and Maria Consuelo (2009) contend, are distorting the lines of audit jobs and consulting and endangering the audit process' freedom. However, well-known researches have questioned the sufficiency of such prescriptive constraints, arguing that the scientific proof is far from uniform and supports concerns about loss of independence. **The study therefore suggest that there is a substantial link of JPNASs and AQ (Hypothesis 4).**

Empirical Studies

Ekwueme, Anichebe and Orjinta (2020) observed the effects of external auditor's independence on earnings management of consumer goods corporations in Nigeria. Their research uses secondary data collected from financial statements from numerous organizations to assess and quantify the extent of earnings distortions using an all-encompassing multivariate methodology. For a ten-year period spanning 2010 to 2019, samples of 20 consumer products companies quoted on the NSE were used. Ex-post facto and longitudinal research designs were used in their investigation. The empirical analysis, which included 200 company-year observations, found that audit tenure has a positive non-significant effect and a direct link with the aggregate of unrestricted accruals of quoted consumer goods corporations in Nigeria, while firm size and JPANSs have a negative and significant effect at the 95 percent confidence level, respectively.

Similarly, Hussein, Hanefah, and Endaya (2020) aims to analyse audit team features that were supposed to be affected on audit quality. It is primarily concerned with whether audit team features such as independence, continuing education and training, experience, and professionalism improve audit quality. The external environment audit, i.e., professional bodies, rules and regulations, and established norms, has a moderating impact on the link of audit team characteristics and AQ in an investigation like this one. To investigate the relationship between the study's variables, multiple regression analysis is used. A survey of 251 external auditors was done using a personally given questionnaire from the Libyan Association of Accountants and Auditors (LAAA). They discovered that the audit team's features were related to audit quality in a positive and significant way. The regression analysis at the dimension level also demonstrates that audit quality is positively and significantly associated. The results also show that the external environment audit factors alter the link between the research variables.

Wakil, Alifiah, and Teru (2020) investigated AI and AQ in the Nigerian public sector. They discussed extensively among academics, concluding that while there is a need for consistency across researchers and practitioners, there is no accord on how to get AQ at this time. The term AQ is a contentious topic in both the public and private sectors of the economy. Audit quality is critical in guaranteeing accountability and openness in the Nigerian public sector. Auditors must have freedom in both fact and appearance in order to achieve audit quality. As a result, the target of this article is to look into the link between auditor independence and audit quality in the Nigerian public sector and predicts a high correlation.

In a similar vein, Aliu, Okpanachi, and Mohammed (2018) looked at the influence of AI on AQ of Quoted Oil and Gas Corporations in Nigeria over a ten-year period (from 2007 to 2016). The sample size is composed of nine (9) of the fourteen (14) enterprises quoted in the downstream segment of the NSE, which were selected utilizing a purposeful sampling approach. The analysis is based on secondary data gathered from the audited yearly financial statements of the sampled companies. The panel data was analyzed using descriptive statistics, a correlation matrix, and a

binary logit regression technique. The data show a significant positive link of AI and AQ, while the control factors of business size and leverage have a positive and negative relationship with AQ, respectively.

Similarly, Ocak (2018) used Turkish listed companies to investigate the influence of AEL on the connection between AB and AQ. Prior studies on auditor busyness haven't looked at how busyness impacts AQ in the case of auditors with different levels of education. Utilizing workload and auditor education level, he established several interacting variables. In addition, the sample was divided into two categories depending on the level of AEL. The major findings suggest that AQ is negatively (positively) affected by auditor workload (auditor education level). The formal education level of auditors helps to mitigate the detrimental impact of auditor busyness on auditor quality. He also discovered that auditor workload had a greater detrimental impact on audit quality among less educated auditors.

From 2013 to 2016, Ogbeide, Okaiwele, and Ken-Otokiti (2018) looked into the influence of AI on AQ of insurance businesses quoted on the NSE. The Yamane method was used to estimate the sample size of 24 insurance firms. Secondary data was gathered through financial statements of the sampled firms. Descriptive statistics, a correlation matrix, and the panel regression method were utilised to examine. The data reveal that audit company tenure has a substantial negative association with audit quality, whereas audit firm rotation has an insignificant positive link with AQ. The size of the company had a high positive correlation with AQ.

