

# **Effect of monitoring mechanism on intellectual capital disclosures of listed industrial goods firms in Nigeria**

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## **Abstract**

*The study is about assessing the effect of monitoring determinants on intellectual capital disclosures of listed industrial goods companies in Nigeria. The study used longitudinal research design, using secondary data collected from the annual financial statement of listed industrial companies in Nigeria for a ten-year period from 2011 to 2020. The study population is the 13 listed industrial companies, the same number of companies also serve as the sample size of the study. Data collected were analyzed using the multiple linear regressions, and certain other robust diagnostic tests such as normality, heteroskedasticity, multicollinearity were conducted. The study made use of content analysis of items indicating intellectual capital disclosure as the dependent variable and the independent variables for the study are board independence, board gender diversity, board financial expertise, board size, audit committee independence, audit committee financial expertise, audit committee size, and auditor type. The findings of the study showed that board size, board gender diversity, board financial expertise, audit committee independence, and auditor type reported negative insignificant effect on intellectual capital disclosures, board independence and audit committee financial expertise reported positive significant effect on intellectual capital disclosures while audit committee size reported a positive but insignificant effect on intellectual capital disclosures of the sampled firms. It is therefore, recommended that more priority and emphasis be given to board independence and audit financial expertise, and audit committee size be mixed with the required competence in the industrial goods firms in Nigeria.*

**Keywords:** *monitoring determinants, intellectual capital disclosures, financial expertise audit committee, board independence.*

## **Introduction**

The board of directors is one of the important elements in internal corporate governance mechanisms. The board plays the key monitoring role in dealing with agency problems (Chobpichien, et al., 2008; Singh & Van der Zahn 2008; Mubarik, et al 2019). Fama and Jensen (1983) argued that by monitoring and controlling the management, the board of directors can reduce agency conflicts where managers may have their own preferences and always fail to act on behalf of the shareholders. Moreover, it can be argued that the board of directors plays an important role in protecting not only the shareholders' interests but also other stakeholders' interests against management's self-interests. To this extent, Hermalin and Weisbach (1991) suggested that the board of directors should provide solutions to mitigate the agency problems faced by companies.

Chobpichien et al. (2008); Martins, et al., (2018) noted that independence, size, frequency of board meetings and non-duality of the chief executive officer (CEO) are the important factors that determine the effectiveness of board that could force management to disclose more information to outside parties. Singh and Van der Zahn (2008) and Ruth et al. (2011) pointed out that the enhancement of board of directors in terms of board size, board composition and leadership structure could improve board effectiveness and its capacity to monitor the management to the extent of increasing the possibility of providing more information about IC to outside investors. Cerbioni and Parbonetti (2007) suggested that the board is effective in improving the IC disclosure when it is small in size, has independent chairman with majority of its members also been independent, has active members in audit, nomination and compensation committee.

Research studies in the area of monitoring determinants of intellectual capital disclosure in the Nigeria context is very few, studies carried out in Nigeria are the empirical works of (Ibikunle, et al., 2013; Omoye, 2013; Ibadin&Oladipupo, 2015; Ibrahim, 2014; Anifowose, et al., 2017), most of these studies focused on DMBs industry, non-financial firms, listed firms without a specific focus on industrial firms in Nigeria, and also no study to the best of my knowledge combined board and audit committee attributes, thereby opening up gaps in the area of firms and variables combination of the study.

The major objective of the study is to examine the effect of monitoring determinants on intellectual capital disclosures of listed industrial goods firms in Nigeria, while other specific objectives are to examine the relationship between board size, board independence, board gender diversity, audit committee independence, audit committee financial expertise, audit committee size on intellectual capital disclosures of the sampled firms.

## **Conceptual Framework**

### **Board size**

Board size is an important proxy for the effectiveness of monitoring function of the board. Larger board has greater diversity of perspectives and skills, which make the board more effective and efficient in decision makings (Pfeffer, 1972). Belkhir (2009) provides empirical evidence that boards contribute to better performance of the firm.

It is argued that board size plays a key role in influencing corporate disclosure decisions. Abeysekera (2010) indicates that larger boards can supplement the skill deficits of directors at an individual level and ensure long-term future earnings of a firm through greater voluntary disclosure. Consistently, Hidalgo et al. (2011) find a significant positive relationship between board size and the level of intellectual capital disclosure of the Mexican listed companies. Combining with the results from previous research, they also conclude that there is no difference in this relationship between developed and developing countries. Moreover, this relationship is specifically relevant to human capital disclosure because larger boards are expected to contain more competent and knowledgeable personnel. Finally, firms with larger boards are more insensitive to voluntarily disclose the skills of each board member to enhance shareholder confidence in the capital market.

In terms of value relevance, large board improves the quality of reported information through the enhanced monitoring function of the board (Abeysekera, 2010), better knowledge and

skills (Pfeffer, 1972) and increased level of disclosure (Abeysekera, 2010; Hidalgo et al., 2011). These theoretical arguments are confirmed by the empirical evidence in Bradbury et al. (2006) that board size is positively related to the quality of information. In addition, large board is more likely to disclose information more frequently. Karamanou and Vafeas (2005) find a positive relationship between the frequency of updates of management earnings forecasts and board size. From investors' perspective, more frequently updated information is more useful to estimate the firm's market value. In contrast to the above studies, there are some empirical evidence that shows that large boards negatively relate to the firm's market value (Yermack, 1996; Vafeas, 2000). The reason may be that larger boards have less effective communication and therefore have fewer decision-making capabilities (Pfeffer, 1972).

### **Board financial expertise**

Generally, companies prefer to have more financial experts on the corporate board, but this demand for financial experts on the board increased after the Sarbanes-Oxley Act (SOX) of 2002. Expertise can be defined as "skillfulness by virtue of processing special knowledge." It is evaluated based on standards discussing the aptitude to perform a task (Sarwaar et al., 2018). The corporate governance reports of CalPERS in 1997, Blue Ribbon Commission report in 1998, SOX in 2002 and NYSE in 2004 also suggest some guidelines regarding the expertise of board members. These reports were issued in response to various accounting scandals that have occurred since the 1990s, such as Enron, HealthSouth, Tyco, WorldCom and different financial crises. Reports further include the significance of financial expertise of directors in performing their central function of monitoring the firm's financial performance. According to the SOX (Section 407), a financial expert is a person who has experience in accounting or finance or has supervisory expertise. DeFond et al. (2005) and Krishnan and Visvanathan (2008) use SOX of 2002 to explain financial expertise.

