

MEDIATING EFFECT OF INTELLECTUAL CAPITAL ON THE RELATIONSHIP BETWEEN BOARD ATTRIBUTES AND FINANCIAL PERFORMANCE OF LISTED NON-FINANCIAL FIRMS IN NIGERIA

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Abstract

The study investigates the mediating effect of intellectual capital on the relationship between board attributes and the financial performance of listed non-financial firms in Nigeria. The study employed board size, board independence, board meeting, board gender, and board expertise as measures of board attributes, while intellectual capital is measured using the Modified Value-Added Intellectual Capital Coefficient (MVAIC). The study adopts a correlational research design and positivist research philosophy. The population of the study covers 107 listed non-financial firms in Nigeria for the period of 11 years from 2012 to 2022. The study selects 58 listed non-financial firms in Nigeria as the sample size using a filtering technique. The findings revealed that the proportion of female directors and the number of board meetings have a positive effect on intellectual capital efficiency. In contrast, the size of the board of directors has a significant negative effect on intellectual capital efficiency. Furthermore, the results indicate that intellectual capital efficiency mediates the relationship between board size and ROE, mediates the relationship between the number of board meetings and financial performance, as well as the proportion of female directors and financial performance. It is recommended that directors of listed non-financial firms and managers should focus on intellectual capital in developing plans and strategies regarding board size, board meetings, and board gender.

Keywords: Intellectual capital, Return on Equity, Board Attributes, Non-financial Firms

1.0 Introduction

The performance of the listed non-financial firms in Nigeria during the period 2012 to 2022 has declined significantly. Apart from the effects of the global financial crisis, foreign exchange crises, and COVID-19 economic lockdown, the decline in financial performance can be partially attributed to the lack of working capital required to run or expand the business due to the high cost of

materials, difficulties in accessing foreign exchange (Eguatu, 2022). Also, maximizing financial performance is one of the primary objectives of the company and is crucial to the prosperity of the company and other stakeholders. A good financial performance also attracts investors to the company (Tarmizi et al., 2023). Therefore, it is imperative for companies to prioritize financial performance and continually strive

to improve it. The common financial performance indicators include return on investment (ROI), return on assets (ROA), return on equity (ROE), Tobin's q, and earnings per share (EPS). These ratios can be determined by analyzing the trends of events in the financial statement of the company or by computing and interpreting various financial ratios to assess different aspects of the company's financial performance. The literatures reveal an association between board attributes and financial performance (Mwamtambulo, 2020; Ngan & Duc, 2020; Odhiambo & Mwanzia, 2021; Hamdi & Munandar, 2023).

Thus, the corporate board is responsible for creating and developing intellectual capital as a strategic resource for sustainable growth. Looking at the rapidly evolving business landscape, the success of a company heavily relies on its capacity to efficiently handle its vast amount of information and intellectual capital (IC). These two areas are of utmost importance for most organizations, specifically for those belonging to the knowledge-intensive sector. Effective management of information and IC can significantly impact a company's creative performance, as it enables businesses to identify and leverage their key assets, such as expertise, skills, and knowledge, to gain a competitive advantage (Mukaro et al., 2023). In this sense, companies that successfully manage their information and IC can improve their innovation capabilities, enhance their problem-solving skills and decision-making processes, and foster a culture of continuous learning and improvement.

Also, the recent economic crises and economic lockdown have brought the importance of intellectual capital to the forefront of researchers' attention. These events have highlighted how crucial it is for companies to manage their intellectual capital effectively to avoid catastrophic failures. As a result, researchers have become increasingly interested in understanding the various factors that can impact a company's financial performance, such as effective board attributes, leadership, efficient human resources, and organizational culture. Intellectual capital can affect a company's profitability and value. Also, Previous studies conflicting results have raised the question of whether board attributes directly affect financial performance, or if there is another invisible variable like intellectual capital that plays a crucial role in this relationship (Aslam & Haron, 2020; Nkundabanyanga et al., 2014; Nour et al., 2018). If intellectual capital is considered a hidden variable in the association between board attributes and financial performance, it can significantly affect the results. Because Intellectual capital can affect a company's financial performance (Xu & Liu, 2021). Therefore, to investigate whether intellectual capital plays a role in the relationship between board attributes and financial performance in Nigerian-listed non-financial firms could not be out of context because non-financial firms play a pivotal role in Nigeria's economic growth and development.

