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# Effect of Corporate Governance on Intellectual Capital: Empirical Study of Nigerian Quoted Non-Finance Companies

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**Mohammed Alhaji Audu**  
**Mohammed Umar Tela**  
**Hauwa Aliyu Yamta**

Department of Banking and Finance, Faculty of Management Sciences  
University of Maiduguri, Nigeria

[maaudu3@gmail.com](mailto:maaudu3@gmail.com); [umartela046@gmail.com](mailto:umartela046@gmail.com) ; [hauwapremier@gmail.com](mailto:hauwapremier@gmail.com)

## **Abstract**

The corporate governance has always been a source of interest in the Nigeria corporate entities especially as most bankrupt companies that were listed in the Nigerian Exchange Group are as a result of poor corporate governance measure. In line with this narrative, the study analyzes the impact of corporate governance on Nigeria's intellectual capital using publicly traded non-finance enterprises on the floor market of the Nigerian Exchange Group. Intellectual capital, as evaluated by the value-added intellectual coefficient, is the dependent variable while Board size, independence, board meetings, board ownership, board gender diversity, and director salary are all considered as the independent factors. In addition, the model was regulated by the profitability variable, which is consistent with previous research. The data set used in this study covers the period from 2011 to 2020. The selection of companies for inclusion in the sample was based on purposive sampling. For the final sample size of 30 non-financial firms, the study relied on the availability of data for all research variables across a 10-year period. The study found that only board independence and director compensation have a significant impact on intellectual capital. Consequently, and the study concluded that increasing director salaries and the number of independent non-executive directors will result in a significant loss of intellectual capital. In line with these findings, the study recommended that there should be a reduction in director compensation as this will enhance intellectual capital of firms in this sector.

**Keywords:** Corporate Governance, Ownership, Board Size, Intellectual Capital

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## **1. Introduction**

An organization's IC is rooted in the connections, structures, and people of the company, and it adds value by nurturing creativity, innovation, information technology, and interpersonal activities. Even while IC enhances performance and provides value to firms as a strategic resource, organizations continue to face management and control challenges with IC. Numerous recent studies emphasize the importance of comprehending the function of corporate governance in efficiently implementing, preserving, and managing information technology in firms (Keenan, J., & Aggestam, M. 2001; Robbins, S., & DeCenzo, D. 2005). Globally, and notably in developing nations, corporate governance structures have developed dramatically during the previous three decades. Emerging market corporations seek substantial strategic assets in today's globalized environment Kumar, V., et al (2020). Additionally, corporate governance procedures are altered in response to international trade skepticism and international investment uncertainty, respectively Cuervo-Cazurra, A., et al (2020). Additionally, emerging economies lack the capacity to reassure investors and other stakeholders that industrialized countries possess Bhaumik, S., et al (2019).

Good corporate governance is essential in today's knowledge-based economy because it allows companies to attract and retain top talent, make strategic investments in cutting-edge technology infrastructure, and form beneficial alliances with suppliers and other stakeholders. Additionally, by revealing critical information to decision makers, robust corporate governance standards motivate firms to resolve information asymmetry and concerns about agency (Al-Sartawi, A. 2017; Mousa, G. A., & Desoky, A. M. 2012). The application of information technology in corporate governance ensures that management decisions are made in the best interest of shareholders. In the words of Keenan, J., & Aggestam, M. (2001), "enterprise governance is responsible for making appropriate investments in intellectual capital." However, little empirical research has been done to examine the role of corporate governance in the formation of IC in companies. The relationship between numerous corporate governance concepts and information technology, is widely misunderstood.

It is the goal of this research to examine the impact of Nigerian listed non-finance companies' intellectual capital on corporate governance. The impact of corporate governance on intellectual capital has been studied in a variety of ways across continents, with varying degrees of success. This research gap was also discovered as a result of the review; (1) Most past studies were done in developed economies such as Mexico Hidalgo, R. L., et al (2011), Pakistan Mujahid, S., et al (2019), Australia Appuhami, R., & Bhuyan, M. (2015) and Indonesia Widiatmoko, J., et al (2020), while in Africa the few studies were in Ghana, Kenya, Egypt, and Nigeria but all the studies in Africa and Nigeria in particular ignore the *non-finance*; (2) the study also observed that most of the studies (Hidalgo, R. L., et al 2011; Appuhami, R., & Bhuyan, M. 2015; Widiatmoko, J., Indarti, M. G. K., & Pamungkas, I. D. 2020; Al-Sartawi, A. 2017) were done using OLS estimation method which is not capable of capturing heterogeneity effects of the sampled firms; (3) Furthermore, none of the studies reviewed employed data up to 2020, hence the study identify a period gap; and (4) These past studies also completely ignore Directors remuneration, board ownership and Board gender which is are key factors that can possibly determine intellectual capital of listed firms in Nigeria.