### **Board independence**

Board structure determines the quality of the monitoring function of the board. However, Fama and Jensen (1983) argue that the board cannot effectively monitor the actions of top managers if the insiders (top managers) dominate the board. They suggest that outside directors are more efficient in the monitoring task and less possible to collude with top managers. Therefore, the ability of the board to reduce agency costs is enhanced by the inclusion of the outside directors. In line with Fama and Jensen (1983), Haniffa and Cooke (2005) state that more non-executive directors provide wider expertise, prestige and contracts, which in turn positively influence the quality of the function of the board. Also, outside directors have more incentives to improve their performance to develop their reputations as qualified outside directors (Haniffa and Cooke, 2005). Consistent with those theoretical arguments, the recommendation of the appointment of independent directors is included in some countries' best corporate governance practices (e.g. New Zealand).

Various conclusions are drawn from prior corporate disclosure studies. Chen and Jaggi (2000) find that the appointment of non-executive directors is associated with additional corporate disclosure. Consistently, Arcay and Vazquez (2005) provide empirical evidence for

the positive relationship between the inclusion of outside directors and voluntary disclosure. However, Ho and Wong (2001) do not find significant relationship between board independence and the level of voluntary disclosure. Further, a number of studies document a negative relationship between the percentage of outside directors and voluntary disclosure (Eng and Mak, 2003). One possible reason could be that the appointment of outside directors only fills the additional position rather than acting as substitutes for existing directors (Cheng and Courtney, 2006). With regard to intellectual capital disclosure studies, and consistent with voluntary disclosure research, Li et al. (2008) observe that intellectual capital disclosure is significantly associated with board independence. On the other hand, Hidalgo et al. (2011) find that board independence is not significantly related to the level of voluntary disclosure. They suggest that the legal environment may augment or diminish this relationship.

The positive impact of the inclusion of outside directors extends to the quality of financial information. Beasley (1996) confirms the importance of outside directors on the board in reducing financial statement fraud by examining the board independence and financial statement fraud for 150 listed firms in the U.S. The study finds that no-fraud firms had a significantly higher percentage of outside directors than that of fraud firms. Beasley (1996) defines outside directors as all non-employee directors. The study adds that the empirical tests are not sensitive to the definition of outside directors used. Consistent with Beasley (1996), Dechow et al. (1996) find that insider dominated boards are more likely to associate with the violations of GAAP and the overstatement of reported earnings. Following prior literature, Bushman et al. (2004), Vafeas (2005) and Karamanou and Vafeas (2005) provide further empirical evidence that information quality increases with the proportion of independent directors. These findings imply that valuation based on the information provided by the firm with higher proportion of independent directors will be less biased because there are less violations and frauds. As such, information from those firms might be more value relevant to investors.

### **Board Gender Diversity**

As a result of growing equality between genders, gender composition of the board has become one of the most significant issues in finance and economic literature. Extant research provides theoretical argument that the inclusion of women on the board benefits the board performance in various ways (Hidalgo et al. (2011)): women provide different perspectives to board decision making, better understanding of the marketplace, increased creativity and innovation, improvement of problem-solving skills and organizational flexibilities.

Much of literature believes that gender diversity has a positive impact on a firm's long-term and short-term financial values. However, mixed results are observed in empirical studies. Shrader et al. (1997) find a positive relationship between the proportion of female managers and financial performance of the firm. Following Shrader et al (1997), Carter et al. (2003) document that gender diversity is positively associated with the firm value measuring by Tobin's Q. On the other hand, Farrell and Hersch (2005) also observe a positive relationship between Return on Assets (ROA) and gender diversity. However, they argue that adding women on the board does not result in value creation. Instead, the result is due to women's self-selections for better performed firms. In contrast to prior studies, Adams and Ferreira

(2009) find a negative relationship between gender diversity and firm performance. As discussed earlier, monitoring function of the board has a direct impact on the level and quality of corporate disclosure. It is argued that board with higher proportion of female directors may be more effective in relating to its monitoring function. Carter et al. (2003) state that gender diversity improves board independence because “people with a different gender, ethnicity, or cultural background might ask questions that would not come from directors with more traditional backgrounds”. Similarly, Beasley (1996) provide some evidence that the inclusion of women on board improves monitoring function of the board. The study shows that female directors generally have better attendance for board meetings than male directors and are more likely to join monitoring committees. In addition, male directors appear to have better attendance with higher proportion of women on the board. Board meeting frequency is considered as a proxy for the attempt that directors made to monitor the management (Guthrie, 2000). Therefore, it can be concluded that women behave differently in terms of the attempt made to fulfill monitoring duties of the board.

With regard to the relationship between gender diversity and the quality of financial information, Gul et al. (2009) argue that board gender diversity enhances the quality of board discussions and improves the ability of the board to provide better quality of corporate disclosure. Further, this study provides timely evidence that board gender diversity is positively related to the stock price information. Similarly, following the argument made in Adams and Ferreira (2009) that female directors provide better oversight over managers, Srinidhi et al. (2011) document that a more diverse board improves the quality of earnings.

### **Audit Committee Size**

In order to perform their role effectively, audit committees should have adequate resources and authority to discharge their increasing responsibilities (Beasley1996; Li et al., 2008; FRC, 2008). Bédard et al. (2004) argue that the larger the audit committee, themorelikely it is to uncover and resolve potential problems in the financial reporting process, because it is likely to provide the necessary strength and diversity of views and expertise to ensure effective monitoring. This suggests that audit committee size is an integral factor for firms in delivering meaningful corporate reporting (Klein, 2002). However, it can also be argued that as the number of audit committee members increases, each may be comforted by the presence of others and free riders emerge (Klein, 2002; Karamanou&Vafeas, 2005). In addition, larger audit committees are also likely to suffer from process losses and diffusion of responsibility (Karamanou&Vafeas, 2005). The Smith Report (2003) recommends a minimum of threenon-executive directors. Empirically, the evidence is mixed. Some studies find audit committee size to be associated with lower earnings management (Yang & Krishnan, 2005; Cornett, et al., 2009), whilst others fail to find a significant relationship with financial reporting issues (Bédard et al., 2004) and voluntary disclosure in interim reports (Mangena & Pike, 2005).

