

## Determinants of Intangible Assets Disclosure in Quoted Companies in Nigeria

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### ABSTRACT

*This study examined the determinants of voluntary disclosure of intangible assets by quoted companies in Nigeria. A disclosure index, based on the modified Value Chain Scoreboard (VCSB), was constructed to measure the dependent variables in four (4) models. The VCSB is intended to inform both the manager and investors about the company's innovational activities with emphasis on investment in intangible assets and their transformation to tangible results. The VCSB is described as a matrix of non-financial indicators arranged in three categories according to the circle of development (Lev 2001). The pooled and panel data, sourced from the annual reports and accounts of one hundred and fifty-seven (157) quoted companies for six (6) years from 2005 to 2010 were used. The Fixed Effects model was chosen for analysis of data. The findings revealed that Age of Company (AGEC) had a positive and significant influence on all classes of voluntary disclosures. Size of Audit Firm (SIZA) was positively and significantly related to overall voluntary disclosure of intellectual capital assets (VDIAOV), while the least disclosed class of intangible assets was voluntary disclosure of intangible assets relating to implementation (VDIAIM); and the most disclosed class was VDIACO. Given these findings, the regulatory authorities could grant awards in order to encourage more voluntary disclosure of intellectual capital by companies in relation to implementation since findings revealed that this phase of component is the least disclosed. Additionally, the big-4 audit firms can organize a mandatory continuous professional training as to extend their protocols and techniques in order to encourage more disclosures by companies audited by the non big-4 audit firms.*

*Keywords: Voluntary disclosure of intangible assets; Nigeria; Corporate attributes*

### INTRODUCTION

Financial reporting represents the medium through which accounting information is communicated to users. Therefore, it is expected that the accounting information communicated to impact and shape the decisions made by the information users. However, the traditional accounting and financial reporting models from which financial statements are prepared do not capture the wide components of intangible assets, except for goodwill and very few other intangible assets, such as patents and copyrights. In addition, the International Accounting Standard No. 38 (IAS 38 and even the defunct Nigerian Statement of Accounting Standard No 31 (SAS 31) provide little or no guidance on the financial reporting of intangible assets. Besides, prevailing traditional accounting model does not guarantee an in-depth understanding of accounting reporting for the 21<sup>st</sup> century accounting research and does not provide empirical insights to voluntary disclosure of intangible assets.

In addition, there is also the challenge of inconsistency in the common framework of measurement, valuation and financial reporting on a wide range of intangible assets and the inability of IAS 38 or even the defunct Nigerian SAS 31 in addressing reliability, separability, measurement, valuation and common financial reporting issues relating to intangible assets (Ibadin & Omoye 2014). Interestingly, today, intangible assets are known to constitute a company's dynamic capabilities that are created by core competencies

and knowledge resources. The worth of a country or the organization is no longer measured by the investments in tangible assets alone, but, to a larger scale, by the quantum of intangible assets it has (Arrighetti, Landini & Lasagni 2011).

Nevertheless, the International Accounting Standards Board (IASB) (2000) has enjoined companies to report on their stock of intangible assets, at least, on a voluntary basis in order to supplement the financial reports and also to provide explanation on the unrecognized assets. This suggests that such information should be expressed in excess of mandatory requirements (Abdul Halim & Baxter 2010), and could only be expressed voluntarily. Companies, in compliance with the necessity for disclosure, are now engaged in varied degrees of disclosure of intangible assets. Against this background, this study seeks to examine the extent of voluntary disclosure of intangible assets practices and the role of various factors in voluntary disclosure practices relating to intellectual capital in Nigeria, as well as to determine the critical factors that are germane to providing useful information that enable accounting information users to evaluate the options available. The factors examined are those that impinge on the short-term and long-term survivability of firms and lead to the creation of shareholder value. Therefore, it is important to understand the accounting reporting practices of developing economies as they relate to disclosure of intangible assets. Besides, there is dearth

of literature on intangible assets disclosure practices in the developing countries; additionally, extant literature has so far concentrated on measurement, valuation and financial reporting issues of intangible assets. The remainder of the paper is as follows: section 2 focuses on literature and hypotheses development. Section 3 deals with methodology. Section 4 presents the data analysis and results. The paper concludes in section 5.

#### LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The world economy is now knowledge-based, with emphasis on investment in non-physical assets with future economic benefits to the company or country (Omoye 2013). The transition towards a knowledge-based economy is changing the traditional business model (Goldfinger 1997) which is substantially built on financial reporting of tangible fixed assets. This gives way to a more-embracing, more reliable, relevant, and complete reporting model which emphasizes on financial reporting of intangible assets.

It has been observed that intangible assets generally play very significant roles in value creation in a number of companies. Consequently, growing interests in these assets continued to mount against the backdrop of stakeholders' use of financial reports and accounts, prepared in line with the traditional accounting model. Ironically, the use of traditional accounting model-compliant reports and accounts, prohibits the inclusion of a full range of intangible assets. Consequently, decisions that are made based on these reports become inappropriate. Given the growing need to incorporate intangible assets into companies' financials as to allow for a more balanced and factual report on companies' activities, intangible assets have assumed the subject of discourse among scholars and researchers (Lev 2001; Kang & Gray 2006; Ibadin 2013). According to Ibadin (2013), voluntary disclosure of intangible assets refers to disclosure that is in excess of legal requirements. This definition is consistent with AdulHalim and Baxter (2010) who agreed that voluntary disclosure of intangible assets is an avenue in providing voluntary or additional information on assets recognized in financial statements. Such additional information, in excess of mandatory requirements, provides explanation on unrecognized assets and help users and other stakeholders to assess business risks inherent in such reports (Oliveira et al. 2006). As a consequence, intangible assets represent the components of the value chain scoreboard (VCSB). The concept of VCSB was developed by Lev (2001) and broadened by Kang & Gray (2006) and Oliveira et al. (2006); whereby it includes discovery and learning phase, implementation phase and commercialization phase. These phases represent the facets of intangible assets in which Oliveira et al (2006) described, as, the human capital, the structural capital and the relational capital, respectively. These phases form the fulcrum or framework of this study in which the VCSB items and categories represent the peculiarities of Nigeria.