This study therefore seeks to address these research problems by first ensuring the inclusion of variables like board size, board independence, board gender diversity, board ownership, directors' remuneration and board meetings in the study as proxies for corporate governance in line with related extant literature. Second, the study employs a panel regression technique of within effect estimator that can capture the heterogeneity effect present in the firm. Third, the study ensures that a larger firm observation of non-finance firms over 10 years is used unlike previous studies of Hidalgo, R. L., et al (2011) Appuhami, R., & Bhuyan, M. (2015), Widiatmoko, J., et al (2020) and Al-Sartawi, A. (2017) that use short periods and small firm observations. More than this, the study to the best of my knowledge will be the first in the context of Nigeria to use most recent data including the crisis period of 2012 and 2013 to investigate the effect of corporate governance on intellectual capital of listed non-finance firms in Nigeria from 2011 to 2020 employing Value Added Intellectual.

Capital Coefficient as a measure of intellectual capital.

## **2. Conceptual Literature**

### **2.1 Intellectual Capital (IC)**

Stewart Stewart, G. (1997) described intellectual capital as "the intangible value provided by individuals and businesses." As a result of the acquisition of important knowledge and resources via IC, numerous organizations have gained a competitive advantage and expanded their market share Luo, Y., & Tung, R.L. (2007). IC can also be used to monitor a company's growth. Improvement of internal controls, enhancement of asset management, and reduction of business decision-related risk are some of the goals that IC helps firms achieve Al-Sartawi, A. (2017). Investment in customers, suppliers, personnel, and technology (IC) is described by

Kaplan, R. S., & Norton, D. P. (1996) as an investment. A company's competitive advantage is based on its ability to tap into its intellectual capital (IC). Forms, tactics, and specific procedures are all part of it. According to Edvinsson, Leif and Michael S. Malone (1997), and others Archer, S., Karim, R. A. A., & Al-Deehani, T. (1998) cv, the market and book valuations of a firm disguise the existence of an intrinsic value (IC). It is an intangible asset that organizations can use to generate revenue, even if researchers dispute on the definition. One of the most difficult aspects of intellectual capital research is calculating and analyzing it. Multiple methodologies have been developed, such as Skandia Navigator Edvinsson, Leif and Michael S. Malone (1997), Intangible Assets Monitor Sveiby, K. E. (1997), the Balanced Scorecard Approach Kaplan, R. S., & Norton, D. P. (1996), Market Capitalization Method and Value-Added Intellectual Capital (VAIC) model, for example (Pulic, 1998, 2000). Since it is widely accepted in academia, the study will use the VAIC approach to estimate Intellectual Capital in this study. Three inputs are used in the VAIC approach for evaluating the efficiency of a company: physical capital, human capital, and structural capital. This technique is based on the VAIC model. The acronyms CEE (Capital Employed Efficiency), HCE (Human Capital Efficiency), and SCE (Structural Capital Efficiency) stand for these three inputs (SCE).

## **2.2 Value Added Intellectual Capital Coefficient (VAIC)**

Management, owners, and other interested parties can use the VAIC model to keep tabs on the overall resources and major resource components of a firm. Value generation processes in organizations that are tracked and managed using accounting-based metrics can now be better understood thanks to this approach. Despite this, VAIC has several restrictions. According to Brennan Brennan, N. (2001), intangible assets are not enough to calculate VAIC. In addition, VAIC does not consider investments in intellectual property or R&D, according to Chang Chang, H. J. (2007). It was also found by Chu, S. K. W., et al (2011) that they were unable to determine the degree of IC in companies with low book values or negative VAIC operating profit, indicating that the scale of corporate risk was overestimated Maditinos, D., et al (2011). It is also impossible to assess the combined effects of several types of tangible and intangible assets Dzenopoljac, V., et al (2017).

## **2.3 Corporate Governance**

Corporate governance refers to how businesses manage their organizational structures in terms of culture, rules, strategy, and how they interact with various stakeholders Barrett, D. J. (2002). All stakeholders, including financial investors, executives, suppliers, local governments, and customers, should obtain a sufficient return on their investment. Corporate governance is a process through which a firm guarantees that all its stakeholders receive an adequate return on their investment (Bhaumik, S., et al 2019; Shleifer, A., & Vishny, R. W. 1997). Corporate governance has a significant impact on a number of aspects of the firm's culture, performance, and accountability, according to Brennan, N. M., & Solomon, J. (2008) and Haniffa, R. M., & Cooke, T. E. (2002). The study will employ agency theory to investigate the connection between corporate governance and information technology in the study, which makes it unique. There are a variety of criteria used by some authors when assessing a company's corporate governance structure, including the size of the board, its independence, the size of the audit committee, its ownership, its diligence, and its compensation. Nonetheless, the study also looks at corporate governance via the perspectives of board size and diligence, as well as gender diversity, board meetings, board ownership, and director remuneration.

