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VALUE ADDED INTELLECTUAL COEFFICIENT AND SUSTAINABLE GROWTH RATE OF LISTED SERVICE FIRMS IN NIGERIA

Nestor Ndubuisi Amahalu[1] Ofulue Igbodo [2] Augustine Nwekemezie Odum[3]
[1,2&3]*Department of Accountancy, Nnamdi Azikiwe University Awka, Anambra State, Nigeria*
Emails: nn.amahalu@unizik.edu.ng[1]; ofulueigbodo3@gmail.com[2]; an.odum@unizik.edu.ng[3]
***All correspondence to**:* ofulueigbodo3@gmail.com

ABSTRACT
This study assessed the effect of value added intellectual coefficient on sustainable growth rate of listed service firms in Nigeria for eleven (11) years period covering from 2015-2025. Ex-Post facto research design was employed. Fifty one (51) quoted service firms constituted the sample size of this study. Secondary data were extracted from the annual reports and accounts of the sampled firms and were analysed using E-Views 10.0 statistical software. The study employed inferential statistics using Panel Least Square (PLS) regression analysis. Finding from the empirical analysis showed that VAIC has a significant and positive effect on sustainable growth rate (β_1 = 0.063268; p-value = 0.0000) of listed service firms in Nigeria at 5% level of significance. Conclusively, this study upholds that an increase in value-added intellectual coefficients exerted 6.33% increase on sustainable growth rate. It was recommended that strategic human resources policies must also be carefully formulated and properly implemented to x-ray the possibility of including human assets in the statement of financial position of corporate entities and to promote intellectual capital reporting

Key words: *Human Capital Efficiency, Structural Capital Efficiency, Sustainable Growth, Value Added Intellectual Coefficient.*

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INTRODUCTION

Intellelctual capital (IC) can be defined as the intangible assets that comprise of knowledge, experience, customer rapport and infrastructure that elevate the performance of organisation due to its ability to create value creation and competitive advantage (Amahalu & Eyide, 2026). IC is Value-Added Intellectual Coefficients (VAIC) that has been developed by Pulic (2000). With the gradual shift of global business world into the knowledge economy, it is becoming increasingly important and obvious to business organisations that to survive in business in this complex and dynamic world, adequate attention must be paid to the intellectual capital base of the firm (Amahalu, et.al., 2022; Sylvanus, et.al., 2021). Gone are the days when firms focus only on their physical capital with little or no attention to their intellectual capitals and still post huge profits. Competition in business today has become so intense that managers utilize every resource at their disposal to edge others out of business. Intellectual capital has

also become an important business resource that organisations can leverage on to gain competitive advantage (Eneh, et.al., 2023; Tom-West, et.al., 2023). The rise of the knowledge society can, however, be considered a quantum jump in a long history of development of human skills and know-how. Adam Smith, in The Wealth of Nations, underlined that improvement of workers' skills was a fundamental source of economic progress. He also stressed that investment in human capital and skills affects personal incomes and the structure of wages (Amahalu, et.al., 2025).

A sustainable growth rate is the maximum rate of growth a company can attain without borrowing internal revenue from outsiders (Amahalu & Nworie, 2026). Companies use their internal revenue to support their growth without taking on any extra debts or equity (Aruna, et.al., 2024). For many years, the main focus of any business is to achieve profit. Infact, profits have been considered as the key performance measure for any firm, even though firms may strive to continue, grow, and expand in the long term (Obumneme, et.al., 2026). The traditional accounting model, which is conceived for companies operating in an industrial economy, remains focused on physical and financial assets and ignores most IC assets (Eze,et.al., 2025). Interestingly, even the International Accounting Standards/International Financial Reporting Standards (IAS/IFRS), including the ones recently modified by the International Accounting Standards Board, did not contribute to redefining many of the concepts, principles and valuation methods of IC assets (Eyide & Amahalu, 2026). The IASB through IAS 38 on Intangible Assets and the subsequent IFRS 3 on Business combinations and IAS 36 on Impairment of Assets applied by IFRS adopting countries and the treatment of goodwill, research and development and other identifiable intangible assets all give credence to the need for incorporating Intellectual Capital in financial reporting (Ubeh, et.al., 2024). The relative lack of IC accounting recognition and its growing role in the value creation process, imply that financial statements have lost some of their value for shareholders and many other users (Isicheli, et.al., 2024).

The divergent views from the reviewed strands of literatures which ranged from positive to negative and to non-significant relationship between intellectual capital and performance led to a gap, in literature which this study sought to fill. The broad objective of this study is to evaluate the effect of value-added intellectual coefficients on sustainable growth rate of listed service firms in Nigeria.