Financial accounting information that is communicated to users can only be said to impact and sharpen the decisions made by the information users if it is complete (Lewis & Pendrill 1996 and Corrado, Sichel & Hulten 2006). Intangible assets are said to constitute the company's dynamic capabilities that are created by core competencies and knowledge resources, whereby they are extensively featured in this modern world (Arrighetti, Landini & Lasagni 2011). The worth of the organization is now known, reflecting the employees' collective capabilities, information system (Stewart 1997), technology-based communication, human innovation and intellectual capital (Canibano, Garcia-Ayuso & Sanchez 2000).

#### COMPANY SIZE

Even though anecdotal evidence suggests that company size causes differing levels of voluntary disclosure of intangible assets, it is logically reasoned that a larger company is more likely to have better disclosure of intangible assets. The technological theory of firm size relates to the relationship between human capital and firm size. Technological theories focus on capital intensity and its association with company size. The implication is that the greater the inequality in human capital, the greater dispersion will there be in company size. Rosen (1982) and Kremer (1993) found a positive correlation between human capital and company size. They had used cross-country measures of human capital and cross-industry measures of wage per worker, a variable closely related to human capital, as regressors. This positive relationship has been reported and documented in Mexico (Chow & Wong-Boren 1987); the U.S (Singhvi & Desai 1971); the U.K (Firth 1979); Sweden (Cooke 1989); France (Depoers 2000), and Portugal (Oliveira et al. 2006). In a similar vein, Barako (2007), Kang and Gray (2006) and Olivera et al. (2006) had found a positive relationship between company size and voluntary disclosure of intangible assets. Meanwhile, Rouf (2011), using total assets as proxy, found a positive but statistically insignificant relationship with voluntary disclosure. Based on the above submissions, it is hypothesized that:

H<sub>1</sub>: Company size is positively related to voluntary disclosure of intangible assets.

#### LEVERAGE

Leverage reflects the proportion of fixed-interest capital in the capital structure of a company. Leverage by companies suggests the use of debt in financing the activities of the company. Agency theory proponents argue that a company with high leverage is incentivized to disclose more information in order to reduce agency costs, arisen from the potential size of wealth transfer from debt holders to shareholders in line with signaling and stakeholders' theories (Oliveira et al. 2006).

Furthermore, leverage, as a structural attribute in many statistical analyses, has come out with mixed

results in terms of its influence on disclosure practices in companies. White et al. 2007 and Olivera et al. (2006) correctly remarked that no reliable relationship between indebtedness and information disclosure has been found in many studies of various countries and sectors. Also, Umoren (2009) found mixed findings in leverage and level of voluntary disclosure relationship. Nonetheless, while Meek, Roberts and Gray (1995) reported a negative relationship, Ferguson, Lam and Lee (2002) found a positive relationship. Chow and Wong-Boren (1987), Wallace, Naser and Mora (1994) and Wallace and Naser (1995) even found a “no effect” relationship between leverage and voluntary disclosure of intangible assets. Meanwhile, Sujan and Abeysekera (2007) found a positive relationship between a firm’s financial structure with low leverage and more disclosures in its annual reports.

H<sub>2</sub>: Leverage is positively related to voluntary disclosure of intangible assets.

#### SIZE OF AUDIT FIRM

In an empirical study on size of audit firm and voluntary disclosure of intangible assets, Barako (2007) argued that although it is entirely a management’s responsibility to prepare annual reports and accounts, an external audit firm can significantly influence the amount of information disclosed in its normal course of duty. Empirical evidence suggests mixed findings in literature on size of audit firm and voluntary disclosure of intangible assets (McNally, Hock & Hasseldine 1982; Wallace & Naser 1995; Wallace et al. 1994; Hossain, Tan & Adams 1994; Hossain, Perera & Rahman 1995 and Raffournier 1995). Not too strong relationship has also been reported (Mora & Rees 1998) while very few other researchers reported strong significant relationship (Giner 1997). Nonetheless, Chow & Wong-Boren (1987) reported a strong relationship between size of audit firm and voluntary disclosure of intangible assets, while maintaining that large audit firms tend to have audit independence. This strong relationship could also confirm the argument that firms or companies with any of the big-4 audit firms are more likely to engage in voluntary disclosure of intangible asset in their annual reports and accounts to prove, perhaps, their integrity and reputation, among others. The large audit firms are known to possess integrity and reputation to preserve, and encourage their clients to provide more extensive intangible assets.

Researches had shown some inconsistencies in empirical findings in the relationship between size of audit firm and extent of information disclosed. While Singhvi & Desai (1971), Raffournier (1995) and Giner (1997) have all confirmed a weak relationship, Firth (1979), Wallace et al. (1994); Hossain et al. (1995) and Dupoers (2000) have a contrary report.

H<sub>3</sub>: Size of audit firm is positively related to voluntary disclosure of intangible assets.

#### NATIONALITY

Internationalization theory is consistently cited to explain a company’s quest in disclosing its intangible assets stock (Allayannis & Weston 2007). This theory posits that any foreign activity by a company would inevitably require an increase in the stock of its intangible assets (such as production skills, or consumer goodwill) as to cope with the complexities occasioned by new markets and new environments. National differences or nationality of a company, connote or simply suggest differences in legal, accounting and other disclosure requirements in the company’s home country in relation to disclosure practices of the company in the host country. These differences define the foreign ownership of a company in the host country.

Researchers have argued (Kang & Gray 2006) that companies with national differences voluntarily disclose information of their intangible assets to reflect their national pride, international disclosure requirements and generally acceptable accounting principles (GAAPs).