## **2.4 Board size**

When discussing the size of a board of directors, the term "board size" is used. Size of board refers to number of people elected by shareholders to lead company affairs and who are obligated by particular standards, such as the requirement that they operate within their powers

and with reasonable care while carrying out corporate tasks, such as this Peasnell, K.V., et al (2005). The "Board Size" of a company's board of directors refers to the total number of members, both internal and external Doğan, M., & Yildiz, F. (2013). According to Dalton et al. Dalton, D. R., et al (1998), the total number of directors on a company's board is the same as the previous definition. As a general rule, larger boards include more executive and non-executive directors on the board Gambo, E. M. J., et al (2018).

## **2.5 Board independence**

According to Fuzi, S. F. S., et al (2016), independent directors are those who are not full-time workers, in contrast to executive directors, who are full-time employees and are involved in the company's day-to-day operations. Independent non-executive directors served as a check on the executive directors' and management's performance and actions. In general, independence directors' representation is critical to the board's functioning. An independent director is a director who is free of conflict of interest and committed to the protection of investors and the enhancement of the board's control quality. This individual assists in guiding the bank's strategic policies and enhancing their effectiveness in managing bank risks. The theoretical notion of outside, independent members on corporate boards is a postwar US board practice invention of 'good governance,' which has progressively risen in popularity over time Gordon, L. A., et al (2009).

## **2.6 Board Ownership**

The percentage of a company's shares owned by its directors is called the directors' shareholding. According to Jensen Jensen, M. C. (1993), when directors do not own a large portion of their business's shares, many complications develop. In the first situation, directors' incentives to pursue shareholders' interests are reduced, hurting the financial health of businesses Simpson, W. G., & Gleason, A. E. (1999). Using share ownership to align directors' interests with those of the company is recommended by Jensen, M. C., & Meckling, W. H. (1976). This refers to the greatest shareholding structure of the company's management, which comprises directors and commissioners, as shown by the percentage of management shares. When managers own the company, they will become more self-absorbed. Managerial ownership structure may be interpreted in two ways: via the lens of agency or through the lens of imbalance. The agency viewpoint considers the management ownership structure as a mechanism or instrument for resolving agency conflict amongst a business's several claims.

## **2.6 Board Meeting**

Board diligence has been defined as the total number of formal meetings of an organization's board of directors held at regular intervals to discuss policy and key issues. Presided over by the organization's chairperson (chairman or chairwoman) or an appointee, it must adhere to quorum rules and record its discussions in minutes. According to the idea of collective responsibility, all directors (including those who are not present) are obligated by the corporation's resolutions. According to KNKG, K. (2006), the Board of Directors is a corporate entity responsible for jointly overseeing and advising management and ensuring that the business practices sound corporate governance. Meetings are one method of doing the goal. Increased meetings / meetings of the board of directors imply that management is closely monitored; this is because such meetings are used to deliberate on the company's growth. Corporate governance implementation rules require the organization to give reports on the number of board meetings held and the attendance of each board member.

## **2.7 Board Gender Diversity**

Diversification can be wide Pelled, L. H. (1996) in terms of demographic characteristics or limited Carter, D. A., et al (2003) in terms of the number of women and minorities on the board of directors. Gender diversity may be defined as the practice of capitalizing on the unique

features and abilities of men and women that can benefit the business. Gender diversity in the boardroom is defined by Dutta and Bose Pelled, L. H. (1996) as the presence of women on the board of directors, which is a crucial component of board diversity. Companies worldwide are being pressed to improve female participation in their boardrooms. Given the statistics on female board presence in Europe, which averaged 23% in 2017 Deloitte. (2017), attempts to construct boards that reflect the society are unsurprising. Gender diversity on the board reflects the diverse human attributes that contribute to the workforce's heterogeneity Robbins, S., & DeCenzo, D. (2005).

## **2.8 Board Remuneration**

The term "executive compensation" refers to the total remuneration paid to top executives in the form of cash bonuses and cash awards Akewuocha, R.O. and Saka, R.O. (2018). Salary, on the other hand, may be considered as an incentive structure that incentivizes employees to perform well. Compensation is based on a number of variables, including education, experience, attitude, and market or industry rates. Shin, E.D., et al (2009) defined executive remuneration as the sum of monetary and non-monetary compensation that an executive receives from their employer for their contributions to the company. Employee compensation is often a combination of salary (which may include bonuses, stock options, and other perks), bonuses, stock options, and other perks, as well as performance-based remuneration.