### **Audit Committee Independence**

The notion that audits committee independence is important for its effectiveness draws from the widely accepted notion that independent directors are more likely to be effective monitors of management actions (Fama& Jensen, 1983). According to Carcello and Neal (2003) and

Mangena and Pike (2005), independent audit committees are more likely to be free from management influence. Hence, they will ensure the quality and credibility of the reporting process, thus reducing information asymmetry. Since IC information plays an important role in the share valuation activities of the stock market (Abbott et al., 2012), an independent audit committee would enhance the provision of such information for the benefit of the investors. The UK Code (2010) recommends that an audit committee should be comprised of at least three (or in the case of smaller companies, two) members, who should all be independent non-executive directors. On the empirical front, evidence is mixed. Some studies find the degree of audit committee independence to be positively associated with financial reporting quality (Mangena & Taurigana, 2007). Others find that firms with audit committees composed solely of outside directors are less likely to have financial reporting problems (Abeysekera (2010)). Yet others fail to find a significant effect of audit committee independence (Yang & Krishnan, 2005; Agrawal & Chadha, 2005; Bassett, et al., 2007). In spite of the mixed results, we expect a positive relationship between audit committee independence and IC disclosure. Our rationale for this is that unlike other disclosures that are regulated, IC reporting is largely unregulated. This creates greater information asymmetry about IC information (Li et al., 2008) opportunities for increased moral hazard, adverse selection and other opportunistic behaviour by managers (Guthrie, 2000). To the extent that independent directors monitor managers effectively,

### **Audit Committee Financial Expertise**

The need for the audit committee to be composed of members with financial expertise was emphasized in the Smith Report (2003). Consequently, the UK Code (2010) has recommended that the audit committee should comprise members with knowledge of the business environment, and, at least one audit committee member should have recent and relevant financial experience. The rationale for this is that financial expertise will support the audit committee members to better understand auditor judgment and discern the substance of disagreements between management and external auditors (Li et al., 2008). In addition, it will improve audit committee effectiveness in identifying and asking questions that ‘make management think harder and auditors dig deeper’ (Martins, et al., 2018). It was contended that if the audit committee does not possess the expertise to understand technical auditing and corporate reporting issues, its oversight role is likely to be discounted by the auditor and management (Ho, 2001). This would undermine the effectiveness of the audit committee in the financial reporting process. It is argued that in the context of IC disclosure, the audit committee with financial expertise is likely to be in a better position to understand the capital market implications of providing quality IC disclosures, particularly in helping investors’ share valuation processes. Such understanding by the audit committee should lead to improvement in IC disclosure in order to communicate information on firms’ value creating processes. As Guthrie and Abeysekera, (2006) document the incentive for directors in disclosing IC information is to support the valuation activities of the stock market participants. Prior empirical studies indicate a negative relation between financial expertise and financial statements fraud (Abbott, et al., 2000), earnings management (Klein, 2002), dismissal of auditors after issuing a going-concern report (Abeysekera (2010)), and a positive relationship with disclosure (Li et al., 2008; Whiting and Birch 2016).

## **Auditor Type**

Auditor type describe the status of the auditor, whether the auditor is a big firm auditor or a small upcoming auditor Industrial specialization is a term used to describe a situation in which specific knowledge is gained and accumulated through the rendering of service to different clients within the same industry (Gul, et al, 2009). Whiting and Birch (2016) define the auditor's specialty as the assignment of a special duty to an audit professional in an area where the person has been trained adequately and especially, with the requisite experience in the practice of auditing in that area within an industry. Industrial specialized auditors also tend to invest more in staff training and technology-related areas of their specialty, such investments will improve the quality of the resulting audit (Sumiadi et al., 2019). Due to his experience and expertise, the industry specialized auditors have more understanding of the client's business. According to Arens, et al (2011) a specialist auditor is an auditor who has a deep understanding (knowledge) and long-term experience of the client's specific business and industry, knows the operations of the company, and knows the specific rules in accounting and auditing for that specific industry. Because the business and industry conditions of the client can affect the client's business risk and the risk of misrepresentation of financial statements. Whiting and Birch (2016)), and Balsam, et al., (2003) found that the type of auditors with industry specialization had lower discretionary accruals than otherwise. Gul et al., (2009) examine whether auditors of industrial specialization affect the relationship between auditor tenure and earnings quality. The results show that the shorter the audit tenure of auditor specialists and non-specialist industry who audit certain companies, the lower the earnings quality of the companies will be. This research supported the research of Balsam et al., (2003). Auditors who have a concentration on a certain industry and audit procedures are likely to gain more and in-depth knowledge about the client's business and industry so that auditors with industry specialization can work more effectively. The effectiveness of the auditor's work reflects the expertise in detecting accounting irregularities that have an impact on the quality of information. The effectiveness and efficiency of audit assignment and responsibility can majorly be improved with a great measure of specialization.

## **Empirical Review**

Abeysekera (2010) examined the influence of board size on intellectual capital disclosure by Kenyan listed firms disclosing more, rather than less, strategic and tactical intellectual capital resources using the top 26 of the 52 firms ranked by the Nairobi Stock Exchange for market capitalization in 2002 and in 2003. This study identifies intellectual capital disclosure by three separate categories: internal capital, external capital, and human capital. Hence, this study examines the influence of board size on six disclosure outcomes. The study develops hypotheses using the resource dependency theory. Using content analysis for data generation, the study classifies firms that disclose more versus those that disclose less, using the mean for all firms for each disclosure outcome. Using logistic regression, the study examines the influence of board size on each disclosure outcome and finds that firms disclosing more tactical internal capital and more strategic human capital have larger boards. Their findings

provide insights into how a larger board size can help boards to overcome skill deficiencies in making more discretionary disclosure related to future earnings.

Taliyang and Jusop (2011) investigated the extent of the intellectual capital disclosure and the relationship between intellectual capital disclosure and corporate governance variables in Malaysian public listed companies. The independent variables tested in this study comprise various forms of corporate governance structure: board composition, role duality, size of audit committee and frequency of audit committee meetings. A sample of 150 companies listed in Bursa Malaysia was selected consisting of five industries which are Information Technology, Consumer Product, Industrial Product, Trading/Services and Finance. The descriptive statistics, content analysis and linear regression model were performed to analyze the data. Out of 4 variables tested, only the frequency of audit committee meeting has significant positive relationship in influencing the level of intellectual capital disclosure in Malaysia. The result also found 72.6 percent of the selected companies disclosed intellectual capital in their annual reports. However, the extent of the intellectual capital disclosure among Malaysian companies is still relatively low about 3.45 percent. Their result revealed that most of Malaysian companies are aware about the intellectual capital disclosure, however, they are not aware on how to measure, report and disclose this information in their annual report.