METHODOLOGY

Ex-post facto design was utilized to explore the impacts of auditor independence on audit quality of 20 industrial products companies in Nigeria, using secondary data from financial reports that could not be changed or modified by the investigator. The study period covered ten years (10) from 2011 to 2020. Audit quality which was taken as our dependent variable was estimated using audit company size *identified as a dichotomous construct 1 if a corporation is audited by Big 4 Audit corporations, and 0 if not*, while audit fees, auditor education level, auditor workload and JPANSs were used as measures for auditor independence. The model used in this study postulated a linearity between auditor independence and audit quality, and for hypothesis testing, panel least square was used, which was directed by the accompanying model:

$$AUDQUAL_{it} = \beta_0 + \beta_1 AUDFE_{it} + \beta_2 AUDEL_{it} + \beta_3 AUDBUSY_{it} + \beta_4 JANAS_{it} + \epsilon_{it} \dots \dots \dots 1$$

Where,

AUDQUAL stands for audit quality captured using audit firm size *measured as a dichotomous construct 1 if a corporation is audited by Big4 audit firm and 0 if not*, AUDFE stands for AF measured as *the quantum of audit fees received*, AUDEL connotes auditor education level proxy using *auditors with post-graduate education measured as a dichotomous variable 1 if the auditor has post-graduate education qualification and 0 if otherwise*, AUDBUSY represents auditor busyness captured as *the aggregate of clients of the auditor measured as a dichotomous measure 1 if the auditor has many clients and 0 if not*, while JANAS connotes JPANSs measured as *a dichotomous variable 1 if the same auditor provides both audit and non-audit services for the firm/client and 0 if otherwise*.

4.1 RESULTS AND DISCUSSION OF FINDINGS

The study looked at the causative link of AI and AQ of publicly traded industrial products corporations for ten years (2011 – 2020). Descriptive statistics, correlations, and VIF analyses

were done as part of the preliminary data analysis. The table below shows the descriptive data of the selected industrial products enterprises that make up our sample.

Table 4.1 Descriptive Statistics Analysis

	AUDQUAL	AUDFE	AUDEL	AUDBUSY	JANAS
Mean	0.575758	1.452180	0.116162	0.717172	0.040404
Median	1.000000	0.076200	0.000000	1.000000	0.000000
Max	1.000000	48.10780	1.000000	1.000000	1.000000
Min	0.000000	0.000000	0.000000	0.000000	0.000000
Std. Dev.	0.495480	6.636758	0.321231	0.451515	0.197404
Skewness	-0.306570	6.350720	2.395856	-0.964407	4.668202
Kurtosis	1.093985	43.05763	6.740124	1.930080	22.79211
Jarque-Bera Prob.	33.07287	14569.01	304.8295	40.13666	3950.891
	0.000000	0.000000	0.000000	0.000000	0.000000
Obs	198	198	198	198	198

Source: researcher's formulation using E-view 10 (2022)

The goal of descriptive statistics was to explain the data's broad distributional qualities, as well as to detect any anomalous occurrences or trends of occurrences that could present problems for subsequent studies. As a result, the data was first explored using simple descriptive techniques to explain and summarize the data gathered for the research. The dependent variable, audit quality, was evaluated using audit firm size, which was recorded using a binary variable 1 if the corporation was audited by any of the BIG 4 auditors and 0 if not. It was discovered that audit quality, as evaluated by auditor company size (BIG4), averaged 0.5757 with standard deviation of 0.495. While the min and max values which are dichotomous are 0 and 1 respectively. Within the period under review, it was discovered that about 57% of the firms selected are being audited by big 4 auditing firm to safeguard excellence while about 43% are being audited by other auditing firms not classified under BIG4. This implies that BIG4 auditors' service was about 57% during the period of the study and the deviation from the mean is 49%. The skewness for audit quality was -0.306 implying that data on audit quality were slanted to the left and so does not conform to the proportioned distribution requirement hence most values were bunched to the right of the distribution. The kurtosis for audit quality was 1.093 that is less than 3 shows that the data on audit quality is normal hence the data is said to be platykurtic having very few outliers. Furthermore, the coefficient of Kurtosis 1.093 also shows that audit firm size construct does not meet the Gaussian distribution standard.

In general, JB Probability values of 0.0000 indicate that all variables are regularly distributed at the 1% significance level. It means that all variables are roughly normally distributed and that they were all kept in the model. This suggests that there are no outlier variables, or they are unlikely to influence the inference and are thus dependable for broad view. The employment of panel least square estimate method is also justified in this case. As a result, any suggestions given would, to a considerable extent, reflect the features of the genuine research population.

4.2: Correlation

Pearson's correlation was used to explain the strength of the link of AI and AQ of publicly traded industrial goods companies in Nigeria, and the severity of the link of the variables.