This study intends to fill the existing gap by examining the mediating effect of intellectual capital on the relationship between board attributes and the financial

performance of the listed non-financial firms in Nigeria. The rest of this paper proceeds as follows: section two reviews related empirical studies; section three describes the methodology of the study; section four presents the results and discussion; and section five concludes the study

2.0 Literature Review

2.1 Theoretical Framework

Researches evaluate the mediating effect of intellectual capital on the relationship between board attributes and financial performance, particularly through the lens of resource dependency theory. The theory postulates that the power dynamics between the organization and its external environment can significantly influence its behavior and decision-making processes. This includes the organization's dependence on external resources, which can influence its strategic decisions. According to the theory, organizations can reduce their dependence on the environment by engaging in activities such as mergers, joint ventures, political action, executive succession, and through the actions of their board of directors. The theory suggests that firms can minimize their dependence on the environment by engaging in various activities that enable them to control their resources. Within the Nigerian business landscape, non-financial service firms heavily depend on external resources such as human capital, technology, knowledge networks, and regulatory support. To enhance their financial performance, these enterprises must comprehend how to leverage their intellectual capital within the

framework of RDT. This comprehension will empower them to formulate successful strategies that minimize their reliance on external resources.

2.2 Conceptual Framework

Financial performance is one of the key indicators for measuring corporate growth and viability (Iqbal et al., 2019). It is a yardstick for evaluating how well an organization utilizes human and material resources toward achieving its goal (Olaoye et al., 2021). Financial performance portrays the ability of profit-oriented companies to survive in competitive markets and to meet the needs of the various stakeholders toward achieving those needs. (Sani & Musa, 2020). Board attributes play a vital role in the general life of corporate bodies. Board attributes have no generally accepted definition in the literature. Kakanda et al. (2016) define board attributes as the features that distinguish a person or group of persons serving on the board.

Intellectual capital is viewed in different ways by different scholars. From the balance sheet perspective, intellectual capital was viewed as a difference between book value and market value (Dzinkowski, 2000). Also, from an intangible perspective, intellectual capital is an intangible resource in the company that creates a competitive advantage (Andriesson, 2004). Intellectual capital is a hidden intangible asset within the company (Ciprian et al., 2012). Intellectual capital is a process in which information can be transformed into value (Atalay, 2018). Among the recent classifications of intellectual capital is the one given by

Inkinen (2016) which he termed the tripartite model. The tripartite model summarised the previous classifications into a single model. In his model, he classified intellectual capital into human, structural, and relational capital. The human capital includes knowledge, education, skills, capabilities, and employees' characteristics. Structural capital includes the company's documents, databases, processes, plans, and information and communication technology. Relational capital includes relationships with various stakeholders such as customers, suppliers, distributors, and partners.

2.3 Hypothesis Development

Board Attributes and Financial Performance

Studies examine the effect of board attributes on financial performance in different economies. For instance, Urhoghide and Akhidime (2015) examine board attributes and firm performance in Nigeria using a sample of 50 companies for the period 2008 to 2013 and analyze using multiple regression techniques. The findings reveal that board size, board independence, board financial expertise, and CEO duality have a significant positive impact on the performance of the sample firms. The findings are confirmed by Adekunle and Aghedo (2014). Also, Ng et al. (2016), examined the impact of board characteristics and financial performance of Malaysian firms and revealed that board size and board tenure have a significant positive relationship with the financial performance of the sample firms. Further, Mwamtambulo (2020), Ngan and Duc (2020), Odhiambo and Mwanzia (2021) and Hamdi and

Munandar (2023) reveal a significant association between board attributes and financial performance. Therefore, it is hypothesized that board attributes have a significant positive impact on the financial performance

H₁ Board attributes (size, independence, meetings, gender, expertise) have a significant positive impact on the financial performance of non-financial firms in Nigeria