Ashbough (2001) examined the nationality or national differences of companies proxied by foreign ownership, and voluntary disclosure practices in corporations. Findings indicated a positive relationship between voluntary disclosures and foreign ownership. Cooke (1992) found a relationship between foreign ownership and voluntary disclosure of information. Clearly Singhvi & Desai (1971) reported a positive relationship between foreign ownership and companies’ corporate reporting practices. Their study established that, among the Indian companies sampled and studied, the difference between the mean disclosure scores of foreign owned was 40.66, while for locally owned companies, the mean was 34.82; which was significant at one percent level. These positive relationships can be explained against the background of divergent and differing accounting rules and principles that exist among countries.

H<sub>4</sub>: Nationality is positively related to voluntary disclosure of intangible assets.

#### AGE OF COMPANY

In many empirical studies, age of company is found to explain voluntary disclosure practices relating to intangible assets. However, empirical evidence suggested that studies on the relationship between age of company and voluntary disclosure of intellectual capital are not conclusive. Meanwhile, Owusu-Ansah (1998) and White et al. (2007) found a strong positive relationship between age of company and voluntary disclosure practices. It has been debated that companies that have had more years of existence would have gathered enough experience and own more resources. In addition, such companies would have had more time to establish their customers and suppliers’ networks, and to contribute more towards communities, as well as have more opportunities, alliances, research centers and universal institutions as to benefit from these ventures.

Glaum & Street (2003) and Akhtaruddin (2005) found a negative but an insignificant relationship. Li et al. (2008) even revealed a significant negative association. However, Kang & Gray's (2006) finding on the relationship between age of company and voluntary disclosure of intangible assets is positive but insignificant.

H<sub>5</sub>: Age of company is positively related to voluntary disclosure of intangible assets

#### PROFITABILITY

In line with agency theory, and based on the separation of owners from control, managers of corporate organizations tend to disclose positive information in order to maintain their accountability, compensation arrangements and positions. Corrado et al. (2006) linked intangible asset investments to good corporate performance, proxied by *profitability*. In their study, the findings suggested that disclosure of intangible assets is positively related to corporate performance.

However, empirical evidence on profitability and voluntary disclosure of intangible assets is mixed (Oliveira et al. 2006; Patell 1976; Penman 1980; Lev & Penman 1990). Lu, Tsai and Yen (2010) have argued that intangible assets determine a large part of a firm's value. According to Klock & Megna (2000), using communication industry as data sample, the industry's Tobin's Q average was in excess of ten (10), suggesting that the market value is about 10 times higher than the book value. The Tobin's Q average in traditional industries, according to the same report, is not greater than one. In a study conducted by Garcia-Meca et al. (2005), on the average, earning forecasts and profitability are positively and significantly associated with voluntary disclosure of intangible assets, including the components of intellectual capital. This positive and significant relationship may be due to the desire of the management to raise management package and bonus as well as to justify profitability levels; or, in line with signaling theory, to signal or disclose the information on intangible assets as value drivers, or to show the market the source of their profits. In contrast, however, the findings of Skinner (1994) and Freeman (1982) failed to indicate significant and conclusive relationship.

H<sub>6</sub>: Profitability is positively related to voluntary disclosure of intangible assets

#### OWNERSHIP CONCENTRATION

Ownership concentration defines the ownership structure and the proportion of company's shares that is owned by a given number of the largest shareholders (Sanda, Mikailu & Garba 2005). In his study on ownership concentration, proxied by institutional investors and holders of shares other than management, Lins (2003), documented a positive and significant relationship between institutional investors and disclosure. High concentration of shares, as argued, tends to create more pressure on managers

to behave in ways that allow them report on their value-maximizing assets. Consequently, it is stated that widely diffused shares of companies, results in disclosure of more information to douse the tendency towards conflict of interest (Gorton & Schmid 1996 and Shleifer & Vishny 1997). However, Oliveira et al. (2006) and Li et al. (2008) revealed a positive relationship between low concentration of shares and voluntary disclosure in intangible assets.

Nevertheless, research evidence on ownership concentration and intangible assets disclosure is not conclusive; numerous research studies (Roland, Tung & George 1990; McKinnon & Dalimunthe 1993; Malone, Fries & Jones 1993) had failed to support significant positive relationship between ownership concentration and voluntary disclosure of intangible assets. Moderate relationship with voluntary disclosure of intangible assets was, however, documented in Raffournier (1995). Meanwhile, no significant relationship is found in the study based on biotechnology firms in Australia (White et al. 2007); indicating that institutional shareholders might not be lobbying the management and board for greater accountability.

H<sub>7</sub>: Ownership concentration is positively related to voluntary disclosure of intangible assets

#### TYPE OF INDUSTRY

Type of industry is defined as the classification of where a company or an industry belongs. High intangible assets-intensive and low intangible assets-intensive industries have been advanced in the literature as plausible variable of influence on voluntary disclosure of intangible assets, including the components of intellectual capital. Oliveira et al. (2006) argued that membership of a given industry is a determinant of what is to be disclosed.

In an empirical study, type of industry has been discussed as an influencing factor in disclosure practices in corporate organizations. The findings of Stanga (1976), Cooke (1992), Raffournier (1995) revealed a positive and significant relationship between industry type and the extent of corporate disclosure. Further studies (Malone et al. 1993; Wallace et al. 1994; Bozzolan et al. 2003; Petty & Cuganesan, 2005 and Oliveira, et al. 2006) found positive but not significant relationship between intangible assets intensiveness and voluntary disclosure of intangible asset of intellectual capital. However, Wallace et al. (1994) and Owusu-Ansah (1998) did not discover any significant relationship.

H<sub>8</sub>: Type of industry is positively related to voluntary disclosure of intangible assets

#### FOREIGN ACTIVITIES OF COMPANY

Companies may transcend national borders in conducting their business transactions. This is particularly so when such companies wish to expand their business operations and market horizons. Companies could also wish to take



advantage of cross-border offerings and as source for capital. Therefore, managers of companies operating in several geographical areas rightly tend to control greater quantum of information. This is because performing commercial activities in different countries provide companies with the opportunities of issuing segmented information about the value-creating assets in order to adapt to clients or suppliers of different markets.