Table 4.2: Correlation Analysis Result

	AUDQUAL	AUDFE	AUDEL	AUDBUSY	JANAS
AUDQUAL	1.000000				
AUDFE	-0.222353	1.000000			
AUDEL	0.183624	-0.056213	1.000000		
AUDBUSY	-0.221400	0.090932	-0.122316	1.000000	
JANAS	-0.239046	-0.026608	-0.074390	0.014957	1.000000

Source: researcher's formulation using E-view 10 (2022)

The outcome of the correlation coefficient showed mixed correlation. This association identified supports the point that majority of the constructs have an inverse link with varying degrees of direction. Besides, the quality of the connection between constructs as evaluated by the Pearson product-moment correlation revealed that the connection relatively small, falling below the 0.80 threshold, indicating that the predictor variables are free of multicollinearity. The Pairwise relationships between the variables of AI and AQ are presented and discussed in this segment. According to the foregoing findings, there is another opposite but minor relationship between auditor education level, auditor workload, and JPANSSs.

When assessing for multicollinearity, the researchers noted that no two endogenous constructs are highly associated in the correlation table above, ruling out the possibility of an outlier. This shows that the model employed for the investigation does not have a multi-collinearity problem. This also explains why panel regression analysis and the VIF were used.

4.3: VIF

The VIF and its reciprocal, or tolerance, were used to test multicollinearity. Collinearity diagnostics examine how tightly regressors are linked to one another and how this affects the consistency and variability of regression results. As a result, we used VIF to further investigate the multi-collinearity issue. The VIF's outcome is shown in table 4.2.3 below:

Table 4.3: VIF Result

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.004266	3.912371	NA
AUDFE	2.52E-05	1.060118	1.011447
AUDEL	0.010865	1.157434	1.022985
AUDBUSY	0.005497	3.615698	1.022622
JANAS	0.028310	1.048984	1.006601

Source: Researcher's summary of VIF result (2022)

The study employed the VIF test to measure the strictness of multicollinearity in the model, where the VIF of each construct are evaluated. According to the rules of this test, multicollinearity may only be proved if the VIF is greater than 10. According to the test's

guidelines, there is no intercorrelation between our independent variables because all of them have a VIF of less than ten: audit fee (1.011), auditor educational level (1.023), auditor busyness (1.0226), and finally JPANSs (1.007). Thus, the multicollinearity of the constructs have no issue and all of them were kept in the regression model. Even if there are, they are unlikely to skew the conclusion and are thus trustworthy for drawing broad conclusions. This backs up the usage of Jacque Bera (JB) in descriptive analysis to check for normalcy and multi-collinearity issues. The adoption of least square estimate approaches is also justified by our findings. As a result, any recommendations given will, to a significant part, reflect the features of the genuine research population and can thus be utilized to make conclusions.

4.4: Regression Results and Discussion of findings

Because the data had both time series (2011-2020) and longitudinal features (10 quoted industrial goods firms), we used panel least regression analysis to examine the connection between the dependent construct (AUDQUAL) and the explanatory constructs (AUDFE, AUDEL, AUBUSY, and JANAS) and to test the framed hypotheses. Nevertheless, the research determined the non-homogeneity of the firms, necessitating the necessity to examine its impact on the data. To determine which effect to explain, the Hausman effect test has to be used. That is, whether the regression result should be interpreted using fixed or random effects. The results of the Hausman test are summarized below:

Hauseman (H) Effect Tests

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	2.789341	4	0.5937

Source: Researcher’s formulation result (2022)

The above test result reveals X^2 value of 2.789 and a p-value of 0.5937, which is larger than 5%, indicating that the data is heterogeneous. The research adopted the random effect since the P-value is more than 5% significance level. For all industrial goods sectors in Nigeria, the H test reveals that the random-effects estimation (REM) technique (see table 4.2 for the result) is more suitable than fixed effects (FEM); thus, the Random Effects outcomes are used to remedy the issue of heterogeneity in the data.

Table 4.2: Random Effect Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.737235	0.065683	11.22409	0.0000
AUDFE	0.015733	0.005091	3.090626	0.0023
AUDEL	0.229235	0.106651	2.149386	0.0329
AUBUSY	-0.197082	0.074605	-2.641653	0.0090
JANAS	-0.591946	0.169113	-3.500295	0.0006

Effects Specification

Period fixed (dummy variables)

R-squared	0.578600	Mean dependent var	0.575758
Adjusted R-squared	0.420567	S.D. dependent var	0.495480
S.E. of regression	0.464652	Akaike info criterion	1.373027
Sum squared resid	39.72588	Schwarz criterion	1.605531
Log likelihood	-121.9297	Hannan-Quinn criter.	1.467137
F-statistic	3.077529	Durbin-Watson stat	1.501599
Prob(F-statistic)	0.000377		

Source: Researcher's summary of regression result (2022).