## **2.9 Theoretical Exposition**

### **2.9.1 Agency Theory**

The term "executive compensation" refers to the total remuneration paid to top executives in the form of cash bonuses and cash awards Akewuocha, R.O. and Saka, R.O. (2018). Salary, on the other hand, may be considered as an incentive structure that incentivizes employees to perform well. Compensation is based on a number of variables, including education, experience, attitude, and market or industry rates. Executive remuneration, as defined by Shin, E.D., et al (2009), comprises both monetary and non-monetary compensation that an executive gets from their firm in exchange for their contributions to the organization. It is frequently a combination of wages, bonuses, shares of or call options on the firm stock, perks, and perquisites that are best structured to account for government laws, tax law, the organization's and executive's preferences, and performance-based remuneration.

## **3 Empirical Literature and Hypotheses Development**

### **3.1 Board size and Intellectual Capital**

To understand the effect of board size on intellectual capital, there have been various studies conducted in Asia, Europe, Africa, and the Pacific. We observed that board size was used as one of the corporate governance determinants of intellectual capital. Specifically, based on studies that find positive effect of board size on intellectual capital, the study identifies the studies of Widiatmoko, J., et al (2020) in Indonesia who find that board size has a positive and significant effect on intellectual capital. Their studies were conducted using non-finance firms for the period of 2015-2018 and they estimated their model using OLS regression. Similarly, Tran, N. P., et al (2020) conducted an OLS regression study in Vietnam using 45 non-finance firms for the period of 2011-2018 and they also found out that board size had a significant and positive relationship with intellectual capital. Shahwan, T. M., & Habib, A. M. (2020) in Egypt, Aslam, E., & Haron, R. (2020) in OIC Countries; as well as Appuhami, R., & Bhuyan, M. (2015) also documented evidence supporting that larger board positively influence intellectual capital. On the contrary, based on studies that find negative effect of board size on intellectual capital, Hidalgo, R. L., et al (2011) found out that board size has a negative and significant effect on intellectual capital. Their studies were done on 100 firms for the period of 2005-2007 and they used OLS regression technique. In Europe, the study also observed that board size

was used as one of the corporate governance determinants of intellectual capital. Still based on studies that found negative relationships, the study observed from the work of Baldini, M. A., & Liberatore, G. (2016), that board size had a negative and significant impact on intellectual capital of Mexican firms. Their findings were based on a multiple regression estimation method using a sample of 172 Mexican firms for the period of 2010. While the study observed that most empirical studies reviewed support larger boards as beneficial to organizations in terms of diversity and the pool of expertise, agency costs resulting from ineffective controls, lack of coordination and poor communication created by larger boards, can overwhelm this benefit Jensen, M. C. (1993). In the light of the above, the study hypothesized as follows:

H01: Board size has no significant positive effect on intellectual capital of listed insurance firms in Nigeria

### **3.2 Board independence and Intellectual Capital**

To understand the effect of board independence on intellectual capital, there have been various studies conducted in Asia, Europe, Africa, and the Pacific. the study observed that board independence was used as one of the corporate governance determinants of intellectual capital. Specifically, based on studies that find positive effect of board independence on intellectual capital, the study identifies the studies of Hidalgo, R. L., et al (2011) in Mexico who investigated the effect of board independence as a proxy of corporate governance on intellectual capital and submitted that board independence has a positive significant effect on intellectual capital. Their studies were conducted using non-finance firms for the period of 2005-2007 and they estimated their model using OLS regression. On the contrary, based on studies that find negative effect of board size on intellectual capital, the study identifies the studies of Shahwan & Habid 2020 in Egypt who conducted a DEA analysis on the effect of corporate governance on intellectual capital. They concluded that board independence has a negative and significant effect on intellectual capital proxied by VAIC. Appuhami, R., & Bhuyan, M. (2015) found out that board independence has a negative and significant effect on intellectual capital. Their studies were done on 30 service firms for the period of 2004-2013 and they used OLS regression technique. Widiatmoko, J., et al (2020) in Indonesia also finds that board independence has a negative and significant effect on intellectual capital. Their studies were conducted using non-finance firms for the period of 2015-2018 and they estimated their model using OLS regression. Similarly, Tran, N. P., et al (2020) conducted an OLS regression study in Vietnam using 45 non-finance firms for the period of 2011-2018 and they also found out that board independence had a significant and negative relationship with intellectual capital. Summarily, most reviewed empirical reveals that more non-executive independent directors on the board will decrease intellectual capital. In the light of the above, the study hypothesized as follows:

H02: Board independence has no significant negative effect on intellectual capital of listed insurance firms in Nigeria

### **3.3 Board meetings and Intellectual Capital**

To understand the effect of board meetings on intellectual capital, there have been various studies conducted in Asia, Europe, Africa, and the Pacific. the study observed that board meetings were used as one of the corporate governance determinants of intellectual capital. Specifically, based on studies that find positive effect of board meetings on intellectual capital, the study identifies the studies of Aslam, E., & Haron, R. (2020) who concluded from their studies of Islamic Banks from OIC Countries that board meetings have a positive and significant effect on intellectual capital of Islamic banks from 2008-2017. The study also reviewed the studies of Mujahid, S., et al (2019) whose results from 99 manufacturing firms in Pakistan reveal that board meetings have a significant positive effect on intellectual capital.