Empirical evidence on foreign activities of company and voluntary disclosure of intangible assets is inconclusive. Some researchers have examined the effects of foreign activities on voluntary disclosure of intangible asset of intellectual capital; and some of them had found significant positive relationship (Cooke 1989 and 1992 with the reason that internationalization theory explains that companies internationalize their markets from their intangible assets to show their stock; Hossain et al. 1995; Wallace et al. 1994; Meek et al. 1995; Raffournier 1995 and Giner 1997). Meanwhile, some other researchers found no empirical evidence or significant relationship between the influence of foreign activities and voluntary disclosure of intangible assets (Malone et al. 1993; Wallace et al. 1994; Olivera et al. 2006 and Kang & Gray 2006).

H<sub>9</sub>: Foreign activities of company are positively related to voluntary disclosure of intangible assets.

#### RATIO OF MARKET VALUE TO BOOK VALUE

Brennan (2001) and Lev (2001) described this ratio as reflecting the gap or difference between market capitalization and accounting book value of company. The discrepancy or gap has been described as a function of how well the undisclosed or hidden assets are reported. With regard to the ratio of market value to book value, studies suggest that this variable as a plausible influence on voluntary disclosure of intangible asset of intellectual capital. This is because any discrepancy or gap between the market and the book values may be a function of how well the undisclosed or hidden assets embedded in the market value are reported. To this end, it is argued (Hall 1982 and 1992) that a high ratio may indicate undisclosed hidden assets represented by intangible assets. This may also suggest that the company is being over-valued by the capital market as compared to its book value. Kang & Gray (2006), using two hundred emerging market companies in 2002, found a positive and significant relationship with voluntary disclosure of intangible assets. In a study conducted in an industry where innovation features, findings revealed that market value, compared to the book value, is markedly higher than the book value because of some undisclosed assets (Klock & Megna 2000). Similarly, Sveiby (1997) observed a positive and significant relationship between the ratio of market value-to-book value and voluntary disclosure of intangible asset of intellectual capital. This, he argued, is not unconnected with the good performance of the companies and the

bright future potentials. Similar findings are reported in Gleason & Klock (2003).

H<sub>10</sub>: Ratio of market value to book value is positively related to voluntary disclosure of intangible assets.

#### METHODOLOGY AND DATA

This is an ex post facto study and a longitudinal survey, from 2005 to 2010, was used to predicate the non-manipulability and non-controllability of the variables. This time frame suggests a longitudinal survey as it spanned for a period of 6 years which enabled us to observe the changes in the variables of study at different points in time.

The focus of study was on the industrial sectors and companies that were quoted and active on the Nigerian Stock Exchange (NSE) as at 31<sup>st</sup> December, 2010. As of this date, there were thirty three industrial sectors in which there were two hundred and forty companies quoted and actively traded. By using the statistical technique developed by Yaro Yamani in Guilford and Fruchter (1973), a sample size of one hundred and fifty-seven companies was derived from the thirty-industry sectors. The Nigerian industry sectors are made up of 33 industrial classifications from which a sample size of 157 companies was drawn through the utilization of Yamani's technique. The simple random sampling was then used to choose the participating companies.

#### MODEL SPECIFICATION AND DATA ANALYSIS PLAN

The models in forms suitable for empirical testing are as follows

$$\begin{aligned} \text{VDIAOV} = & \alpha_1 + \beta_1 \text{COMS}_{it} + \beta_2 \text{LEVE}_{it} + \\ & \beta_3 \text{SIZA}_{it} + \beta_4 \text{NDOC}_{it} + \beta_5 \text{AGEC}_{it} + \\ & \beta_6 \text{PRFT}_{it} + \beta_7 \text{OWCO}_{it} + \beta_8 \text{TYID}_{it} + \\ & \beta_9 \text{FORA}_{it} + \beta_{10} \text{MVBV}_{it} + U_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} \text{VDIADL} = & \alpha_2 + \beta_{11} \text{COMS}_{it} + \beta_{12} \text{LEVE}_{it} + \\ & \beta_{13} \text{SIZA}_{it} + \beta_{14} \text{NDOC}_{it} + \beta_{15} \text{AGEC}_{it} + \\ & \beta_{16} \text{PRFT}_{it} + \beta_{17} \text{OWCO}_{it} + \beta_{18} \text{TYID}_{it} + \\ & \beta_{19} \text{FORA}_{it} + \beta_{20} \text{MVBV}_{it} + U_{it} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{VDIAIM} = & \alpha_3 + \beta_{21} \text{COMS}_{it} + \beta_{22} \text{LEVE}_{it} + \\ & \beta_{23} \text{SIZA}_{it} + \beta_{24} \text{NDOC}_{it} + \beta_{25} \text{AGEC}_{it} + \\ & \beta_{26} \text{PRFT}_{it} + \beta_{27} \text{OWCO}_{it} + \beta_{28} \text{TYID}_{it} + \\ & \beta_{29} \text{FORA}_{it} + \beta_{30} \text{MVBV}_{it} + U_{it} \end{aligned} \quad (3)$$

$$\begin{aligned} \text{VDIACO} = & \alpha_4 + \beta_{31} \text{COMS}_{it} + \beta_{32} \text{LEVE}_{it} + \\ & \beta_{33} \text{SIZA}_{it} + \beta_{34} \text{NDOC}_{it} + \beta_{35} \text{AGEC}_{it} + \\ & \beta_{36} \text{PRFT}_{it} + \beta_{37} \text{OWCO}_{it} + \beta_{38} \text{TYID}_{it} + \\ & \beta_{39} \text{FORA}_{it} + \beta_{40} \text{MVBV}_{it} + U_{it} \end{aligned} \quad (4)$$

Where, the dependent variables for the four (4) regression models are:

- VDIAOV = Voluntary disclosure of intangible asset of intellectual capital (Overall);  
 VDIADL = Voluntary disclosure of intangible asset of intellectual capital (Discovery and Learning);  
 VDIAIM = Voluntary disclosure of intangible asset of intellectual capital (Implementation);  
 VDIACO = Voluntary disclosures of intangible asset of intellectual capital (Commercialization).

