

## Intellectual Capital Investment and Corporate Sustainability Growth: An Empirical Evidence on Listed Firms in Nigeria

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### **ABSTRACT**

*The study examined the relationship between intellectual capital investment and corporate sustainability growth. Intellectual capital investment was proxy using human capital investment (HCI), relational capital investment (RCI) and structural capital investment (SCI) while corporate sustainability growth was measured using corporate sustainability growth rate (CSGR). Ex post facto design was adopted and data for this study was collected from the annual reports and accounts of the selected industrial goods firms listed on the floors of Nigerian Exchange Group (NGX) for the period of 2016-2022. Panel Least squares model was used in the data analysis and the results of the study show a significant and positive relationship between human capital investment, relational capital investment, structural capital investment and sustainability growth of industrial goods firms in Nigeria at 1% significant level. The study therefore concludes that intellectual capital investment ensures corporate sustainability growth. Thus, the study recommends that manufacturing firms in Nigeria should improve on human capital investment as any negative changes in human capital investment will impact the sustainable growth of the firm. They should also invest on relational and structural capital as it can improve their competitiveness and bottom line*

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**Keyword:** *Human Capital Investment; Relational Capital Investment; Structural Capital Investment; Corporate Sustainability Growth*

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## 1. INTRODUCTION

The transition of the global economy from manufacturing based to the knowledge-based economy leads to a pioneering business paradigm. In the current era of the knowledge-based economy, the importance of Intellectual Capital (IC) is constantly increasing. Intellectual Capital (IC) represents a group of imperative strategic assets, indispensable for enterprises' growth and ultimate success. In modern days, enterprises consider intellectual Capital (IC) to be the most imperative asset and a strategic weapon for competitiveness. Liu, Li, Jiang, Li, Su, Lu and Li (2021) believe that intellectual resources are indispensable for enterprises to stay competitive in today's highly dynamic business environment as it enables enterprises to produce sustainable value.

Sustainability growth on the other hand is the most pressing global issue. The increasing concern about sustainability these days has shifted focus from the model of economic growth to the emerging model of sustainable growth (Omaliko & Okpala, 2022). Gradually, this is becoming an integral part of the agenda of the corporate world too. In today's highly dynamic and competitive world, a mere maximizing of growth would not fetch up the valuable and desired wealth maximization.

Therefore, corporate sustainability growth does not solely depend on the successful development of tangible resources but also on intangible resources such as the effective management of knowledge and intellectual capital systems. Intellectual capital investment is comprised of three components: human capital investment (human resource), structural capital investment (organizational capital/value) and relational capital investment (Customer capital/relationship) (Akpan & Akinniyi, 2019). Even when it has been a known fact that organizations with good intellectual capital investment out perform their counterparts, there are only few empirical studies on the effect of intellectual capital investment on corporate sustainability growth especially in developing economies like Nigeria. Furthermore, intellectual capital investment is therefore considered to be the hidden value not reported in the financial statements which enables organizations to obtain a competitive advantage. Thus, this study seeks to empirically examine the effect of each components of intellectual capital investment on corporate sustainability growth using some selected listed firms in Nigeria.

Also, competition at a cross-border scale compels domestic companies to adjust their competitive position by achieving sustainable growth. In the knowledge-intensive industries, intellectual capital investment generally represents the critical resource in the value creation process. Traditional measures of corporate performance, which are based on conventional accounting principles, are unsuitable in the new economy. But such measures are the main basis of decision making. The conventional performance measurement techniques like (return on equity, return on assets, return on investment etc) may lead managers, investors, and other stakeholders to make inappropriate decisions unlike when corporate sustainability growth is used especially when companies have large portion of their investment in intangible assets. Hence the need for the present study to examine the relationship between intellectual capital investment and corporate sustainability growth using some selected listed firms in Nigeria. Thus, the following hypotheses were formulated to achieve the purpose of this study.