Mujahid, S., et al (2019) arrived at the conclusion from a quadratic regression analysis of manufacturing firms in Pakistan from 2008 to 2017. Appuhami, R., & Bhuyan, M. (2015) found out that board meetings have a negative and significant effect on intellectual capital. Their studies were done on 30 service firms for the period of 2004-2013 and they used OLS regression technique. The study also observed from the work of Baldini, M. A., & Liberatore, G. (2016), that board meetings had a negative and significant impact on intellectual capital of Mexican firms. Their findings were based on a multiple regression estimation method using a sample of 172 Mexican firms for the period of 2010. On the contrary, Widiatmoko, J., et al (2020) in Indonesia finds that board meetings have a negative and significant effect on intellectual capital. Their studies were conducted using non-finance firms for the period of 2015-2018 and they estimated their model using OLS regression. Furthermore, evidence from Gulf Countries, Al-Sartawi, A. (2017) conducted an OLS regression analysis of the effect of corporate governance on intellectual capital. In their study, the results reveal that board meetings have a negative significant effect on intellectual capital. Summarily, the study observed that more of the studies reviewed support evidence of a positive significant effect of board meetings on intellectual capital. Hence, the study hypothesized as follows:

H03: Board meetings has no significant positive effect on intellectual capital of listed insurance firms in Nigeria.

### **3.4 Board ownership and Intellectual Capital**

To understand the effect of board ownership on intellectual capital, there have been various studies conducted in Asia, Europe, Africa, and the Pacific. The study observed that board ownership was used as one of the corporate governance determinants of intellectual capital. Specifically, based on studies that find positive effect of board ownership on intellectual capital, the study identifies the studies of Shahwan & Habid 2020 in Egypt who conducted a DEA analysis on the effect of corporate governance on intellectual capital. They concluded that board ownership has a positive and significant effect on intellectual capital proxied by VAIC. In the same vein, Widiatmoko, J., et al (2020) in Indonesia find that board ownership has a positive and significant effect on intellectual capital. Their studies were conducted using non-finance firms for the period of 2015-2018 and they estimated their model using OLS regression. Similarly, Tran, N. P., et al (2020) conducted an OLS regression study in Vietnam using 45 non-finance firms for the period of 2011-2018 and they also found out that board ownership had a significant and positive relationship with intellectual capital. However, based on studies that found negative relationships, the study observed from the work of Baldini, M. A., & Liberatore, G. (2016), that board ownership had a negative and significant impact on intellectual capital of Mexican firms. Their findings were based on a multiple regression estimation method using a sample of 172 Mexican firms for the period of 2010. From the empirical results reviewed, the study observes that most authors document evidence supporting a positive significant effect of board ownership on intellectual capital. Hence, the study hypothesized as follows:

H04: Board ownership has no significant positive effect on intellectual capital of listed insurance firms in Nigeria.

### **3.5 Board gender diversity and Intellectual Capital**

To understand the effect of board gender diversity on intellectual capital, there have been various studies conducted in Asia, Europe, Africa, and the Pacific. The study observed that board gender diversity was used as one of the corporate governance determinants of intellectual capital. Specifically, based on studies that find positive effect of board gender diversity on intellectual capital, the study identifies the studies of Mujahid, S., et al (2019) whose results from 99 manufacturing firms in Pakistan reveal that board gender diversity has a significant

positive effect on intellectual capital. Mujahid, S., et al (2019) arrived at the conclusion from a quadratic regression analysis of manufacturing firms in Pakistan from 2008 to 2017. However, the studies of Widiatmoko, J., et al (2020) in Indonesia finds that board gender diversity has a negative and significant effect on intellectual capital. Their studies were conducted using non-finance firms for the period of 2015-2018 and they estimated their model using OLS regression. Furthermore, evidence from Gulf Countries, Al-Sartawi, A. (2017) conducted an OLS regression analysis of the effect of corporate governance on intellectual capital. In their study, the results reveal that more women on the board decreases intellectual capital. Also, In Europe, the study also observed that board gender diversity was used as one of the corporate governance determinants of intellectual capital. Still based on studies that found negative relationships, the study observed from the work of Baldini, M. A., & Liberatore, G. (2016), that board gender diversity had a negative and significant impact on intellectual capital of Mexican firms. Their findings were based on a multiple regression estimation method using a sample of 172 Mexican firms for the period of 2010. From the foregoing, even though it is generally believed that women are more averse to risk those men on the board of directors, most of the empirical findings supports less women on the board for effective intellectual capital. In the light of the above, the study hypothesized as follows:

H05: Board gender diversity has no significant negative effect on intellectual capital of listed insurance firms in Nigeria.