Oba, et al., (2013) examined whether or not board characteristics have an impact on the quality of intellectual capital disclosures of twenty Nigerian companies that made the Forbes Africa top 25 companies in (2012). A measure of the quality of intellectual capital disclosure (ICDQ) based on a content analysis of the text in annual reports of sample companies is incorporated in the model to examine its interaction with various board mechanisms. The results reveal that board independence, audit committee independence, and board gender diversity are non-significant in predicting ICDQ. However, board size, board nationality diversity and firm size were found to be relevant contributors to the variation in ICDQ. Their interaction with ICDQ considerably increases the explanatory power of the model. From the findings, a case is made for the nationality diversification of board members (directors) and the maintenance of manageable board sizes. This study provides first-time evidence of the interaction of board mechanisms and ICDQ in Nigeria. Although this study was carried out in Nigeria but focuses on Forbes Africa top 25 companies (2012) in West Africa there by ignoring sector selection, this current study will be focused on industrial goods sector of the economy.

Tejedo-Romeroa, et al., (2017) determined the effect of Women directors and disclosure of intellectual capital information. The study uses a resource-based perspective and balanced panel data analysis to explore whether their presentation of women on the boards of directors of Spanish companies is associated with an increase in voluntary disclosure of information concerning intellectual capital [IC]. Their findings show that gender diversity is a complementary corporate governance mechanism that has a significant positive effect on levels of disclosure of IC information. This appears due to the presence of women on boards serving to prompt stronger monitoring and oversight behavior. Their findings should encourage support for policies that will increase current levels of representation of women on

corporate boards and influence the setting of corporate governance requirements relating to disclosure by capital market regulators.

Rasmini, et al (2014) investigated the effect of board diversity on the extent of intellectual capital disclosure, board structure as one of corporate governance mechanism. Samples in this research were financial companies listed on the Indonesia Stock Exchange during the period 2004-2009. The sample obtained by purposive sampling, and 33 companies fit with the sample criteria. The hypothesis tested by using multiple regression analysis. The result of hypothesis testing shows that gender diversity and diversity of nationality influence the intellectual capital disclosure. The result also shows that variation of formal education background (education diversity) and proportion of outside director (board's independence) has no effect on intellectual capital disclosure. Firm size as a control variable has positive effect on intellectual capital disclosure. The above study only focuses on one aspect of board structure which cannot generalize as key determinant of intellectual capital in another domain.

Haji and Ghazali (2013) examined the role of audit committee attributes in intellectual capital disclosures. The study argues that, given the changing informational needs of stakeholders and the ongoing discussion on integrated reporting, the role of the audit committee should extend to ensuring the overall quality of corporate reporting. The study draws evidence from a sample of leading Malaysian companies based on their market capitalization over a three-year period (2008-2010), a period subsequent to the recent policy changes. The extent and quality of IC information, as a surrogate of non-financial information, was measured and regressed against several audit committee attributes, such as audit committee size, independence, financial expertise and meetings, controlling the overall governance and firm-specific variables. The findings show a strong positive role of the audit committee functions in the overall amount of IC information as well as all three subcomponents of IC information (internal, external and human capital). The results are robust to controls for the overall governance and firm-specific attributes as well as different measures of IC information. Their results suggest that the role of the audit committee function extends to non-financial information communication such as IC. Although the study points out the important of audit committee attributes as it relates to intellectual capital, their study may not be applicable to other countries.

Whiting and Birch (2016) examined the effect of corporate governance on intellectual capital disclosure the study focuses whether facets of corporate governance (board size, proportion of independent directors on the board, board committees, and Big 4 auditor) promote the voluntary disclosure of intellectual capital in annual reports in Australia and New Zealand and whether this is country dependent. Data for this study was collected from OSIRIS and annual reports with disclosure detected through a rigorous electronic word search approach. Statistical testing with OLS regression followed. The presence of nomination committees and a majority of independent directors on the board were found to be significant positive predictors of intellectual capital disclosure in both countries, and larger board sizes in Australian company's enhanced intellectual capital disclosure. These results concur with resource dependency and stakeholder theoretical arguments. The study did consider other determinant of intellectual capital disclosure as it only focuses on some of the corporate governance variables.

Balasundaram (2019) investigated the impact of audit committee characteristics on Intellectual Capital Disclosure (ICD) of listed companies on the Colombo Stock Exchange (CSE) for a period of five- years from 2014-2018. The ICD index comprised of 30 items in terms of Relational Capital Disclosure (RCD), Structural Capital Disclosure (SCD) and Human Capital Disclosure (HCD). The data was analyzed using correlations and regression analysis. Most of the Sri Lankan Listed companies disclosed ICD index, sentences, pictures, tables and graphs in line with the Global Reporting Initiative (GRI) guidelines in their annual reports. ICD was measured by a disclosure index score. The independent variables comprised various forms of audit committee characteristics: audit committee size, frequency of audit committee meetings and audit committee independence. The study confirms that the size of audit committee and audit committee meetings is important attributes to explain ICD in Sri Lanka. However, their study found a negative significant relationship between ICD and audit committee independence.

## **Theoretical Clarification**

### **Stakeholders Theory**

Stakeholder theory is considered one of the key theories for accountability and CG (Solomon, 2010). Under stakeholder theory the general assumptions it posits is that the firm of business operates within a complicated multi-party environment, engages with this environment operations (Cots 2011). These parties, which are called stakeholders, are either affected by or affecting the business (Deegan, 2009) accordingly, companies will disclose information voluntarily to address the outside stakeholder's concerns and to encourage their engagement in its different activities (Michelon&Parbonetti 2012). Each category of stakeholders has their unique expectations from the business firms; for example, shareholders want continuous growth of wealth, governmental departments want compliance, and the analyst wants information that facilitates their forecast and analysis. Accordingly, the information requirements are varied and under the premises of stakeholder theory the companies are expected to satisfy all these information needs. In addition, companies communicate a different type of information via its annual reports to address a different type of stakeholders and in response to a varied and wide range of needs for information. Moreover, companies that adopt a responsive disclosure policy may find themselves in better communicative positions which result in a better mental image and the ability to be more competitive than companies that neglect stakeholders' claims for information.