**H<sub>01</sub>:** Human capital investment has no significant relationship with corporate sustainability growth

**H<sub>02</sub>:** There is no significant relationship between relational capital investment and corporate sustainability growth

**H<sub>03</sub>:** Structural capital investment has no significant relationship with corporate sustainability growth

## **2. CONCEPTUAL REVIEW**

### **2.1. Intellectual Capital Investment**

Bell (1997) defined intellectual capital investment as an investment in a resource that an organization utilizes to create competitive advantage, including the forms, strategies and special methods. Stewart (1997) thought of IC as the synthesis of knowledge, information, skill, experience and learning ability. The changing trends from traditional economy (land, labor and financial) to knowledge intensive economy during the last two centuries have made service based industries take the major share in the value creation process especially in developed societies. Intellectual Capital (IC) has been widely acknowledged as that innate attribute usually acquired by a firm which drives it on the wheel of value creation, value addition and value sustainability (Onyekwelu, Okoh & Iyidiobi, 2017).

#### **2.1.1 Components of Intellectual Capital Investment**

##### **2.1.1.1 Human Capital Investment**

The term human capital is defined as a combination of the following four factors – genetic inheritance; education; experience; and attitudes about life and business (Ogbo, Ezeobi & Ituma, 2013). Human capital is understood to mean employee values that create potential and are reflected in the knowledge, skills, competencies, abilities, experience and talents of employees and managers in an organization. Human capital is one of the essential variables in the study of intellectual capital, and it is the dimension of intellectual capital which deals with human knowledge, and which influences a firm's value by affecting the other elements (Ogbo, Ezeobi & Ituma 2013).

According to Ahangar (2011), human capital is recognized as the largest and the most important intangible asset in an organization that provides the goods and/or services that customers require to solve their problems. It includes the collective knowledge, competency, experience, skills, and talents of people within an organization.

##### **2.1.1.2 Relational Capital Investment**

Relational capital investment means external links with suppliers and customers of the organization, which allows it to buy and sell goods and services in an efficient and effective manner (Sumedrea, 2013). According to Tutun and Som (2019) relational capital represents the ability of an organization to interact positively with business community members to motivate the potential for wealth creation by enhancing human and structural capital.

##### **2.1.1.3 Structural Capital Investment**

Structural capital is an organization's ability to meet the company routines and structures that support employee efforts to produce optimal intellectual performance as well as overall business performance, for example: the company's operational systems, manufacturing processes, organizational culture, management philosophy and all forms of intellectual property are owned by the company. An individual can have a high intellectual level, but if the organization has poor systems and procedures such intellectual capital cannot achieve optimal performance. Structural capital is the infrastructure that supports employees to create optimum performance, including the ability of the organization to reach the market, hardware, software, databases, organizational structure, patent, trademark, and all the ability of organizations to support employee productivity (Aluwong, 2022).

### **2.1.2 Corporate Sustainability Growth (CSG)**

The term “Sustainable Growth” has a multidisciplinary use and meaning. However, from a financial perspective, sustainable growth implies “an affordable growth that can be sustained profitably for future benefits.” The concept of corporate sustainable growth became popularized with the remarkable study of Higgins in the year 1977, where he first proposed the use of sustainable growth rate model in explaining the practical limit for growing firms. The concept of sustainable growth rate elucidates, “what sales growth is consistent with the realities of the company and of the financial marketplace” (Van Horne & Wachowicz, 2015). Omaliko and Okpala (2022) reported that corporate sustainability is all about financial performance information and non-financial information that includes social and environmental activities that enable companies to grow sustainably and friendly.

According to Omaliko and Onyeogubalu (2021), to be sustainable, organizations must concede the following:

- i. Responsible for their social, environmental and economic impact.
- ii. Being transparent in decisions and activities affecting its responsibilities.
- iii. Respond to the interests of its stakeholders.
- iv. Accept the fact that the rule of law is mandatory

For the purpose of this study, corporate sustainability growth was measured as return on equity multiplied by retention ratio. This is expressed as  $ROE(1-RR)$ .