### **3.6 Directors' remuneration and Intellectual Capital**

To understand the effect of directors' remuneration on intellectual capital, there have been various studies conducted in Asia, Europe, Africa, and the Pacific. The study observed that directors' remuneration was used as one of the corporate governance determinants of intellectual capital. Specifically, based on studies that find positive effect of directors' remuneration on intellectual capital, the study identifies the studies of Appuhami, R., & Bhuyan, M. (2015) who found out that directors' remuneration has a positive and significant effect on intellectual capital. Their studies were done on 30 service firms for the period of 2004-2013 and they used OLS regression technique. On the contrary, Tran, N. P., et al (2020) conducted an OLS regression study in Vietnam using 45 non-finance firms for the period of 2011-2018 and they found out that directors' remuneration had a significant and negative relationship with intellectual capital. Summarily, the study notes a rare usage of directors' remuneration as a corporate governance determinant of intellectual capital. The literature reviewed reveal mixed findings of directors' remuneration and intellectual capital. From the foregoing, the study hypothesized as follows:

H06: Directors' remuneration has no significant effect on intellectual capital of listed insurance firms in Nigeria.

## **4. Methodology**

Following the existing literature by using an expo-facto and non-experimental research technique at the firm level. The research is long-term, spanning over a decade. In other words, between 2011 and 2020, hire publicly listed non-finance enterprises on the Nigerian Exchange Group's floor. (NGX). Purposeful sampling was used since organizations were chosen for inclusion based on predetermined selection criteria. Assuming the companies were listed on Nigerian Exchange Group (NGX) between 2011 and 2020, their annual financial reports were accessible during that time period, and the companies did not have subsidiaries in Nigeria that weren't listed on NGX, these criteria were created (NGX). Newly listed or delisted firms are not included in the study. To provide a representative sample, only non-finance companies with complete data were included for the study. The availability of data for all research variables over a 10-year period determined the ultimate sample size of 30 non-finance enterprises. To



examine the effect of corporate governance on intellectual capital, the study adopted and modified the model of Widiatmoko, J., et al (2020) to express the econometric model as  

$$VAIC_{it} = \beta_0 + \beta_1 BODS_{it} + \beta_2 BODI_{it} + \beta_3 BMET_{it} + \beta_4 MAOW_{it} + \beta_5 BOGD_{it} + \beta_6 DRSA_{it} + \beta_7 FSIZ_{it} + \mu_{it}$$

Where:

- VAIC=Dividend Per Share
- BODS=Board Size
- BODI=Board Independence
- BMET=Board Diligence
- MAOW=Board Ownership
- DRSA=Directors Remuneration
- BOGD=Board Gender Diversity
- FSIZ=Firm Size
- $\beta_0$  = Constant
- $\beta_1$ -  $\beta_6$ = Slope Coefficient
- $\mu$ =Stochastic disturbance
- i=ith firm
- t=time-period

## 5. Empirical Results and Discussion

Table 1 below represents the descriptive statistics for this study. Overall, the descriptive data shed light on the selected Nigerian publicly traded non-finance companies that were the subject of this investigation.

### 5.1 Descriptive Analysis

Descriptions of the explanatory and dependent variables using descriptive statistics will be the focus of this section. Each variable's average, standard deviation, highest and lowest values are examined.

***Table 1. Descriptive Statistics.***

VARIABLES	MEAN	SD	MIN	MAX	NO OBS
VAIC	5.58	4.70	-0.75	37.07	299
BODS	9.71	2.60	4	18	300
BODI	66.76	13.93	33.33	93.33	300
BMET	4.82	1.12	1	10	300
MAOW	16.32	24.16	0	94.35	300
BOGD	12.35	11.04	0	66.67	300
DRSA	0.73	0.81	0.01	4.30	298
RETA	5.74	11.01	-52.56	53.95	299

Source: Author (2023)

According to the data in the table, the standard deviation for the VAIC is 4.70 points, indicating a mean of 5.58 points. The average board size (BODS) for the companies the research studied was ten members. There was a mean score of 66.76 for board independence (BODI), with a standard deviation of 13.93. The BMET had a mean of 4.82 and a standard deviation of 1.12 during its most recent session. There was a mean of 16.32 and a standard deviation of 24.16 for board ownership (MAOW). In terms of BOGD, the average was 12.35, while the standard deviation was 11.04. With a standard deviation of 0.81, director's remuneration (DRSA) was

found to be 0.73. Profitability (RETA) was found to have a mean of 5.74 and a standard deviation of 11.01.

### 5.2 Correlation Analysis

Correlation matrixes were used to evaluate the relationship between variables, and results are shown below in a table.