Objectives

1. The study ascertains the extent of the effect of Value-added intellectual coefficients on sustainable growth rate of listed service firms in Nigeria

LITERATURE REVIEW

Value Added Intellectual Coefficient (VAIC™)

This method was developed by Ante Pulić, an Austrian researcher in 1998 at the Austrian Research Center of Intellectual Capital (Pulić, 1998, 2000). The important element of the VAIC™ method is the interpretation of income as the value added created by the company and as a result of its key resources. This value (including the efficiency of intellectual capital) is expressed in financial terms, which appear to be more objective due to their widespread use in traditional accounting systems (Amahalalu, et.al., 2016). The results should be seen in the context of a particular market or industry or the national economy, in which the firm operates. As a result, it is possible to determine whether the firm operates at a higher efficiency level or lower than the accepted average (Egolum, et.al., 2019). One of the criteria for the evaluation of activities of the company is the value added, for which intellectual capital is one of the factors determining its development.

Value Added Intellectual Coefficient (VAIC™) developed by Ante Pulic is an analytical tool for measuring the efficiency of intellectual capital within a company. It was designed to enable management, shareholders and other relevant stakeholders to efficiently monitor and evaluate the efficiency of firm's total resources and each major resource component. The model gives a new insight into how value creation efficiency in the company is measured and monitored using accounting based figures.

Sustainable Growth Rate (SGR)

The sustainable growth rate is the rate at which a business can grow without acquiring outside financing. Usually, when a business looks at growing a determination is made as to whether it is more advantageous to use debt or issue new equity. Typically, a business with a high sustainable growth rate is one that is maximizing sales efforts and/or generating high profit margins. It is also an indicator that the business is effectively managing its inventory, receivables, and payables. As time goes on and the business matures, the SGR usually declines as new market entrants begin to eat away at margins or diminishing demand drivers reduce the pricing power of the business (Nwankwo, et.al., 2024; Ezeokafor & Amahalu, 2019; Ndubuisi, & Obi, 2020).

SGR is often used to help shed light on whether a business is managing its operations efficiently. The reason for this is that the sustainable growth rate is driven by net income and net income can be increased or decreased depending on how efficient a business is operating. As businesses manage inventory and vendor payments more effectively, they can drive up profit margins, increasing their sustainable growth rate (Ndu, et.al., 2024; Amahalu & Obi, 2020).

Value Added Intellectual Coefficient and Sustainable Growth Rate

VAIC™ indicator is a performance measurement that is assumed to be able to meet the requirements of modern economy, measuring the effectiveness of key resources in the enterprise. The VAIC™ method relies on the concept of value added as the measure of performance, relative to intellectual capital (Ezennia & Amahalu, 2024; Okegbe, et.al., 2019). It consists of the sum of three component ratios, that is, human capital efficiency (HCE), structural capital efficiency (SCE), which embraces both internal and relational capital efficiency, and capital employed efficiency (CEE) which includes physical and financial capital efficiency (Amahalu, et.al., 2022).

Many researchers have adopted the VAIC™ model as a proxy of IC in analysing relationship between performance of IC and company's performance. Most of the studies found positive relationship between IC or some of its components and company's performance. For example, Ting, et,al., (2022); Vidyarthi (2019). However, not all studies support these results. Khurana, and Sharma (2024) found a significant negative association between human capital efficiency and company's performance. Additionally, Marzo and Bonnini, (2023) reported non-significant association between human capital efficiency and capital gains made by investors.

Theoretical Review

This study derives theoretical support from Resource Based View

Resource-Based View (RBV) Theory

The resource-based view (RBV) is a managerial framework used to determine the strategic resources a firm can exploit to achieve sustainable competitive advantage. The resource-based theory of the firm was propounded by Wernerfelt (1984) to address the limitations of environmental models of competitive advantage and attempts to provide a link between heterogeneous resources controlled by an organization, mobility of the resources within the particular industry and the strategic or competitive advantage enjoyed by an organization. The resource-based view (RBV) is a way of viewing the firm and in turn of approaching strategy.

Fundamentally, this theory formulates the firm to be a bundle of resources. It is these resources and the way that they are combined, which make firms different from one another. It is considered as taking an inside-out approach while analysing the firm.

Empirical Review

El-Madbouly (2025) examined the effect of the firm performance accounting indicators as leverage, liquidity, profitability, asset efficiency, and size on the sustainable growth rate. moreover, thie research also examined the effect of the sustainable growth rate on the value of firms listed in the Egyptian stock market. The research used a sample of Egyptian listed firms for 5 year's period starting from 2015 till 2019. The empirical results have found statistically significant positive relationships between the sustainability growth rate and the firm leverage, profitability, and firm asset efficiency. However, there was a statistically significant negative relationship between the sustainability growth rate and the size of the firm. Meanwhile, the relationship between the sustainability growth rate and the firm's liquidity is non-significant. In addition, the empirical results have found a statistically significant positive effect of the sustainability growth rate on the firm value for firms listed in the Egyptian stock market.