## **2.2 Theoretical Framework**

### **2.2.1 Intellectual Capital Theory**

This theory was propounded by Becker in the year 1962. The theory of intellectual capital is a new prominent theory which has not only challenged the large attention, but already considerably promises the increase of business results in the future. The base of the theory lies in the fact that tangible assets (land, buildings, equipment and money) of today's leading companies around the world have less value than intangible assets, which has not been quoted in their business balances. This theory is founded on the conviction that the wealth of enterprises is based on the human capital, structural capital and consumer capital. The value creation happens when one kind of capital turns into another. The value has been created whenever the human ability (human capital) creates new business processes (structural capital) which results in better services for consumers

and increases their loyalty (consumer capital) (Njuguna, 2014). Hence, the study was anchored on this theory as it elaborates intellectual capital investment and its role towards achieving organizational sustainability growth.

### **2.3 Empirical Review**

Aluwong (2022) investigated intellectual capital performance in Nigeria drawing samples from listed non-finance firms on the floor of the Nigerian Exchange Group market. While performance proxied by return on asset is the dependent variable, the independent variables adopted for this study includes structural capital efficiency, capital employed efficiency, human capital efficiency and value-added intellectual capital coefficient. The econometric techniques adopted in this study are the panel fixed and Random effect regression techniques. The empirical result of this study leads to the conclusion that out of the four independent variables adopted in this study, only the variable of human capital efficiency insignificantly affects performance of listed non-finance firms in Nigeria. However, we conclude that structural capital efficiency, capital employed efficiency and value-added intellectual coefficient significantly improve firm performance.

Lambe, Ame and Dzugwahi (2022) examined the effect of intellectual and natural capital on financial performance of listed multinational companies in Nigeria. The study period spanned ten (10) years from 2012 to 2021 and the data used for the study were sourced from the published financial statements of the companies and the Nigerian Exchange Group (NGX). Twenty-four (24) listed multinational companies constitute the population and nineteen (19) of them were selected as a sample based on a study filter. The ex-post facto research design and positivist research philosophy were adopted, and the study is anchored on resource-based theory and diffusion of innovation theory. Multiple regression with the aid of a statistical tool STATA version 16 was used for the data analysis. The outcome of the study revealed that intellectual capital has a positive and significant effect on financial performance of listed multinational companies in Nigeria. On the other hand, natural capital has a positive but insignificant effect on financial performance. The study concludes that intellectual capital enhances financial performance.

Akpan and Akinniyi (2019) investigated the effect of intellectual capital on value creation and bank performance in Nigeria. The study adopted ex-post facto as its research design and data for the study were obtained from banks quoted on the Nigeria stock exchange and the study period was 2013-2015. Three hypotheses were tested and the statistical technique employed was descriptive statistics and OLS regression analysis. The result of the analysis showed that human capital, structural and relational capital does not significantly affect the performance of banks in Nigeria. It was concluded that that though the intellectual capital components do not significantly affect banks performance, this should not underscore the relevance of intellectual capital as a major driver for corporate performance and value creation.

Duru, Okpe and Nichole (2018) examined the effect of intellectual capital on financial performance of banks in Nigeria. Three research objectives guided this study and the study, which adopted the ex-post facto research design, used data from four deposit money banks in Nigeria (First Bank Plc, Diamond Bank Plc, Zenith Bank Plc and United Bank for Africa Plc) covering the periods 2011 to 2015. Descriptive statistics was used for pre-test analysis and regression analysis was used for test of hypothesis. The study revealed that human capital efficiency has positive and

insignificant effect on return on assets; structural capital efficiency has positive and insignificant effect on return on assets; and that capital employed efficiency has negative and insignificant effect on return on assets of firms in Nigeria banking sector..