**Table 2. Correlation analysis.**

	VAIC	BODS	BODI	BMET	MAOW	BOGD	DRSA	RETA
VAIC	1.00							
BODS	-0.05	1.00						
BODI	-0.14	0.28	1.00					
BMET	-0.12	0.01	0.00	1.00				
MAOW	-0.08	-0.04	-0.10	0.03	1.00			
BOGD	-0.09	-0.18	-0.02	0.09	-0.02	1.00		
DRSA	-0.28	-0.15	-0.06	0.23	0.30	-0.05	1.00	
RETA	0.38	-0.04	-0.04	0.05	-0.16	0.4	-0.17	1.00

Source: Author’s computation (2023)

Findings reveal a weak and negative association between board size and intellectual capital, two important variables to consider (-0.05). The link between board independence and intellectual capital is weak and unfavorable (-0.14). The link between board meetings and intellectual capital is tense and unsteady (-0.12). Board ownership and intellectual capital have a weak and negative relationship (-0.08). The link between board gender diversity and intellectual capital is weak and unfavorable (-0.09). Director salary has a weak and negative association with intellectual capital (-0.28). The link between profitability and intellectual capital is both beneficial and weak (0.38). Regression data will be necessary to support the hypothesis because correlation tests do not capture cause-and-effect linkages.

### 5.3 Regression Results

In particular, the panel data regression and an OLS pooled findings to examine the cause-effect correlations between the dependent variables and independent factors and to evaluate the hypotheses.

**Table 3. Regression Result.**

	CTAR (Pooled OLS)	Model	CTAR (FIXED Effect)	Model	CTAR (RANDOM Effect)	Model
C	11.37 {0.000} ***		10.89 {0.000} ***		10.81 {0.000} ***	
BODS	-0.11 {0.255}		-0.18 {0.159}		-0.16 {0.157}	
BODI	-0.04 {0.033} **		-0.05 {0.006} **		-0.05 {0.007} **	
BMET	-0.30 {0.181}		-0.04 {0.842}		-0.07 {0.714}	
MAOW	0.01 {0.541}		-0.02 {0.248}		-0.012 {0.362}	
BOGD	-0.05 {0.030} **		0.01 {0.599}		0.00 {0.971}	
DRSA	-1.35 {0.000} ***		-0.73 {0.102}		-0.90 {0.025} **	
RETA	0.15 {0.000} ***		0.10 {0.000} ***		0.10 {0.000} ***	
F-statistics/Wald Statistics	12.60 (0.00) ***		5.98 (0.00) ***		49.62 (0.00) ***	
R- Squared	0.23		0.14		0.14	
VIF Test	1.12					
Heteroscedasticity Test	65.08 (0.000) ***					
Hausman Test			7.05 (0.4239)			

Note: (1) bracket { } are p-values

(2) \*\*, \*\*\*, implies statistical significance at 5% and 1% levels respectively

There was only a little amount of systematic variation in intellectual capital proxied by a value-added intellectual coefficient in the pooled non-finance businesses across the period of interest that was explained by the independent variables in the model (the R-squared value of 0.23). The unexplained component of intellectual capital is due to the erroneous term excluding other independent variables that potentially effect intellectual capital. It is legitimate and may be used for statistical inference. The F-statistic of 12.60 and P-value of 0.00 reveal that the OLS regression model is statistically significant at the 1% level. With a mean VIF of 1.12, the model has no multicollinearity, and no independent variables should be discarded. According to the table above, heteroscedasticity is a problem for OLS results [65.08 (0.00)]. The heteroscedasticity of the sampled companies suggests that they are not all the same. A robust or panel regression technique is therefore necessary to capture the influence of each company's heteroscedasticity on the results. Panel regression with fixed and random effects was employed in this study.

The F-statistics of 5.98 (0.00) for the fixed effect model and 49.62 (0.00) for the random effect model indicate that both models are suitable for making inferences because they are both statistically significant at 1 percent. In terms of the coefficient of determination (R-squared), the independent and control variables explained 14 percent and 14 percent of systematic fluctuations in intellectual capital, respectively. This means that the OLS pooled regression explained less variation in intellectual capital. The Hausman test was used to pick between the two-panel regression estimates findings, with the random effect model being chosen above the fixed effect model. The Hausman test p-value (0.4239) suggests that the study should accept the null hypothesis and reject the alternative hypothesis at a 5% or 1% level of significance. The study should rely on the results of random effect panel regression for the conclusions and recommendations. This shows that random effect results are statistically more appealing than results from fixed effects. In order to test the hypotheses, the study needed to discuss random effect outcomes. For each independent variable, the random effect regression analysis is provided in the table below.