Board Attributes and Intellectual Capital

Empirical evidence established the relationship between board attributes and intellectual capital. For instance, Komala (2017) examines the effect of board gender, education, nationality, and meetings on intellectual capital performance. The findings revealed that board meetings, education, and nationality have a significant positive effect on the intellectual capital of the sampled firms. Budiarti (2018) also studies Indonesian firms and the findings reveal that board size, board meetings, and management ownership have significant positive effects on the ICDI of the sampled firms. Hariyanto et al. (2022) delve into Indonesia's pharmaceutical sector and examined the effect of corporate governance on intellectual capital. The findings reveal that board size and board meetings have a significant positive effect on the ICDI of the sampled firms. Therefore, it is hypothesized that board attributes have a significant positive impact on the financial performance

H₂ Board attributes (size, independence, meetings, gender, expertise) have a

significant positive impact on the intellectual capital of non-financial firms in Nigeria.

Board Attributes, Intellectual Capital and Financial Performance

Researchers have explore the mediating role of intellectual capital in the relationship between corporate governance and firm performance across diverse countries. Nkundabanyanga et al. (2014) focus on Uganda, investigating the mediation of intellectual capital in the connection between corporate governance and firm performance. The study reveals that intellectual capital mediated the relationship between corporate governance and firm performance among the sampled Ugandan service firms. In Iran, Nour et al. (2018) explore the mediating role of intellectual capital between corporate governance and firm performance. The findings suggest that intellectual capital had a negative mediating role on certain aspects of corporate governance (board size, board independence, and free float) and firm performance among the sampled companies. Therefore, it is hypothesized that intellectual capital mediates the relationship between board attributes and financial performance.

H₃: intellectual capital mediates the relationship between board attributes and the financial performance of non-financial service firms in Nigeria.

3.0 Methodology

This study is designed to be correlational. The data used is generated from secondary sources obtained from annual reports and accounts listed on the Nigerian exchange group. The population of the study covers the entire one hundred and seven (107) listed non-financial service firms in Nigeria as of 31st December 2022. These firms cut across agriculture, construction, consumer goods, healthcare, ICT, industrial goods, natural resources, and services firms in Nigeria. These firms were selected due to the role they play in the economic activities of Nigeria. The study used the filtering method as a sampling technique. Because some of the information is not available in the annual reports and accounts of the firms for data generation. Therefore, the study sets the following filter in selecting the only firm that meets the criteria: a) to remove any company under technical suspension; b) to remove any company with missing data needed for the study; and c) to remove any company with outlier data. After applying the filter, 58 firms constitute the sample of the study. The study uses the dependent variable (return on equity), the independent variable (board attributes), the mediator (intellectual capital), and the control variables (firm size, leverage, and industry dummy) to test the hypotheses of the study.

Table 1: Variables Definition and Measurement

Variables	Nature	Apriori	Measurements
Return on Equity (ROE)	Dependent		Net income divided by shareholder equity (Akbar, 2021; Rositha et al., 2019).
Modified Value-Added Intellectual Efficiency (MVAIC)	Mediating	+	HCE +SCE +RCE + CEE (Xu & Lu, 2019 ; Tran et al., 2020).
Board Size (BSiz)	Independent	+	Number of directors at the end of the year (Bala et al., 2019; Ng et al., 2016).
Board Independence (Bind)	Independent	+	Proportion of independent non-executive directors on the board for the year (Bala et al., 2019).
Board Meeting (BMeet)	Independent	+	Number of meeting annually (Faisal et al., 2016; Khatib & Nour 2021).
Board Gender (BGen)	Independent	+	proportion of female to a number of directors (Bala et al.,2019; Oba & Fodio, 2013).
Board Expertise (BExp)	Independent	+	A dichotomous variable: 1= If directors hold at least degree educational level, 0 = otherwise (Mohammed, 2018).
Firm Size (FSiz)	Control	+	Log of total assets (Aslam & Haron, 2020; Bala et al., 2019; Kajola, 2017; Shahwan & Fathalla, 2020).
Leverage (Lev)	Control	+	Total debt divided by total assets (Aslam & Haron, 2020; Bala et al., 2019; Kajola, 2017)
Industry Dummy (IE)	Control	+	A dummy 1 for manufacturing firms and 2 for service firms.