Kurfi, Udin and Bahamman (2017) examined the impact of intellectual capital (IC) on financial performance of listed Nigerian food products companies for five year period 2010 to 2014 by adopting Pulic model of IC known as value added intellectual coefficient (VAIC). Regression models are used to test the hypotheses of the study where the results show that there was positive significant influence of IC on financial performance. Specifically, the results showed that structural capital (SC) and capital employed (CE) influence the financial performance of Nigerian food products companies.

Onyekwelu, Okoh and Iyidiobi (2017) appraised the effect of intellectual capital on financial performance of firms in Nigeria using the banking industry. The research used the Value Added Intellectual Coefficient (VAIC) to ascertain the extent that intellectual capital indices affect financial performance of three Nigeria. Data were collected from the published annual financial statements of the three banks and analyzed using regression tool. The study indicates that IC has a positive and significant effect on banks' financial performances of the banks but some are not significant. The results further showed that the banks are statistically different in both the intellectual capital and its financial performance indicators. It also shows that the banks with high IC also show high financial performance.

### 3. METHODOLOGY

*Ex Post Facto* design was used in the study based on the fact that the data for the study was secondary which already existed and cannot be controlled. The population of the study covers the entire firms listed under industrial goods sector of Nigerian Exchange Group (NGX) as at December 31, 2022. Thus, a sample of 7 firms was selected from the population of the study covering the period 2016-2022. The data was collected from the annual reports and accounts of the sampled firms. Panel least square regression model was used to examine the relationship between intellectual capital investment and corporate sustainability growth.

#### 3.1 Measurement and Operationalization of Variables

**Table 1: Variable Measurements**

Variable	Measurement
<b>Dependent</b>	
Corporate Sustainability Growth	ROE(RR)
<b>Independent</b>	
Human Capital Investment	VA/HC
Relational Capital Investment	RC/VA
Structural Capital Investment	SC/VA

Source: Empirical Survey (2023)

#### 3.2 Model Specification and Justification

The researcher designed a model in line with the previous studies to examine the relationship between intellectual capital investment and corporate sustainability growth. The functional model for the study is shown below as thus:

$$CSG = F(HCI, RCI, SCI)$$

The explicit form of the regression designed for the study is expressed as thus:

$$\text{Model: } CSG_{it} = \beta_0 + \beta_1 HCI_{it} + \beta_2 RCI_{it} + \beta_3 SCI_{it} + \mu$$

Where:

CSG = Corporate Sustainability Growth

HCE = Human Capital Investment

RCE = Relational Capital Investment

SCE = Structural Capital Investment

$\mu$  = error term

**Decision Rule:** accept  $H_0$  if P-value >1%- 5% significant level otherwise reject  $H_0$

#### 4. Data Analysis and Results

**Table 2: Descriptive Statistics**

	CSG	HCI	RCI	SCI
<b>Mean</b>	1.76	2.12	1.98	1.60
<b>Median</b>	0.30	2.30	1.90	1.80
<b>Maximum</b>	12.3	3.30	3.10	3.60
<b>Minimum</b>	-1.12	1.00	0.90	0.00
<b>Std. Dev.</b>	3.14	0.57	0.46	0.87
<b>Skewness</b>	2.14	0.45	0.05	0.11
<b>Kurtosis</b>	3.04	2.28	3.16	2.46
<b>Jarque-Bera</b>	3.20	2.73	0.08	0.71
<b>Probability</b>	0.78	0.25	0.96	0.70
<b>Sum</b>	86.4	105.9	97.2	78.4
<b>Sum Sq. Dev.</b>	473.7	15.75	10.19	36.4
<b>Observations</b>	<b>49</b>	<b>49</b>	<b>49</b>	<b>49</b>

**Source: E-View 12 Computational Results (2023)**

Table 2 above shows that corporate sustainability growth (CSG) value for the sampled firms' was 1.76. This implies that corporate sustainability growth is determined by firms' intellectual capital investment. The maximum value for the study was 12.3 while the minimum value was -1.12. The variations in minimum and maximum CSG value for the sampled firms justify the study that corporate sustainability growth is a determinant of intellectual capital investment. The distribution is leptokurtic since the kurtosis (3.04) is more than 3, which means there are much outlier. The Jarque-Bera probability of 0.78 is more than 0.05 which means that the distribution of corporate sustainability growth does not deviate significantly from a normal distribution.