The voluntary disclosure index of intangible asset of intangible assets (VDIAOV) was based on the modified Kang & Gray's (2001) framework of Value Chain Scoreboard (VCSB) which, in turn, was based on the taxonomy of intangible assets of the *discovery and learning* (VDIADL), the *implementation* (VDIAIM), and *commercialization* phases (VDIACO). These intangible assets components reflect the human capital, structural capital and relational capital as defined by Sveiby (1997), Meritum Project (2002), Guthrie et al. (2006) and Oliveira et al. (2006). Taking the above considerations into account, the total score of each class of voluntary disclosure of intangible assets index (VDIA) relating to *the overall, discovery and learning, implementation and commercialization* for each company was defined:

$$VDIAc = \frac{\sum_{i=1}^m di}{m}$$

Where  $di = 0, 1$  or  $2$  as follows:  $d_i = 0$  for item not voluntarily disclosed or referred to;  $d_i = 1$  for voluntary disclosure for item in qualitative terms,  $d_i = 2$  for disclosure in quantitative and financial terms;  $c$  = the class of intangible asset of intellectual capital and  $m$  = the maximum number of relevant items in each class of VDIA each company disclosed. The maximum number of items used in this study was thirty (30) (i.e.  $m=30$  items, for the *overall*, eleven (11) items for *discovery and learning*, eight (8) items for *implementation* and eleven (11) items for *commercialization*). The maximum number of thirty (30) items and those for the other components were derived after making necessary adjustments to Kang and Gray's (2006) framework as to reflect the common items that are peculiar to Nigerian economic landscape.

The independent variables for each of the models are:

- COMSit = Company size (total assets of the company over a specified period of 6 years);  
 LEVEit = Leverage (the ratio of total liabilities to equity over a specified period of 6 years);  
 SIZAit = Size of audit firm (the big-4 and the non big-4 audit firm over a period of 6 years);  
 NDOCit = (National differences of company (place or principal address of companies over a period of 6 years);

- AGECit = Age of company (difference between the upper limit of financial year in consideration and year of incorporation of company over a period of 6 years);  
 PRFTit = Profitability (ratio of profit after tax to total assets over a specified period of 6 years);  
 OWCOit = Ownership concentration (percentage of institutional investors value of ordinary shares over a specified period of 6 years);  
 TYIDit = Type of industry (intangible assets intensiveness of companies over a specified period of 6 years);  
 FORAit = Foreign activities of company (presence of foreign activities of companies over a period of 6 years);  
 MVBVit = Ratio of market value to book value (market/book values gap over a period of 6 years);  
 Uit = Random error (over a specified period of 6 years).

Where  $\alpha_1, \alpha_2, \alpha_3, \alpha_4 > 0$ , are constants for the 4 models, and the coefficients,  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}, \beta_{14}, \beta_{15}, \beta_{16}, \beta_{17}, \beta_{18}, \beta_{19}, \beta_{20}, \beta_{21}, \beta_{22}, \beta_{23}, \beta_{24}, \beta_{25}, \beta_{26}, \beta_{27}, \beta_{28}, \beta_{29}, \beta_{30}, \beta_{31}, \beta_{32}, \beta_{33}, \beta_{34}, \beta_{35}, \beta_{36}, \beta_{37}, \beta_{38}, \beta_{39}$  and  $\beta_{40} > 0$

Meanwhile, the pooled and panel data estimation techniques were used in this study and applied on the four multiple regressions. Generally, there are legal differences, defined in terms of corporate policies and specificities in the way the companies do business across industries, including differences in management styles and philosophies, degree of operating practices, nature of business and risk profiles of shareholders and management. All these suggest the use of panel data analysis.

Nevertheless, there was a preference to jointly utilize the pooled and panel data analyses. However, the pooled data analysis neglects the heterogeneity effects (the individuality or uniqueness) in the sampled companies. Against the background, the panel data analysis was preferred as it allows for analysis and consideration of the cross-sectional and time-series characteristics of the sampled companies. In essence, the panel data analysis accommodates 'time as well as the heterogeneity' effects of which may be random or fixed. In the Fixed Effects Model, we used data analyses.

Table 1 provides the nature and characteristics of the data. The descriptive statistics presented in Table 1, among others, show the means (the extent) of voluntary disclosures of intangible asset of intellectual capital of the four models, namely, the overall Voluntary Disclosure of Intangible Asset of Intellectual Capital (VDIAOV); the Voluntary Disclosure of Intangible Asset of Intellectual Capital relating to discovery and learning (VDIADL); the Voluntary Disclosure of Intangible Asset of Intellectual Capital relating to implementation; and the Voluntary Disclosure of Intangible Asset of Intellectual Capital relating to commercialization. The statistics also display

TABLE 1. Descriptive statistics for variables for 2005-2010

	Mean	Max.	Min.	Std.Dev.	Skewness	Kurtosis	Jar-Bera	Prob
VDIAOV.	0.3203	2.667	0.067	0.142	5.5571	84.83	256876.9	0.00
VDIADL.	0.3966	1	0	0.1561	0.6898	3.5384	82.61869	0.00
VDIAIM.	0.0748	0.75	0	0.1262	1.7157	5.6545	708.9373	0.00
VDIACO.	0.409	1.18	0	0.1593	0.8559	4.2352	167.8504	0.00
*COMS	56305	3031933	11	189958	7.5509	86.494	271175.3	0.00
LEVE.	4.1889	826.5	-15.9	31.376	21.95	543.32	11069374	0.00
SIZA.	0.6173	1	0	0.4863	-0.482	1.2328	152.7078	0.00
NDOC.	0.8573	1	0	0.35	-2.043	5.1742	806.9697	0.00
AGEC.	28.243	79	0	13.272	0.508	3.3524	43.56689	0.00
PRFT.	0.312	155	-438.1	16.657	-19.21	542.16	11005198	0.00
OWCO.	0.5008	66	0	2.2073	28.967	859.69	27770821	0.00
TYID.	0.4414	1	0	0.4968	0.2361	1.0558	150.7838	0.00
MVBV.	15218	4545455	0	242989	17.294	304.45	3467989	0.00
FORA.	0.7666	1	0	0.4232	-1.26	2.5888	245.7521	0.00

\*in million naira (N).

the standard deviation (STD) of each of the dependent variables as well as the means and standard deviations (STD) of each of the independent variables used in each of the models.