### **Signaling Theory**

Signaling theory was developed and originated in biological and behavioral sciences to explain some aspect of animal and human behavior and evolution which underscore a theoretical framework for examining the communication between individuals, both within the same species and across different species. Many categories of signaling introduced under biological and behavioral signaling model this include the sexual signaling e.g., hunter/gender human (male) had used the food sharing with female as signal to sexually attract her and another example of signaling is among the peafowl, when the peacock uses its large colorful tail to signal the peahen (Debelle et al., 2017).

Nevertheless, in the field of corporate communication signaling theory was first introduced by (Spence, 1973) in his widely cited article “Job Market signaling” which he authored based on his PhD project in Harvard University where he researched the Market Signaling. In that work signaling theory sought to more fully explain the information gap between the employers and the job seekers. Before hiring, employers cannot properly assess how well the job seeker will fulfill the job requirements before appointment. On the other hand, the jobseekers will signal their skills and qualifications to the employers by applying to the job.

The hiring process, according to Spence, looks like buying a lottery: there is always a margin of uncertainty associated with the decision. After the decision is made any adjustment needed from both parties, either by training and education from the employer or the cost of quitting by the employee is referred to as “signaling cost”. Thus, researchers refer to this theory wherever there is information asymmetry in labour market (Morris 1986). For example, where the managers who possess the information will voluntarily use it to give signals to the outside parties who are interested to know the firm’s news (An et al. 2011). Under these theory managers are interested in sharing their achievements and the positive performance that their firms have actualized. Within signaling theory the notion has been developed that the managers intentionally provide such signals to market themselves in the labour market as distinguished and successful leaders (Morris, 1986).

Sometimes, companies want to make their competencies visible and to offer the relevant information that investors and potential investors need for decision taking (Li, et al., 2014; Kang & Gray 2011), allowing precise evaluation (Edvinsson and Malone, 1997). An et al., (2011) stated that signaled disclosures to investors normally comes with good quality information and is helpful for decision making and reevaluating the company’s value. It gives numerous details about products, future plans, growth potential and expansion strategies (Morris 1986). In addition, (Li et al. 2008) suggested that firms may try to signal their expertise and excellence to the market in the form of voluntary disclosure concerning the qualifications of management, and employees as well as business strategies and business lines. This point of view is also concluded by (García-meca et al. 2005). Hence, signaling theory can give us some explanations for managers’ rationale in disclosing voluntarily financial and non-financial information.

It is based on two general assumptions (Myers&Majult, 1984). Firstly, managers are better informed than shareholders or the public concerning of firm’s positions. Secondly, given that managers have information advantage, they may choose to disclose information in an attempt to signal to the public regarding firms’ position. The signaling theory suggests that more profitable firms will disclose more information to inform their stakeholders about their good performance. In other words, firms with good performance are more likely would disclose more information regarding the intellectual capital as compared to firms with bad performance

## **Methodology**

The study used longitudinal research design, using secondary data collected from the annual financial statement of listed industrial companies in Nigeria for a ten-year period from 2011

to 2020. The study population is the 13 listed industrial companies, the same number of companies also serve as the sample size of the study. Data collected were analyzed using the multiple linear regression, and certain other robust diagnostic test such as normality, heteroskedasticity, multicollinearity were conducted to ascertain the data fitness, reduce biasness as far as possible and to eliminate spurious regression result. The study made use of content analysis of items indicating intellectual capital disclosure as the dependent variable and the independent variables for the study are board independence, board gender diversity, board financial expertise, board size, audit committee independence, audit committee financial expertise, audit committee size, and auditor type.

### Model Specification

The models developed for the study to measure the relationship between the dependent variables and the independent variables shall be as follows:

$$ICD_{it} = \beta_0 + \beta_1 BS_{it} + \beta_2 BID_{it} + \beta_3 BGD_{it} + \beta_4 BFE_{it} + \beta_5 ACI_{it} + \beta_6 ACF_{it} + \beta_7 ACS_{it} + \beta_8 ATY_{it} + \varepsilon_{it}$$

Where;

BSZ = board Size,

BID=board Independence,

BGD=board gender diversity,

BFE=board financial expertise.

ACI= Audit committee independence

ACF= Audit Committee financial Expertise

ACS= Audit committee size

ATY= Auditor Type

**Table 1 Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>ICD</b>	130	0.6872308	0.1028208	0.33	0.83
<b>BID</b>	130	0.2191538	0.1491164	0.06	0.71
<b>BGD</b>	130	0.1939231	0.1548968	0	0.67
<b>BFE</b>	130	0.3441538	0.1680752	0.1	0.71
<b>ACI</b>	130	0.3778462	0.1315618	0.14	0.67
<b>ACF</b>	130	0.3871538	0.1506175	0.14	0.8
<b>ACS</b>	130	5.530769	0.9819176	4	7
<b>ATY</b>	130	0.7384615	0.4411726	0	1
<b>BSZ</b>	130	8.830769	3.502244	5	21

*Source: Author's computation using Eviews 10.*

Table 1 Shows the mean value of intellectual capital disclosure (ICD) to be 0.6872308, with a corresponding standard deviation of 0.1028208, with the minimum value of 0.33, and a maximum value of 0.83 This implies that the average value of (ICD) in the industrial goods company is 0.6872308 to a maximum value of 0.83, and the deviation from both sides of the mean. The value of the standard deviation is lower than the mean, which indicates that the

data are non-dispersed from the mean. The table also showed a mean value of board independence (BID) of 0.2191538, corresponding to a standard deviation value of 0.1491164, having a minimum value of 0.06, and a maximum value of 0.71, this also implies that since the standard deviation value of 0.1491164 is less than the average value of 0.2191538 shows the closeness of the data to the mean. The mean of board gender diversity (BGD) is 0.1939231 with a corresponding standard deviation value of 0.1548968, a minimum value of 0 and a maximum value of 0.67 proportions, meaning that the average value of (BGD) in the industrial goods company is 0.1939231 compared to the maximum proportional value of 0.67; the standard deviation value is lower than the mean which indicates that the data are not far apart from the mean. The table also showed a mean value of board financial expertise (BFE) of 0.3441538 with a corresponding standard deviation value of 0.1680752, with the minimum value of 0.1 and a maximum value of 0.71, meaning that the average value of (BFE) in the industrial goods company is 0.3441538 compared to the maximum value of 0.71; the standard deviation value is lower than the mean which indicates that the data are not far apart from the mean, showing moderate risk.