The average value of human capital investment (HCI) for the sampled firms was 2.12. This means that firms with HCI value of 2.12 and above have human capital investment at a risk level of 0.57%. The maximum and minimum values for the study were 3.30 and 1.00 respectively. The variation in minimum and maximum HCI values between the sampled firms justifies the study that firms with such variability have sustainable growth. The distribution is platykurtic since the kurtosis (2.28) is less than 3, which means there are few outliers. The Jarque-Bera probability of 0.25 is more than 0.05 which means that the distribution of human capital investment does not deviate significantly from a normal distribution.

The average relational capital investment (RCI) value for the sampled firms was 1.98. This means that firms with RCI values of 1.98 and above have relational capital investment. The maximum and minimum values for the study were 3.10 and 0.19 respectively. The variation in the minimum and maximum RCI values between the sampled firms justifies the study that firms with such variability are more sustainable. The distribution is leptokurtic since the kurtosis (3.16) is more than 3, which means there are much outlier. The Jarque-Bera probability of 0.70 is more than 0.05 which means that the distribution of structural capital investment does not deviate significantly from a normal distribution.

The mean value of structural capital investment (SCI) for the sampled firms was 1.60. This implies that firms with SCI of 1.60 and above have structural capital investment at a degree risk of 0.58%. The maximum and minimum values for the study were 3.60 and 0.00 respectively. The variation in minimum and maximum SCI values between the sampled firms justifies the study that firms with such variability have sustainability growth. The distribution is platykurtic since the kurtosis (2.46) is less than 3, which means there are few outliers. The Jarque-Bera probability of 0.25 is more than 0.05 which means that the distribution of human capital investment does not deviate significantly from a normal distribution.

**Table 3: Correlation Matrix**

<b>Variables</b>	<b>CSG</b>	<b>HCI</b>	<b>RCI</b>	<b>SCI</b>
<i>CSG</i>	1.00			
<i>HCI</i>	0.19	1.00		
<i>RCI</i>	0.16	0.54	1.00	
<i>SCI</i>	0.11	0.01	0.20	1.00

**Source: Result Output from E-Views 12 (2023).**

Table 3 above shows the relationship between the independent and dependent variables used in the model. The results of the study show that all independent variables are positively related to the dependent variable (corporate sustainability growth) and with each other. The values on the diagonal are all 1, indicating that each variable is perfectly correlated with itself. When testing for multi-collinearity, we found that no two exogenous variables were perfectly correlated. This implies that there is no multi-collinearity in our model.

#### **4.1. Test of Hypothesis**



**Table 4: Panel Least Squares Result on the Relationship between Intellectual Capital Investment and Corporate Sustainability Growth**

Dependent Variable: CSG  
 Method: Panel Least Squares  
 Date: 06/29/23 Time: 11:46  
 Sample: 2016 2022  
 Periods included: 7  
 Cross-sections included: 7  
 Total panel (balanced) observations: 49

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HCI	0.663502	0.148040	4.481910	0.0000
RCI	0.861361	0.200567	4.294629	0.0004
SCI	1.893283	0.535501	3.535536	0.0020
C	4.118437	1.228745	3.351743	0.0100
R-squared	0.591034	Mean dependent var	20.17640	
Adjusted R-squared	0.569733	S.D. dependent var	3.141557	
S.E. of regression	3.147244	Akaike info criterion	5.209039	
Sum squared resid	445.7314	Schwarz criterion	5.363473	
Log likelihood	-123.6214	Hannan-Quinn criter.	5.267631	
F-statistic	9.420237	Durbin-Watson stat	1.962303	
Prob(F-statistic)	0.000000			

**Source: Result Output from E-Views 12 (2023).**

The R-squared for the model, shown in Table 4 above, was 0.59%, indicating that the variables included in the model accounted for 59% of the change in the dependent variable of corporate sustainability growth (CSG), while about 41% was unaccounted for. The F-statistic value of 9.420 and its P-value of 0.0000 indicate that the panel least-squares model is statistically significant at 1% level. This implies that the regression model is valid and appropriate for the study.