Regression Models

The study uses structural equation modeling to empirically examine the mediating role of intellectual capital on the relationship between board attributes (independent variable) and financial performance (dependent variable). The study uses the following models in line with Zhao, Lynch, and Chen's (2010) assumptions.

$$\text{MVAIC}_{it} = \alpha + \beta_1 \text{BSiz}_{it} + \beta_2 \text{BInd}_{it} + \beta_3 \text{BMeet}_{it} + \beta_4 \text{BGen}_{it} + \beta_5 \text{BExp}_{it} + \beta_6 \text{FSiz}_{it} + \beta_7 \text{Lev}_{it} + \beta_8 \text{IE}_{it} + e_{it} \text{ ----(1)}$$

$$\text{ROE}_i = \alpha + \beta_1 \text{BSiz}_{it} + \beta_2 \text{BInd}_{it} + \beta_3 \text{BMeet}_{it} + \beta_4 \text{BGen}_{it} + \beta_5 \text{BExp}_{it} + \beta_6 \text{MVAIC}_{it} + \beta_7 \text{FSiz}_{it} + \beta_8 \text{Lev}_{it} + \beta_9 \text{IE}_{it} + e_{it} \text{ ----(2)}$$

Where: e = Error terms in year t for firm i , α = Intercept or constant, $\beta_1 - \beta_9$ = Coefficient of parameters for firm i in year t , i = firms and t = year

4 Results and Discussion

This subsection shows the summary of the variables and presents the results generated from the variable of the study.

Descriptive Statistics and Correlation Analysis

Table 2 presents the descriptive statistics of the dependent independent, mediator, and control variables. It shows that non-financial firms listed in the Nigeria exchange group from 2012-2022 had an average return on equity (ROE) of 0.059. This means that investment in equities in sampled non-financial firms generates an average return of 6% for the period. Also, table 2 reveals a minimum ROE of -0.794 and a maximum of

0.581. The standard deviation of 0.292 indicates a high dispersion from the mean value of 0.059. It can be observed from Table 2 that the sampled non-financial firms in Nigeria indicate an average board size of 8.743 which shows that an average of 9 members are sitting on the board of sampled listed non-financial firms in Nigeria from 2012 to 2022. The board size (BS) of the sampled non-financial firms in Nigeria had a minimum of 3 and a maximum of 19 directors for the period 2012 to 2022. The table reveals a standard deviation of 2.439

In the year 2012-2022, the sampled non-financial firms in Nigeria had an average independent non-executive director that constituted 65% (0.653) of the number of the total directors sitting on the board of the sampled companies. Also, Table 2 reveals that the board independence (BI) of the sampled non-financial firms in Nigeria had a minimum of 39% and a maximum of 90% independent non-executive directors for the period 2012 to 2022. The table reveals a standard deviation of 0.110 from the mean value of 0.653. Table 2 reveals that the sampled non-financial firms in Nigeria reveal a mean value of board meetings as 4.729 which shows that an average of 5 meetings are conducted by the board of sampled listed non-financial firms in Nigeria from 2012 to 2022. Also, non-financial firms in Nigeria recorded a minimum of 1 and a maximum of 10 meetings for the period 2012 to 2022. 9. The Table reveals a standard deviation of 1.268

Table 2 reveals the sampled non-financial firms in Nigeria had an average female board director of 15% (0.147) of the number

of directors in the companies. The board gender (BG) of the sampled non-financial firms in Nigeria reveals a minimum value of 0 and a maximum of 67% female directors for the period 2012 to 2022. Table 2 reveals a standard deviation of 0.119 which indicates dispersion around the mean value of 0.147. Also, Table 4.1 reveals that in 2012-2022, the sampled non-financial firms in Nigeria had an average of 87% (0.869) directors with a degree or its equivalent to the number of directors. The board expertise (BE) of the sampled non-financial firms in Nigeria recorded a minimum of 40% and a maximum of 100% directors with at least a degree for the period 2012 to 2022. The table reveals a standard deviation of 0.144 which indicates a significance dispersion around the mean value of 0.869.