The table also showed a mean value of audit committee independence (ACI) of 0.3778462 with a corresponding standard deviation value of 0.1315618, with the minimum value of 0.14 and a maximum value of 0.67, meaning that the average value of (ACI) in the industrial goods company is 0.3778462 compared to the maximum value of 0.67; the standard deviation value is lower than the mean value indicating that the data are not dispersed from the mean.

The table also showed a mean value of audit committee financial expertise (ACF) of 0.3871538 with a corresponding standard deviation value of 0.1506175, with the minimum value of 0.14 and a maximum value of 0.8, meaning that the average value of (ACF) in the industrial goods company is 0.3871538 compared to the maximum value of 0.8; the standard deviation value is lower than the mean value indicating that the data are not dispersed from the mean.

The table also showed a mean value of audit committee size (ACS) of 5.530769 with a corresponding standard deviation value of 0.9819176, with the minimum value of 4 and a maximum value of 7, meaning that the average value of (ACS) in the industrial goods company is 5.530769 compared to the maximum value of 7; the standard deviation value is lower than the mean value indicating that the data are not dispersed from the mean.

The table also showed a mean value of auditor type (ATY) of 0.7384615 with a corresponding standard deviation value of 0.4411726, with the minimum value of 0 and a maximum value of 1, meaning that the average value of (ATY) in the industrial goods company is 0.7384615 compared to the maximum value of 1; the standard deviation value is lower than the mean value indicating that the data are not too far apart from the mean.

The table also showed a mean value of board size (BSZ) of 8.830769 with a corresponding standard deviation value of 3.502244, with the minimum value of 5 and a maximum value of 21, meaning that the average value of (BSZ) in the industrial goods company is 8.830769 compared to the maximum value of 21; the standard deviation value is lower than the mean value indicating that the data are not closer to the mean.

**Table 2 Correlation Matrix**

VAR	ICD	BID	BGD	BFE	ACI	ACF	ACS	ATY	BSZ
ICD	1								
BID	0.2018	1							
BGD	0.1257	0.6036	1						
BFE	0.0092	-0.0571	-0.3405	1					
ACI	0.0104	-0.3931	-0.3258	0.1369	1				
ACF	0.3947	0.2434	0.1884	-0.2161	-0.11	1			
ACS	0.0554	0.1503	0.0066	-0.0618	-0.2971	0.0763	1		
ATY	0.3718	0.0414	-0.1947	0.3138	0.0303	0.1579	0.0724	1	
BSZ	0.0857	-0.2891	-0.0495	-0.2281	-0.0526	0.097	0.0353	0.1267	1

*Source: Author's computation using EViews 10.*

Table 2 helps to analyze the correlation association between the independent variables. According to Gujarati (2004), high or intense correlation exist if the correlated values are greater than ( $>$ ) 0.80, otherwise there is low or absence of correlation. From table 2 above, it can be seen that all the associations between the variables are less than ( $<$ ) 0.50, meaning that there is low or no correlation between the variables.

**Table 3. Hausman Specification Test**

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.721679	8	0.4611

*Source: Author's computation using Eviews 10.*

Table 3 shows the Hausman specification test to ascertain the appropriate model to be used in the research estimate, the Null hypothesis is accepted because the probability statistics reported an insignificant value of 0.4611 being higher than ( $>$ ) 0.05; meaning that the Random effect model is the appropriate model to be used which will be subjected to the Breusch-pagan LM test.

**Table 4. Breusch-Pagan LM Test**

Lagrange Multiplier Tests for Random Effects

Null hypotheses: No effects

Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided

(all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	222.5349	3.858486	226.3934

(0.0000)      (0.0495)      (0.0000)

**Source: Author's computation using Eviews 10.**

The Breusch-Pagan test above showed a probability result of 0.000 a value which is less than (<) 0.05, meaning that the Null hypothesis is rejected, the Random effect model (REM) is preferred to the Pooled model. Therefore, the random effect model will be used for the data estimate.

**Table 5. Regression Analysis**

Dependent Variable: ICD  
 Method: Panel EGLS (Cross-section random effects)  
 Date: 02/01/22 Time: 13:49  
 Sample: 2011 2020  
 Periods included: 10  
 Cross-sections included: 13  
 Total panel (balanced) observations: 130  
 Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.633828	0.074971	8.454365	0.0000
BSZ	-0.001450	0.001947	-0.744916	0.4578
BID	0.186267	0.074757	2.491644	0.0141
BGD	-0.052016	0.046417	-1.120608	0.2647
BFE	-0.016834	0.044273	-0.380223	0.7044
ACI	-0.029083	0.048847	-0.595400	0.5527
ACF	0.112294	0.036149	3.106426	0.0024
ACS	0.003248	0.009774	0.332267	0.7403
ATY	-0.012428	0.019889	-0.624856	0.5332

Effects Specification		S.D.	Rho
Cross-section random		0.096136	0.8239
Idiosyncratic random		0.044447	0.1761

Weighted Statistics			
R-squared	0.152991	Mean dependent var	0.099420
Adjusted R-squared	0.096991	S.D. dependent var	0.046720
S.E. of regression	0.044396	Sum squared resid	0.238495
F-statistic	2.731959	Durbin-Watson stat	1.700289
Prob(F-statistic)	0.008353		

Unweighted Statistics			
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R-squared	0.053682	Mean dependent var	0.687231
Sum squared resid	1.290591	Durbin-Watson stat	1.603328

**Source:** Author's computation using Eviews 10.

The regression analysis result in Table 5 the coefficient of determination ( $R^2$ ) is observed to be 0.152991, and the adjusted R-squared is also equal to 0.096991, it shows that the independent variable is only able to explain 15.30% of the dependent variable while the remainder of 84.70% represent other independent variables not listed among that of this study. The value of the F-statistics is 2.731959 with a corresponding probability Prob(F-statistics) of 0.008353, meaning that all the variable jointly has significant positive effect on the intellectual capital disclosure of all the listed industrial goods firms in Nigeria, the Durbin-Watson statistics showed a value of 1.7, which falls within the acceptable region of 1.5 and 2.5, which also means that the model is free from autocorrelation, (Gujarati 2004), therefore the model is fit for the estimate.