**Autocorrelation Test:** The DW statistic is 1.962303, which is approximately 2, which agrees with Durbin Watson's rule of thumb. This means that the data are free of autocorrelation and suitable for the interpretation of the result. The Schwarz Criterion and the Akika Info Criterion of 5.363473 and 5.209039, respectively; further strengthen the reliability of our result as it confirms the goodness of fit of the model.

In addition, the specific results for each explanatory variable from the panel least squares model as shown in Table 4 are provided below as follows:

## 4.2. Discussion of Findings

**H<sub>01</sub>:** Human capital investment has no significant relationship with corporate sustainability growth

This hypothesis was tested and the result of the panel's least squares regression model as shown in Table 4 shows that the relationship between human capital investment (HCI) and corporate sustainability growth (CSG) is positive and significant, with a P-value of 0.0000 for the model, which is below the 1% level of significance adopted. The result of the positive coefficient of 0.664 for the model also implies that an increase in human capital investment increases the corporate sustainability growth by 66.4%. We therefore accepted the alternate hypothesis, which states that human capital efficiency investment is significantly related to corporate sustainability growth. This finding is consistent with the findings of Duru, Okpe and Nichole (2018) who found that human capital ensures firm performance. Contrary to this, Akpan and Akinniyi (2019), Aluwong (2022) found that human capital investment does not affect corporate performance.

**H<sub>02</sub>:** There is no significant relationship between relational capital investment and corporate sustainability growth

This hypothesis was tested and the result of the panel least squares model as shown in Table 4, shows that the relationship between relational capital investment (RCI) and corporate sustainability growth (CSG) is positive and significant, with a P- value of 0.0004 for the model which is less than 1% significant level adopted. In addition, the positive coefficient of 0.861 for the model suggests that relational capital investment ensures the corporate sustainability growth by 86.1%. We therefore accepted the alternate hypothesis, which states that there is a significant relationship between relational capital investment and corporate sustainability growth. This result agrees with the a priori expectations of Aluwong (2022), Kurfi, Udin and Bahamman (2017) who reported that relational capital investment has significant implications for firm performance.

**H<sub>03</sub>:** Structural capital investment has no significant relationship with corporate sustainability growth

This hypothesis was tested and the result of the panel's least squares model as shown in Table 4, shows that the relationship between the structural capital investment (SCI) and corporate sustainability growth is positive and significant, with a P-value of 0 .0020 for the model, which is below the 1% level of significance adopted. Furthermore, the positive coefficient of 1.893for the model shows that an increase in structural capital investment increases the corporate sustainability by 1.893%. We therefore accepted the alternate hypothesis, which states that structural capital investment has significant relationship with corporate sustainability growth. The finding is in consonance with the findings of Aluwong (2022), Lambe, Ame and Dzugwahi (2022), Kurfi, Udin and Bahamman (2017) who found that structural capital efficiency has no impact on the performance of firms in Nigeria.

## 5. Conclusion

The study concludes that intellectual capital investment has significant effect on sustainability growth of industrial goods firms in Nigeria. Thus, intellectual capital investment ensures corporate sustainability growth.

## 5.1 Recommendation

1. Management of industrial goods firms should look for ways to improve the efficiency of the human capital investment at their disposal. Thus, any negative changes in human capital efficiency impacts corporate sustainability growth.
2. They should also invest relational capital as it ensures corporate competitiveness, bottom line and sustainability growth.
3. Since positive and significant relationship was found between structural capital investment and corporate sustainability growth, industrial goods firms should invest more in structural capital in order to increase profitability.

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