The table further reveals the means for VDIAOV, VDIAOL, VDIAIM and VDIACO which are at about 0.32, 0.39, 0.07 and 0.41, respectively. The standard deviation (STD) for VDIAOV is 0.15, with maximum and minimum values of 2.67 and 0.07 respectively. Voluntary Disclosure of Intangible Asset of Intellectual Capital relating to *discovery and learning* (VDIADL) has a standard deviation (STD) of 0.16; VDIAIM has a standard deviation (STD) of 0.13, while VDIACO reveals a standard deviation (STD) of 0.16. Meanwhile, Kang and Gray's (2006) study reported 31.70% for the overall voluntary disclosure (VDIAOV) and 63.40% for the discovery and learning phase (VDIADL). The discovery and learning phase was the most disclosed item in a company's annual report. The commercialization phase (VDIACO) constituted 31.20% of the total disclosure, while the implementation phase (VDIAIM) was only at 5.70%.

Given the above and other statistics, including comparative statistics, one can discern a number of implications of and insights into the nature and characteristics of companies sampled. Firstly, the mean value of 0.32 for VDIAOV indicates that only 32% of the companies, quoted and sampled, voluntarily disclosed their intangible asset irrespective of the classes or phases (namely, discovery and learning, implementation and commercialization). However, about 39% of the companies disclosed intellectual capital component or phase of discovery and learning (VDIADL), internal renewal items (e.g., R&D and employee training) as well as networking items (e.g., customer relationship and business collaborations); about 7% of quoted companies voluntarily disclosed VDIAIM; while about 41% of quoted companies disclosed intangible asset relating to commercialization phase (VDIACO). Most of the disclosures in this phase were due to disclosure about how the corporation increased customers' awareness via brand name and innovative

marketing strategies. It is instructive to note that out of the three (3) components of VDIADL, VDIAIM and VDIACO, the component, VDIAIM, is the least disclosed by quoted companies in Nigeria. This brings to light the submission by Lev (2001) that companies with this class of assets are usually reluctant to disclose them for strategic reasons. It is also important to note here that despite the near absence of a consistent financial reporting framework for intangible assets, the quoted companies disclose their commercialization, discovery and learning, and overall classes of intangible assets at about 41%, 39% and 32%, respectively. This suggests that companies are beginning to heed the calls to improve their business practices and financial reporting by disclosing their "hidden" assets which hitherto were not disclosed.

Given the above insights and characteristics of the sampled companies, it is important to bring to the fore other features of the data. As seen from Table 1, all the variables are asymmetrical. More precisely, the skewness is positive for almost all the pooled series, indicating fat tail on the right side of the distribution as compared to the left side. On the contrary, foreign activities of company (FORA), national differences of company (NDOC) and size of audit firm (SIZA) have a negative skewness which indicates fat tail on the left side of the distribution. The values for the Kurtosis of all the variables also show that data are not normally distributed because these values, except for AGECE, deviated from the benchmark of three (3) for a normal distribution. In fact, the values displayed indicate that the distribution is actually leptokurtic; whereby, this simply means that the central peak is higher and sharper, and its tails longer and fatter. In addition, the Jarque-Bera (JB) statistics and the corresponding p-values were also used to test for normality assumption and significance of differences in the distributions. Based on JB statistics and the associated probability values, the normality assumption is rejected at 1% level of significance for all the variables in this study. Nonetheless, non-normally distributed variables posed little or no problem since the primary focus is outside

forecasting. By way of practical strategy, the normality assumption is considered to be a non-estimation distortion problem, such as autocorrelation, multicollinearity and heteroskedasticity (Gujarati 2004).

From Table 2, the VIF values range from 1.02 to 4.36, suggesting that all the variables are moderate and consequently relevant for inclusion in all the models. Besides, the mean for all VIFs is 2.266, far lesser than the threshold of 10. In addition, the VIFs of the variables are below the threshold of 10. This indicates that the variables are not significantly correlated with each other. Consequently, there is no reason to suspect for any serious multicollinearity problem.

#### POOLED AND PANEL DATA REGRESSION RESULTS

This study adopted two widely used panel data regression models, namely fixed effects and random effects estimation techniques. The choice of these models was based on the assumptions made on the explanatory variables and cross sectional error term. However, less emphasis was given to the pooled results in all the four (4) models, namely VDIAOV, VDIADL, VDIAIM and VDIACO models. This is because the pooled results do not usually consider the companies' 'heterogeneity' attributes in the estimation of their parameters. These effects are known to be better captured by the two (2) widely used panel data regression models, i.e. the fixed effects and random effects panel data regression models. However, in selecting from the two (2) panel data models to be used in the four (4) models, the Hausman test was conducted for each model, as indicated in the respective tables. The rule is to accept the null hypothesis (which is to accept or adopt the random effects model and reject fixed effects model) at 10% (or less) level of significance. This means that we would adopt and interpret and draw policy recommendations from any of the models selected on the basis of the Hausman test.

Eventually, the cross sectional fixed effects and cross sectional random effects models were applied since our interest was outside the period effects. We, therefore, ignored the period fixed and random effects models. However, in choosing between the cross sectional fixed and cross sectional random effects models, the Hausman

test was used. The results of the Hausman tests suggested that the corresponding effects are statistically significant; hence, the null hypothesis is rejected by our data, and the fixed effects model accepted (or preferred) to analyze each of the models. This therefore also means that the correct policy recommendations for selecting key companies' specific determinants for the overall voluntary disclosure of intangible asset of intellectual capital by quoted companies in Nigeria could be deduced from the cross sectional fixed effects model.