**Hypothesis ( $H_01$ ):** *Board size has no significant effect with intellectual capital disclosures of listed industrial goods firms in Nigeria.*

The result of board size showed a coefficient of -0.001450 with a corresponding prob(0.4578 > 0.05), meaning that there is a negative insignificant relationship between board size and intellectual capital disclosures of companies listed in the industrial goods sectors of the Nigeria economy, that is a 1% increase in board size will result in a 0.145% decrease in intellectual capital disclosures in the sampled companies. The null hypothesis is *accepted*

**Hypothesis ( $H_02$ ):** *Board independence has no significant effect with intellectual capital disclosures of listed industrial goods firms in Nigeria.*

The result of board independence showed a coefficient of 0.186267 with a corresponding prob(0.0141 < 0.05), meaning that there is a positive significant relationship between board independence and intellectual capital disclosures of firms listed in the industrial goods sectors of the Nigeria economy, that is a 1% increase in board independence will result in a 18.63% increase in intellectual capital disclosures in the sampled firms. The null hypothesis is *rejected*.

**Hypothesis ( $H_03$ ):** *Board gender diversity has no significant effect with intellectual capital disclosures of listed industrial goods firms in Nigeria.*

The result of board gender diversity showed a coefficient of -0.052016 with a corresponding prob(0.2647 > 0.05), meaning that there is a negative insignificant relationship between board gender diversity and intellectual capital disclosures of firms listed in the industrial goods sectors of the Nigeria economy, that is a 1% increase in board gender diversity will result in a 5.20% decrease in intellectual capital disclosures in the sampled firms. The null hypothesis is *accepted*

**Hypothesis ( $H_04$ ):** *Board financial expertise has no significant effect with intellectual capital disclosures of listed industrial goods firms in Nigeria.*

The result of board financial expertises showed a coefficient of -0.016834 with a corresponding prob(0.7044 > 0.05), meaning that there is a negative insignificant relationship between board financial expertise and intellectual capital disclosures of companies listed in the industrial goods sectors of the Nigeria economy, that is a 1% increase in board financial expertise will result in a 1.68% decrease in intellectual capital disclosures in the sampled firms. The null hypothesis is *accepted*.

Hypothesis (**H<sub>05</sub>**): *audit committee independence has no significant effect with intellectual capital disclosures of listed industrial goods firms in Nigeria.*

The result of audit committee independence showed a coefficient of -0.029083 with a corresponding prob(0.55277 > 0.05), meaning that there is a negative insignificant relationship between audit committee independence and intellectual capital disclosures of firms listed in the industrial goods sectors of the Nigeria economy, that is a 1% increase in audit committee independence will result in a 2.91% decrease in intellectual capital disclosures in the sampled firms. The null hypothesis is *accepted*.

Hypothesis (**H<sub>06</sub>**): *audit committee financial expertise has no significant effect with intellectual capital disclosures of listed industrial goods firms in Nigeria.*

The result of audit committee financial expertises showed a coefficient of 0.112294 with a corresponding prob(0.0024 < 0.05), meaning that there is a positive significant relationship between audit committee financial expertise and intellectual capital disclosures of firms listed in the industrial goods sectors of the Nigeria economy, that is a 1% increase in audit committee financial expertise will result in a 11.23% increase in intellectual capital disclosures in the sampled firms. The null hypothesis is *rejected*.

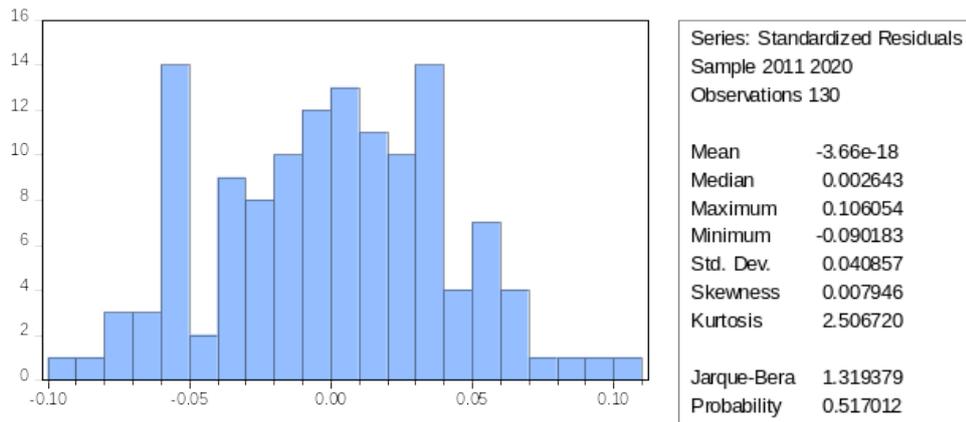
Hypothesis (**H<sub>07</sub>**): *audit committee size has no significant effect with intellectual capital disclosures of listed industrial goods firms in Nigeria.*

The result of audit committee size showed a coefficient of 0.003248 with a corresponding prob(0.7403 > 0.05), meaning that there is a positive insignificant relationship between audit committee size and intellectual capital disclosures of firms listed in the industrial goods sectors of the Nigeria economy, that is a 1% increase in audit committee size will result in a 0.32% increase in intellectual capital disclosures in the sampled firms. The null hypothesis is *rejected*.

Hypothesis (**H<sub>08</sub>**): *auditor type independence has no significant effect with intellectual capital disclosures of listed industrial goods firms in Nigeria.*

The result of auditor types showed a coefficient of -0.012428 with a corresponding prob(0.5332 > 0.05), meaning that there is a negative insignificant relationship between auditor type and intellectual capital disclosures of firms listed in the industrial goods sectors of the Nigeria economy, that is a 1% increase in auditor type will result in a 1.24% decrease in intellectual capital disclosure. The null hypothesis is *accepted*.

## **Table 6. Normality Test**



**Source: Author's computation using EViews 10.**

Figure 1 on table is a check for the normality of residuals from the regression line. The report showed a Jarque\_Bera statistical value of 1.319379 with a corresponding probability value of 0.517012 or (51.70%). The null hypothesis of normality is accepted since the probability value at 51.70% is greater than 5% critical value. The implication is that the residual of the population is normally distributed, which agrees with assumption of regression line.