According to the findings in Table 2, the non-financial firms in Nigeria sampled from 2012 to 2022 exhibited an average intellectual capital efficiency of 3.868. This indicates that, on average, these firms generated 3.868 units of value for each naira invested. The intellectual capital (MVAIC) of non-financial firms in Nigeria for the period from 2012 to 2022 showed that the sampled non-financial firms recorded a minimum coefficient of -2.059 and a maximum coefficient of 10.27. The standard deviation of 2.819. Lastly, Table 2 also reveals that firm size (Fsize), leverage (LEV), and industry dummy (IE) of the sampled listed non-financial firms in Nigeria from 2012 to 2022 have a minimum of ₦26 million, 0, and 1 respectively with a maximum value of ₦2.7 trillion, 0.672 and 2 respectively. The firm size of the sampled

firms reveals a mean value of ₦85.5 Billion and a standard deviation of 242 which indicates a significant dispersion from the mean value for the period under review. Also, leverage of the period reveals an average of 0.181 and a standard deviation of 1.192 which highlights a significant dispersion from the mean value for the period. Lastly, industry shows a mean value of 1.466 and a standard deviation of 0.499.

The result in Table 3 shows the correlation matrix which indicates the association between the variables of the study. The Table revealed that independent variables (board size, board independence, board meeting, and board gender) are positively associated with the ROE of the listed non-financial firms in Nigeria. In contrast, board expertise is negatively associated with the ROE of the listed non-financial firms in Nigeria. The table presents a positive association between board size and ROE from the correlation coefficient of 0.077. Table 3 also shows that there is a positive association between the board independence of the sample firms and ROE from the correlation coefficients of 0.098. Also, table 3 indicates a positive correlation between board meetings and ROE from the coefficient of 0.167. Table 3 presents a positive association between board gender and ROE from the correlation coefficient of 0.176. Hence, the result shows a negative association between the board expertise and the ROE of the sampled firms from the correlation coefficients of -0.038. Table 3 presents a positive association between MVAIC and ROE from the correlation coefficient of 0.511.

Table 2 Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max.
ROE	638	0.059	0.292	-0.794	0.581
BS	638	8.743	2.439	3.000	19.00
BI	638	0.653	0.110	0.389	0.909
BM	638	4.729	1.268	1.000	10.00
BG	638	0.147	0.119	0.000	0.667
BE	638	0.869	0.144	0.400	1.000
MVAIC	638	3.868	2.819	-2.059	10.27
Fsize	638	85.45	242.1	0.260	2658
Lev	638	0.181	0.192	0.000	0.672
IE	638	1.276	0.447	1.000	2.000

*Source: Stata Output***Table 3 Correlation Matrix**

	ROE	BS	BI	BM	BG	BE	MVAI C	Fsize	Lev	IE
ROE	1.000									
BS	0.077	1.000								
BI	0.098	-0.023	1.000							
BM	0.176	0.117	0.096	1.000						
BG	-0.038	0.072	-0.022	0.186	1.000					
BE	0.511	-0.083	-0.039	-0.069	-0.003	1.000				
MVAI C	0.203	0.071	0.098	0.165	-0.027	1.000				
Fsize	-0.268	0.443	-0.002	0.148	0.222	-0.120	0.361	1.000		
Lev	-0.162	-0.125	-0.062	-0.124	-0.020	0.046	-0.286	-0.002	1.000	
IE		0.006	0.080	0.052	-0.165	0.083	-0.228	0.087	0.029	1.000

Source: STATA OUTPUT

Regression Results

Table 4 presents the regression result of the relationship independent variable (board attributes) and the mediator (Intellectual capital). The extract of the result indicates a log likelihood of -4556.78 which is statistically significance at a 1% level of significance. Also, the table indicates an R-Square of 0.221 which means that 22% of the changes in a mediating variable (MVAIC) are determined by the independent variables selected. This indicates that other factors not included in the model accounted for 78%.