The random panel regression study of listed industrial goods firms in Nigeria is shown in table 4.2. According to the study's findings, the R. squared value was around 0.5786 (57.9%) and the R-squared adjusted value was roughly 0.4205 (42.1%). The R-squared coefficient of determination was 57.9%, implying that the model described 57.9% of the systematic fluctuations in individual dependent variables of auditor's independence of our sampled companies over a 10-year period, while the stochastic error component captured the remaining 42.1 percent. Furthermore, the overall auditor's independence model employed for the analysis was statistically significant at the 1% level, with an F-stat. value of 3.077 and a p-value of 0.0003. This demonstrates that the model utilized was adequate. Furthermore, the Durbin Watson Stat. of 1.5015 revealed that the model is well dispersed because the rate is around 2, showing no auto correlation issues, and that the errors are not affecting one another.

Similarly, it was discovered that audit fees have a positive and statistically significant influence on audit quality, with a positive coefficient value of 0.0157 and a p-value of 0.0023 ($1 = 0.0157$, $p = 0.0023$). The value 1 was positive, indicating that audit fee has a positive impact on AQ of quoted industrial products firms in Nigeria. As a result, when audit charge increases by one naira, auditor independence is multiplied, boosting audit quality. This verifies the concept that greater levies, the chances of improved audit quality since the auditor will be driven to thoroughly analyze his reports in order to provide the best as a result of the larger amount of money he receives, resulting in a 2.3 percent improvement in audit quality. As explained by the notion of economic bonding, a positive association of AF and AQ suggests that greater audit fees tend to enhance thorough scrutiny of audit books. This finding was consistent with that of Zamzami, Tantri, and Timur (2017), Rahmina and Agoes (2014), and Nozarpur (2014), all of whom discovered a significant positive link of AQ and AF. The study rejects the first null hypothesis at 5% level of significance ($0.0023 < 0.05$) and indicates that AF have a significant positive impact on the AQ of quoted industrial products companies in Nigeria.

Similarly, AEL had a significant positive impact on AQ of Nigerian industrial goods companies. When an auditor receives an extra qualification, their independence is enhanced because these qualifications cause them to be more conservative when performing audit tasks, resulting in higher audit quality. Furthermore, one of the primary qualities that improves audit quality is auditor education level. As a result of possessing more information, being more knowledgeable and competent, and putting more effort, auditors with a higher degree gives superior service than auditors with a lower degree. Educated auditors are more cautious when doing audit jobs because of their qualifications. We rejected our second null hypothesis as a result of this significant effect at 5% ($0.0329 < 0.05$), and concluded that auditor education has a significant positive impact on AQ of industrial products firms in Nigeria.

On the contrary, auditor busyness exerts negative but significant effect on audit quality has a negative impact (Beta -0.1970 and P-value 0.0090). However, busy auditors who put in a lot of effort can alleviate the detrimental impact of auditor busyness on audit quality. The primary arguments in favor of auditor busyness having a negative influence on AQ are that it reduces audit excellence due to non-concentration induced by a wide client portfolio and a busy schedule. This is due to the fact that overloaded auditors lack the time to learn about their clients' businesses and financial reports. This is in line with Gul et al., (2017); Suzuki and Takada, (2017). (2016). The third null hypothesis was rejected as a result of the considerable effect documented ($0.0090 < 0.05$), and concludes that auditor busyness has a significant negative impact on audit quality of listed industrial products firms in Nigeria.

Likewise, JPANS has a significant negative impact on AQ in Nigerian firms; when the provision of both audit and non-audit services is increased by even a small amount, auditor independence is harmed, lowering audit quality. This suggests poor earnings quality as well as proof of independence compromise through fees levied by these shared services, which is the basic assumption of economic bonding theory. Even though, the provision of both audit and non-audit jobs is encouraging to the clients and auditor by cost savings arising through combined production but it affects audit quality negatively. For this reason the pricing of JPANS have been proved as a catalyst to checkmate audit quality and thus a direct means of assessing auditor independence. The findings agrees with that of Okafor and Okaro (2014) which documented significant negative influence of JPANS on AQ. Thus this led to rejection of our last null hypothesis and accepts the alternate one by concluding that JPANS impairs auditor independence at 99% confidence level.

5. Conclusion and Recommendations

Based on the literature studied, the AI has a substantial relationship with AQ. Because of the differences in investigation methodology, sample size, data collection equipment, and analysis processes, it is clear from the assessment that certain researchers found a positive relationship between AI and AQ, while others found the opposite. Nonetheless, this investigation evaluates and theorizes the link of AQ and AI using appropriate proxies (AF, AEL, auditor activity, and JPANS). The study discovered that AF and AEL positively and significantly influence AQ of industrial goods corporations in Nigeria, while auditor busyness and JPANS negatively influence AQ, implying that AI is compromised. As a result, professional accounting organizations, the Financial Reporting Council of Nigeria, and the National Assembly should, in line with international trends, issue a codified and sanctioned framework, guideline, or standard for the scope of auditors in Nigeria. The explicit separation of the price and quantity components of fees, on the other hand, would be a more definitive test for cost dependency.

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