In all the panel regression estimations for the four (4) models, and using the pooled series, the results were corrected for heteroskedasticity. This is in line with the suggestion by White (1980) that the problem of heteroskedasticity, which is expected to be present in cross-sectional data, occurs when the variance of the residuals is not constant. Besides, the poolability tests were conducted for the data used in the four (4) models, as indicated in the respective tables. Results suggested that the data are poolable. Poolability tests confirmed the presence (or absence) of cross sectional fixed and random characteristics in the data. The results of the tests are as indicated in the cross section F and cross section chi-squared values in the respective tables.

In comparing all the models presented in Table 3, it is easily observed that AGECE is determinant factor in the *overall* voluntary disclosure in model I (VDIAOV) and the components-model II (VDIADL), model III (VDIAIM) and model IV (VDIACO). This finding is consistent with Lu, Tsai and Yen (2010), but inconsistent with Black, Jang & Kim (2006) and Kang & Gray's (2006). Meanwhile, FORA is statistically insignificant in models I, II, III, but it is positively and statistically significant in model IV. The finding of this study is inconsistent with Piekkola (2009) and Denekamp (1995) whose findings on globalized companies and VDIADL are positive and statistically significant. Foreign activity of company (FORA) is positively related and statistically significant to the voluntary disclosure of intangible asset relating to *commercialization* component. This finding is consistent with Piekkola (2009) and Denekamp (1995) whose findings, though based on the overall disclosure of intangible asset stock, is statistically significant.

TABLE 2. Variance inflation factors (VIFs)

Explanatory Variables	VIFs	1/VIF	Mean of VIFs
AGEC	4.36	0.23	
FORA	3.76	0.26	
LEVE	1.03	0.97	
MVBV	1.02	0.98	
NDOC	4.5	0.22	2.266
OWCO	1.06	0.95	
PRFT	1.02	0.97	
SIZA	2.61	0.38	
COMS	1.23	0.81	
TYID	2.07	0.48	



TABLE 3. Fixed effects regression results for the 4 models

DEPENDENT VARIABLE	MODEL I	MODEL II	MODEL III	MODEL IV
	VDIAOV	VDIADL	VDIAIM	VDIACO
	coefficients (t – stats)			
Intercept	0.06 (0.76)	0.03 (0.44)	0.01 (0.25)	0.04 (0.52)
Indep variables				
AGEC	0.01* (3.08)*	0.01 (5.02)*	0.00 (1.61)***	0.01 (2.87)*
FOR A	0.06 (1.25)	0.01 (0.25)	-0.01 (-0.25)	0.11 (1.99)**
LEVE	0.00 (0.48)	0.00 (0.66)	0.00 (1.96)***	0.00 (0.01)
MVBV	0.00 (0.98)	0.00 (1.41)	0.00 (1.52)	0.01 (0.42)
NDOC	0.04 (1.07)	0.03 (0.83)	0.01 (0.33)	0.05 (0.98)
OWCO	-0.00 (-0.36)	-0.00 (-0.42)	0.00 (0.02)	-0.01 (-0.40)
PRFT	0.00 (1.26)	0.00 (1.75)***	0.02 (0.45)	0.00 (0.20)
SIZA	0.06 (1.95)*	0.05 (2.03)**	0.02 (0.96)	0.06 (1.71)***
COMS	0.00 (0.59)	0.01 (2.06)**	0.00 (0.04)	-0.00 (-0.18)
TYID	-0.05 (-0.46)	-0.04 (-0.47)	-0.00 (-0.02)	0.06 (0.52)
Adjusted R <sup>2</sup>	0.295	0.31	0.5267	0.2459
F-Statistics	2.051	3.03	7.1276	2.174
Overall Sig	0	0	0	0

\*Significant at  $p < 0.00$ , two tailed; \*\* Significant at  $p < 0.050$ , two tailed\*\*\* Significant at  $p < 0.100$ , two tailed  
Source: Author's compilation.

Other revelations in the comparative presentation are as follows: LEVE is positively and statistically significant in model III but statistically insignificant in model I, II and IV. With respect to LEVE-VDIAIM's positive and significant relationship, this may mean that lenders might be aware of the responsibility placed upon them, and in line with the agency theory, expect disclosure of *implementation* component. This enables them to conduct a proper evaluation of the vivid and strategic advantages arising from this class of information. This finding, however, is inconsistent with Kang & Gray (2006) who discovered a negative but statistically insignificant relationship (between LEVE and VDIADL). On the LEVE-VDIADL's positive but insignificant relationship, it could also be reasoned that debt holders and other creditors could not be motivated by this class of assets in granting credit facilities (whether, short or long term) to the companies for the reason that their 'thirst' for additional information is satisfied in ways that are different from voluntary disclosure of intangible asset

of intellectual capital relating to *discovery and learning*. This finding is consistent with those of Leftwich, Watts & Zimmerman (1986), Chow & Wong-Boren (2000) and Oliveira et al. (2006) who despite the agency and media agenda-setting theories which hypothesized a significant relationship with VDIADL found no such relationship between leverage and VDIADL. However, this finding negates Kang & Gray (2006) who found a negative and significant relationship with intangible asset disclosure stemming from *discovery and learning*. PRFT is positively and statistically significant in model II but insignificant in models I, III and IV. SIZA is found to be positively and statistically significant in models I, II and IV but the influence is statistically insignificant in model III. The PRFT-VDIAOV's positive and significant relationship may not be unconnected with the companies' desires to show their abilities, in terms of their internal renewals, acquired capabilities and networking. This finding aligns with Singhvi & Desai (1971), Chow & Wong – Boren

(1987), Firth (1979), Cooke (1989), Depoers (2000), Oliveira et al. (2006) and Lev (2001). However, the statistically insignificant and positive relationship suggests that larger companies may be less likely to engage in voluntary disclosure practices relating to the other classes of intangible asset of intellectual capital because they are already deriving the benefits of being large scale which ordinarily would have accrued from the benefits of disclosure. Even though this finding is consistent with Kang & Gray (2006), the positive and statistically insignificant relationship might also be traced to: (i) the readily available resources (unrelated to size) to engage in voluntary disclosure practices of intangible assets, without being influenced to do so, and (ii) companies' natural expectation to go through the three (3) phases of the value chain of *discovery and learning, implementation and commercialization* (regardless of size), in order to create value.