Also, the regression estimates from Table 3 show that board size (BS) is negative and statistically significant ($\beta = -0.153$; $p < 0.018$). This implies that board size decreases the intellectual capital efficiency of listed non-financial firms in Nigeria. The finding provides clear evidence that a larger board decreases the intellectual capital efficiency of the listed non-financial firms in Nigeria for the period 2012-2022. This study supports the findings of Kamath (2019), and Scafarto et al. (2020) find that an increase in the board size reduces the intellectual capital efficiency of the firms measured by VAIC. Further, the finding contradicts the proposition of resource dependency theory which predicts that board members possess different skills and expertise that will be harnessed by the firms in enhancing the intellectual capital efficiency of a firm.

Further, the result from Table 3 shows that board independence reveals a negative beta coefficient of -0.441, but statistically

insignificant ($p = 0.270$). The negative path coefficient indicates that a decrease in the proportion of independent non-executive directors increases the intellectual capital efficiency of the firms in Nigeria by 44%, which is statically insignificant at any acceptable level. The finding is in line with Faisal et al (2016), Ismail et al (2016) and Melani (2021) who document that board independence has no significant effect on intellectual capital. Moreover, the finding supports the proposition of resource dependency theory which predicts that independent board members provide ideas that improve the intellectual capital efficiency of a firm.

Also, Board meeting (BM) is find to have a positive significant influence on intellectual capital efficiency ($\beta = 0.250$; $p = 0.030$). The positive coefficient in this context indicates that an increase in the number of meetings enhances the intellectual capital efficiency of the listed non-financial firms in Nigeria by 25%. The finding supports the position of Komala (2017). Further, the finding disagreed with resource dependency theory propositions. Concerning Board gender (BG), the results from the regression show that board gender is positive and significantly related to intellectual capital efficiency ($\beta = 2.508$; $p < 0.043$). Also, the positive coefficient in this context indicates that an increase in the proportion of female directors increases the intellectual capital efficiency of the listed non-financial firms in Nigeria by 25%. This finding supports the conclusion of Isola et al. (2020). Further, the finding agreed with the resource dependency

theory proposition that women bring new skills and resources that enhance intellectual efficiency.

Finally, the structural equation modeling estimate in Table 3 shows that Board expertise has a positive and insignificant impact on intellectual capital efficiency ($\beta 1.160$; $p < 0.270$). The positive coefficient in this context indicates that an increase in the proportion of directors with a degree or its equivalent increases the intellectual capital efficiency of the listed non-financial firms in Nigeria which is not significant at any acceptable level. This implies that board members with a minimum degree do not matter when considering intellectual capital efficiency. The finding supports Al-Musalli

and Ismail (2012), who provide evidence that board expertise has no significant effect on intellectual capital efficiency. Also, the finding contradicts resource dependency theory predictions that board expertise enhances intellectual capital efficiency.

Based on the foregoing analysis and hypothesis two of this study, which states that board attributes have a significant effect on the intellectual capital of listed non-financial firms in Nigeria are hereby tested. The findings which stipulate that board size, board meeting, and board gender have significant effects on intellectual capital efficiency provide enough evidence to accept hypothesis two of this study.

Table 4 Effect of Board Attributes on Intellectual Capital

	Coeff.	z-value	p-value
Cons	-12.102	-4.84	0.000***
BS	-0.153	-2.37	0.018**
BI	-0.441	-0.34	0.737
BM	0.250	2.17	0.030**
BG	2.508	2.02	0.043**
BE	1.091	1.10	0.270
Fsize	0.725	7.96	0.000***
Lev	-4.121	-7.89	0.000***
IE	-1.030	-3.14	0.002***
Log likelihood	-4556.78		
P- Value	0.000		
R-Square	0.221		
OBS	638		

Source: STATA OUTPUT. *, **, *** indicate significance level at 10%, 5% and 1% respectively

(2010) approach with the aid of Preachers and Hayes's

Table 5 below shows the results of the analyses of indirect effect using Zhao et al.

code of testing the significant effect of indirect relationship. The result reveals that the coefficient of the direct effect of BS on ROE (after introducing MVAIC mediators) is -0.001, and it is not significant as confirmed by the P-value (0.852). The indirect effect is significant as proved by the bootstrapped P-value (0.016). Thus, the result shows proof to suggest that MVAIC transmits the effect of BS to ROE. The finding supports the position of Nour et al (2018) in Iran. Aslam and Haron (2020) in OIC banks. Thus, we fail to reject the H_{03a} hypothesis which indicates that intellectual capital mediates the relationship between board size and financial performance.