**Table 7. Multicollinearity Test**

Variable	VIF	1/VIF
<b>BID</b>	2.19	0.457209
<b>BGD</b>	1.99	0.503185
<b>BFE</b>	1.43	0.697285
<b>ACI</b>	1.34	0.747601
<b>BSZ</b>	1.31	0.765329
<b>ATY</b>	1.3	0.771266
<b>ACF</b>	1.19	0.84362
<b>ACS</b>	1.14	0.880427
<b>Mean VIF</b>	1.48	

**Source: Author's computation using EViews 10.**

Table 7 revealed that the variance inflation factor (VIF) showed a tolerance (1/VIF) value that is uniformly less than (<) 1, which indicates the absence of multicollinearity among the independent variables, it is therefore, fit for the estimate.

**Table 8. Heteroscedasticity Test**

Panel Heteroskedasticity LR Test

Null hypothesis: Residuals are homoscedastic

Equation: UNTITLED

Specification: ICD C BSZ BID BGD BFE ACI ACF ACS ATY

	Value	df	Probability
Likelihood ratio	2.906002	13	0.9983

**Source: Author's computation using EViews 10.**

From table 8 above the likelihood ratio or Obs. R-squared reported a value of 2.906002, and a corresponding probability 0.9983 or 99.83%, which is greater than 0.05, therefore, the null hypothesis is accepted; this indicates that the residuals are homoscedastic which is desirable.

**Table 9 Cross-Section Dependence Test**

Residual Cross-Section Dependence Test  
 Null hypothesis: No cross-section dependence (correlation) in residuals  
 Equation: Untitled  
 Periods included: 10  
 Cross-sections included: 13  
 Total panel observations: 130  
 Note: non-zero cross-section means detected in data  
 Cross-section means were removed during computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	182.1028	78	0.1100
Pesaran scaled LM	8.334897		0.0710
Pesaran CD	-1.145405		0.2520

**Source: Author’s computation using Eviews 10.**

The null hypothesis in Table 9 is accepted which indicates that no cross-section dependence in the residuals, as can be seen in the probability value outcome as reported by Pesaran CD test with the statistical value of -1.145405 and an insignificant probability distribution value of 0.2520; a value greater (>) than 0.05 or 5%, meaning that there is no cross-section dependence in the residuals, making the data fit for estimate.

**Conclusion and Recommendations**

The study is about assessing the effect of monitoring determinants on intellectual capital disclosures of listed industrial goods companies in Nigeria. It was discovered that there is a negative insignificant relationship between board size and intellectual capital disclosures of companies listed in the industrial goods sectors of Nigeria; a result that is consistent with the findings by Oba et al., (2013), but inconsistent with the findings by Abeysekera (2010) and Oba (2013), meaning that the size of the board alone does not make any difference in the determination of intellectual capital disclosures of the sampled firm

The table also showed that there is a positive significant relationship between board independence and intellectual capital disclosures of firms listed in the industrial goods sectors

of the Nigeria economy, the result is in agreement with the findings by Whiting and Birch (2016), but inconsistent with the work done by Oba et al., (2013), this means that the independence of members of the board is crucial in determining the intellectual capital disclosures of the sampled firms.

A negative insignificant relationship between board gender diversity and intellectual capital disclosures was reported, the result is not consistent with the findings of Rasminiet al., (2014), and Tajedo-Romero et al., (2017), the findings show that gender diversity composition does not matter as to affect intellectual capital disclosures in the sampled firms.

Also, a negative insignificant relationship between board financial expertise and intellectual capital disclosures was reported from the table, the result is not consistent with the outcome of the findings of Haji & Ghazali (2013), this shows that the financial expertise has no effect on intellectual capital disclosures.

The table also showed that there is a negative insignificant relationship between audit committee independence and intellectual capital disclosures, the findings disagree with what Balasundaram (2019), this means that audit committee independence has nothing to do with intellectual capital disclosures in the sampled firms.

A positive significant relationship between audit committee financial expertise and intellectual capital disclosures was reported, the result is consistent with the result of the study by Haji (2015), meaning that the financial expertise of auditors is a strong determinant of intellectual capital disclosures in the sampled firms.

The table also reported that there is a positive insignificant relationship between audit committee size and intellectual capital disclosures, this result is in agreement with Taliyang and Jusop (2011), not with that by Balasundaram (2019); this means the size of the audit committee is important, but not a strong determinant of intellectual capital disclosures of the sampled firms.

The outcome from the table shows a negative insignificant relationship between auditor type and intellectual capital disclosures, the result disagrees with the findings by Whiting and Birch (2016), and Haji (2015), but agrees with the findings of Morariu (2013), this means that the type of audit firm does not determine intellectual capital disclosures of the sampled firms.

## **Recommendations**

The study recommends as follows based on the findings

- i) The statutory requirement for the number of board members should be adhere to with the right mixit does not make any difference in the determination of intellectual capital disclosures of the sampled firm
- ii) The independence of members of the board is crucial in determining the intellectual capital disclosures, it should be emphasized always.
- iii) The gender diversity composition of women on the board should be made to be more of independent non-executive status to be relevant.

- iv) Board financial expertise is important to the board to help in the interpretations of financial data and information and not necessarily in determining intellectual capital disclosures.
- v) The independence of audit committee is vital in helping to oversee and checkmate the activities of the external auditor and should be strengthened and supported by the board, but little to do with intellectual capital disclosures
- vi) The financial expertise of auditors is a strong determinant of intellectual capital disclosures this element of the auditor characteristics must be prioritized.
- vii) The size of the audit committee is important, but not a strong determinant of intellectual capital disclosures, it should however be encouraged especially in a large firm.
- viii) The capacity, composition and educational and practical competence of the audit firms should be prioritized rather than the type of audit firm.

### **Suggestions for further studies**

The study adds to existing body of literatures in this area of study relating to intellectual capital accounting disclosures and related areas. This study is inexhaustive, but it can be expanded into areas like ownership structure, management accounting practices and intellectual capital functions, financial reporting and intellectual capital disclosures, earnings quality and intellectual capital impact and the likes, the sectorial studies can also be extended to other industries such as the private educational institutions, aviation sectors and even cross jurisdictional Comparism

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