Finally, COMS was found to be positively and statistically significant in model II but insignificant in models I, III and IV. Other variables are either positively or negatively, but not statistically significantly related to these models. It could be seen that larger companies are more likely to engage in voluntary disclosure of intangible asset relating to *discovery and learning*. This disclosure might be necessitated by the companies' desires to show their abilities, in terms of their internal renewals, acquired capabilities and networking. This finding is consistent with Singhvi & Desai (1971). The studies on the same variable of company size by Chow & Wong – Boren (1987) and Firth (1979) support the positive and statistically significant relationship in this study as it relates to model II. This finding on the discovery and learning relationship with company size is also in alignment with Cooke (1989), Depoers (2000), Oliveira et al. (2006) and Lev (2001). The statistically insignificant and positive relationship could also mean that the larger companies in Nigeria are less interested in voluntary disclosure practices in relation to the discovery and learning components as they may feel they are already benefiting from the large scale and resourcefulness of disclosure. This finding agrees with Kang & Gray (2006), with the following reasons possibly adduced: (i) the availability of resources (unconnected with size) to (ii) The usual prospect to go through the three (3) phases of the value chain of discovery and learning, implementation and commercialization (not considering the size).

#### CONCLUSION

This study examined the determinants of voluntary disclosure of intangible asset of intellectual capital in quoted companies in Nigeria. Using data from 2005 through 2010, this research has made some contributions. These include the applicability of the Value Chain Scoreboard (VCSB) as the basic intangible assets model. The VCSB in this study was supported by management-

based theories in explaining why companies in Nigeria voluntarily disclose their intangible assets of intellectual capital. Using a disclosure index to measure these dependent variables, the study examined a sample of one hundred and fifty-seven (157) companies in Nigeria. This is particularly of interest to Nigeria, which, since the advent of ICT and telecommunications in the last decade, has become destination of choice for foreign investment. The findings from the study indicate that companies quoted on the Nigerian Stock Exchange have various degrees of engagements in voluntary disclosure practices but with the least disclosure from the implementation component. The empirical analysis of the determinants of voluntary disclosures of intangible asset in this study reveals that age of company, leverage, profitability, foreign activities of company, size of audit firm and company size as determinants to voluntary disclosure of intangible asset in Nigeria.

#### RECOMMENDATIONS

A mandatory regulation and a common framework for disclosure of intangible asset of intellectual capital should be encouraged. The Financial Reporting Council of Nigeria (FRCN) should come up with some mechanisms such as a yearly award ceremony; jointly organized by the FRCN with the accounting professional bodies in Nigeria in conjunction with the Nigerian Stock Exchange, Nigerian Securities and Exchange Commission (NSEC) and other stake holders. The inclusion of intellectual capital disclosure in the financial reports and accounts of companies should be one of the criteria for the assessment of the award. This will serve to motivate the companies to increase the extent and, possibly, the quality of intellectual capital-related assets in the annual reports and accounts. Besides, much older and, by extension, more established companies should (through the relevant units and programs in their companies) provide the environment, as may be mandatorily required by regulatory bodies, that promotes the dissemination of ideas, protocols and techniques to younger companies. This would give these younger companies the opportunity to tap from the experiences offered by the large companies.

The big-4 audit firms, possessing greater expertise and requisite knowledge, should take up the role as trainers where small audit firms or the non big-4 audit firms can be the beneficiaries. Such training would be an avenue to spread the technical expertise and techniques of the big-4 audit firms in assisting the non big-4 audit firms to provide useful and professional disclosure advice to their clients' companies. In addition, the relevant regulatory bodies such as the Ministry of Commerce and Industries, and any other relevant ministries, or regulatory institutions, such as the Nigerian Stock Exchange (NSE) and Nigerian Securities and Exchange Commission (NSEC), should take into cognizance the large and profitable companies since they are more likely to voluntarily disclose their intangible asset stock; and consequently, through the instrumentality

of the relevant policy, to make it mandatory for large and profitable companies to 'voluntarily' disclose their intangible assets in narrative or quantitative form. This will enable potential investors and other stakeholders to know about the value-creating or profit-creating assets. Further, the positive and significant influence of leverage on commercialization components calls for the relevant regulatory bodies and authorities such as the NSE and Nigerian Securities and Exchange Commission (NSEC) to make commercialization-related disclosures mandatory for companies seeking financing since such disclosures could bring out the end products of the value chain. Based on the disclosure by this component, lenders and potential lenders will have the opportunity to conduct a proper appraisal on the companies' core competences. It is also expected that the managements and boards of companies with foreign activities should insist on disclosure of the intangible assets stock. This is because such disclosures represent the insights into the organizational capital and specific value-driving internal assets required in managing the variety of foreign direct investments.

Companies and their managements, within the context and limitations defined in this study, should place less emphasis on the statistically insignificant variables in all the four (4) models. These variables include ratio of market value to book value (MVBV), national differences of company (NDOC), ownership concentration (OWCO) and type of industry (TYID) in considering disclosure's policies, rules and practices. This is particularly important as they fail to be statistically significant in any of the four (4) models.

Future research is advised to consider a larger number of quoted companies. In addition, further studies are also encouraged to consider disclosures in the 1st tier securities market or even companies in the informal sector in Nigeria. Finally, it may be desirable to have a series of in-depth interviews and other surveys with Nigerian companies, managers/financial officers in order to probe, for consistency or otherwise, the findings of this study.

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