Also, Table 5 shows the coefficient of the direct effect of BI on ROE as 0.268 which is significant as confirmed by P-value (0.003). The indirect effect is insignificant as proved by the bootstrapped P-value (0.822). Thus, the result suggests that MVAIC does not mediate the relationship between BI and financial performance (ROE). That is, with the mediating effect of intellectual capital, board independence does not show an association with ROE. The finding contradicts the position of Nour et al (2018) in Iran. Also, Aslam and Haron (2020) report the mediating effect of IC on BI and FP. Thus, it rejects the H_{03b} hypothesis which indicates that intellectual capital mediates the relationship between board independence and financial performance.

Table 5 shows the coefficient of the direct effect of BM on ROE as 0.017 which is significant as confirmed by P-value (0.033). The indirect effect is significant as proved

by the bootstrapped P-value (0.068). Thus, the result suggests that MVAIC mediates the relationship between BM to ROE. The finding supports Nkundabanyanga et al. (2014). Thus, we fail to reject the H_{03c} hypothesis which states that intellectual capital mediates the relationship between board meetings and financial performance.

Further, Table 5 shows the coefficient of the direct effect of BG on ROE as 0.178 which is significant as confirmed by P-value (0.040). The indirect effect is significant as proved by the bootstrapped P-value (0.020). Thus, the result suggests that MVAIC mediates the relationship between BG to ROE. Thus, we fail to reject the H_{03d} hypothesis which indicates that intellectual capital mediates the relationship between board gender and financial performance.

Lastly, Table 5 shows the coefficient of the direct effect of BE on ROE as -0.020 which is insignificant as confirmed by the P-value (0.773). The indirect effect is insignificant as proved by the bootstrapped P-value (0.207). Thus, the result suggests that MVAIC does not mediate the relationship between BE and financial performance (ROE). Thus, it rejects the H_{03e} hypothesis which indicates that intellectual capital mediates the relationship between board expertise and financial performance.

Therefore, we fail to reject the H_{3a} , H_{3c} , and H_{3d} hypotheses which reveal that intellectual capital mediates the relationship between board attributes (board size, board meetings, and board gender) and the financial performance of listed non-financial firms in Nigeria.

Table 5 Effect of Board Attributes on Financial Performance via Intellectual Capital

	Coeff.	z-value	p-value
Cons	-0.419	-2.36	0.018**
MVAIC	0.030	10.81	0.000***
BS	-0.001	-0.19	0.852
BI	0.268	2.93	0.003***
BM	0.017	2.13	0.033**
BG	0.178	2.05	0.040**
BE	-0.020	-0.29	0.773
Fsize	0.007	1.11	0.266
Lev	-0.129	-3.37	0.001***
IE	-0.032	-1.39	0.018**
R-Square	0.283		
P-Value	0.000		
OBS	638		
BS→MVAIC	-0.005	-2.40	0.016**
BI→MVAIC	-0.009	-0.22	0.822
BM→MVAIC	0.008	1.83	0.068*
BG→MVAIC	0.094	2.33	0.020**
BE→MVAIC	0.035	1.26	0.207

Source: STATA OUTPUT. *, **, *** indicate significance level at 10%, 5% and 1% respectively

5.0 Conclusion and Summary

The study examines the mediating effect of intellectual capital on the relationship between board attributes and the financial

performance of listed non-financial firms in Nigeria. The study reveals that board meetings and board gender have significant positive effects on the intellectual capital of

the listed non-financial firms in Nigeria while board size has significant negative effects on the intellectual capital of the listed no-financial firms in Nigeria. Also, intellectual capital mediates the relationship between board attributes (board size, board meetings, and board gender) and the ROE of listed non-financial firms in Nigeria. The study recommends that to improve intellectual capital efficiency through board attributes, the listed non-financial firms should focus specifically on the size of the board of directors, the frequency of the board of directors' meetings, and the proportion of female directors. Also, the study recommends that directors of listed non-financial firms and managers should focus on intellectual capital (human, structural, and relational capital) in developing plans and strategies regarding board size, board meetings, and board gender.

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