#### **5.4 Discussion of Findings**

No new information contradicts the current findings of this research because it is an extension of earlier studies. Board size (Random effect regression = -0.16 (0.157)) has a negative and modest impact on intellectual capital as an independent variable. The study concludes that: The size of Nigerian listed non-finance companies' boards has no discernible impact on those firms' intellectual capital. This suggests that expanding the board's size will have no impact on the company's intellectual capital. This conclusion is consistent with previous empirical findings that suggest that board size has no discernible effect on intellectual capital (Widiatmoko, J., Indarti, M. G. K., & Pamungkas, I. D. 2020; Shahwan, T. M., & Habib, A. M. 2020; Aslam, E., & Haron, R. 2020; Al-Sartawi, A. 2017). However, the study disagrees with the findings of Hidalgo, R. L., et al (2011) and Baldini, M. A., & Liberatore, G. (2016), who claimed that board size enhances intellectual capital considerably. The study findings also suggest that board independence (Random effect regression = -0.05 (0.007)) appears to have a negative and substantial influence on intellectual capital as an independent variable. As a result, the study should reject the null hypothesis H02: Board independence has no substantial influence on intellectual capital of Nigerian listed non-finance enterprises. This implies that increasing board independence will result in a large reduction in intellectual capital. This finding is consistent with previous empirical findings that suggest that board independence reduces intellectual capital considerably (Widiatmoko, J., Indarti, M. G. K., & Pamungkas, I. D. 2020; Shahwan, T. M., & Habib, A. M. 2020; Aslam, E., & Haron, R. 2020; Al-Sartawi, A. 2017). However, the study disagrees with the findings of Hidalgo, R. L., et al (2011) and Baldini, M. A., & Liberatore, G. (2016), who concluded that board independence improves intellectual

capital considerably. The study also shows that board meetings (Random effect regression = -0.07 (0.714)) have a negative and minor influence on intellectual capital as an independent variable. As a result, the study should accept the null hypothesis H03: Board meetings have no substantial influence on the intellectual capital of Nigerian listed non-finance enterprises. This implies that increasing the number of board meetings will have a negligible effect on intellectual capital. This finding is consistent with previous empirical findings that suggest that board meetings have a negligible effect on intellectual capital Widiatmoko, J., et al (2020). However, the study disagrees with the findings of Mujahid, S., et al (2019), Appuhami, R., & Bhuyan, M. (2015) and Baldini, M. A., & Liberatore, G. (2016) that board meetings significantly boost intellectual capital. The findings also reveal that board ownership (Random effect regression = -0.01 (0.362)) appears to have a negative and minor influence on intellectual capital as an independent variable. As a result, the study should accept the null hypothesis H04: Board ownership has no substantial influence on intellectual capital of Nigerian listed non-finance enterprises. This implies that increasing board ownership will have a negligible effect on intellectual capital. This conclusion is consistent with previous empirical findings that suggest that board ownership has a negligible effect on intellectual capital Baldini, M. A., & Liberatore, G. (2016). However, the study disagrees with Widiatmoko, J., et al (2020) findings that board ownership considerably enhances intellectual capital. Board gender diversity (Random effect regression = 0.00 (0.971)) as an independent variable to intellectual capital indicates to have a positive and minor influence on intellectual capital. As a result, the study should accept the null hypothesis H05: Board gender diversity has no substantial influence on intellectual capital of Nigerian listed non-finance enterprises. This implies that increasing board gender diversity will have a negligible effect on intellectual capital. This finding is consistent with previous empirical findings that suggest that board gender diversity has a little effect on intellectual capital Mujahid, S., et al (2019). However, the study disagrees with the findings of Al-Sartawi, A. (2017) and Baldini, M. A., & Liberatore, G. (2016), who claimed that board gender diversity reduces intellectual capital considerably. Finally, the study shows that director's salary (Random effect regression = -0.90 (0.025)) appears to have a negative and substantial influence on intellectual capital as an independent variable. As a result, the study should reject the null hypothesis H06: Director compensation has no substantial influence on the intellectual capital of Nigerian listed non-finance enterprises. This implies that increasing director salary will result in a considerable drop in intellectual capital. This result is consistent with previous empirical findings that suggest that director compensation dramatically reduces intellectual capital Appuhami, R., & Bhuyan, M. (2015). However, the study disagrees with Tran, N. P., et al (2020) findings that director compensation greatly boosts intellectual capital.

## **6. Conclusion and Recommendation**

In a knowledge-based economy, a company's ability to attract and retain talented employees, adopt new technical infrastructure, and maintain positive relationships with suppliers and other stakeholders is enhanced when it has excellent corporate governance in place. The reduction of information asymmetry and agency problems can also be achieved by good corporate governance systems, which provide decision-makers with access to critical information. In light of this, the empirical findings of this study led to the conclusion that only board independence and director compensation have a significant impact on intellectual capital. To the detriment of intellectual capital, increasing director compensation and the number of independent non-executive directors is recommended. This paper conclude that the director's compensation should be lowered as a result of the findings.

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