Ahmeti, Kalimashi, Ahmeti and Ahmeti (2024) identified the factors affecting the sustainable growth rate of companies over eleven years from 2011 to 2021. The research used panel regression analysis and examined a sample of 92 manufacturing companies operating in the market of Kosovo. The study used a pooled OLS regression model to investigate the variables affecting sustainable growth rate (SGR). According to the research, SGR has a negative significant impact on profitability (ROA), liquidity (LIQ), and equity ratio (TETA). However, there was a positively statistically significant relationship between SGR, asset efficiency (STA), capital structure (TDTE), and sales growth (SG).

Xu and Wang (2019) analyzed the relationship between intellectual capital (IC) and performance of the textile industry in China and South Korea during 2012–2017, and measured the contribution of IC sub-components to companies' performance. The fixed effect regression results showed that the aggregate IC positively affects earnings, profitability, and productivity of textile companies in China and South Korea. At the sub-components level, the contribution of capital employed effciency (CEE) is the largest, followed by structural capital efficiency (SCE), and relational capital efficiency (RCE) in China's textile industry. In addition, Korea's textile industry relies heavily on CEE and human capital efficiency (HCE), while the contribution of RCE is relatively small.

MATERIALS AND METHODS

The research design that was employed in this study is the *ex-post facto* research design. The population of this study consist of the eighty two (82) service firms listed on the Nigeria stock exchange as at 31st December, 2024 (See Appendix A).This study adopted purposive sampling technique. Fifty-one (51) firms were selected as the sample size (refer to appendix B). This study made use of secondary data precisely.

Independent Variables

VAIC - value added efficiency of tangible and intangible assets:

VAIC = CEE + HCE + SCE ……. Eqn 1.

Capital Employed Efficiency (CEE) measure the efficiency of Capital Employed (CE), where (CE) = book value of firm net assets.

CE = physical capital + financial assets

CE = Total assets – intangible assets

CEE = VA/CE ……. Eqn 2.

CE represents tangible resources while HC represents intangible resource (Pulic, 2000).

VA_{it} = $OUTPUT_{it}$ - $INPUT_{it}$

$Output_{it}$ is the total income generated by the firm from all products and services sold during the period t, and $input_{it}$ represents all the expenses incurred by the firm during the period t except cost of labour, tax, interest, dividends and depreciation.

Human Capital Efficiency (HCE). In VAIC model, HC is defined as salary and wages in a period (Pulic, 1998). Besides showing the firm size, high HC reflects higher employee skills that would add more value compared to employees with lower salary and wages. HCE shows the efficiency of HC usage in creating VA. If the human capital cost is low while VA is high then the firm uses its HC efficiently.

HCE = VA/HC ……. Eqn 3.

Structural Capital Efficiency (SCE). Structural capital (SC) includes strategy, organization network, patent, brand name. Internal structural capital is developed internally, consists of policy and process, work environment, innovation created by research and development. SC is measured using Pulic (1998)

SC = VA – HC ……. Eqn 4.

HC and SC are in reverse proportion, increasing HC will decrease SC. SCE is measured (Pulic, 1998):

SCE = SC/VA ……. Eqn 5.

Intellectual Capital Efficiency (ICE) is calculated:

ICE = HCE + SCE ……. Eqn 6.

Dependent Variable

SGR=ROE×(1-Dividend Payout Ratio)

Where,

SGR = Sustainable Growth Rate

ROE= Net Income ÷ Shareholder's Equity

Dividend Payout Ratio = Dividends Paid÷Net Income

Table 1: Variables Definition and Measurement Units

Variable Type	Proxy	Variable Symbols	Variables Explanation
Independent Variable)			
	Value Added Intellectual Coefficients	VAIC	CEE + HCE + SCE
Dependent Variable			
	Sustainable Growth Rate	SGR	ROE×(1-Dividend Payout Ratio)

Source: Authors' compilation (2026)

$SGR = f\ (VAIC) + \varepsilon$

$SGR_{it} = \beta_0 + \beta_1 VAIC_{it} + \varepsilon_{it}$ ……. Eqn 6.

Where:

ε_{it} is the error term capturing other explanatory variables of the firm not explicitly included in the model.

βo is the intercept of the regression.

SGR_{it} = Sustainable Growth Rate of firm í in period t

$VAIC_{it}$ = Value Added Intellectual Coefficient of firm í in period t

í = individual firms

t = time periods

RESULTS AND DISCUSSIONS

Test of Hypothesis

H_o: Value-added intellectual coefficients has no significant effect on sustainable growth rate of listed service firms in Nigeria

Table 3: Panel Least Square Regression Analysis testing the relationship between VAIC and SGR

Dependent Variable: SGR
Method: Panel Least Squares
Date: 03/03/26 Time: 11:52
Sample: 2015 2025
Periods included: 11
Cross-sections included: 51
Total panel (balanced) observations: 561

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.310543	0.009043	34.34028	0.0000
VAIC	0.063268	0.001723	36.71525	0.0000

R-squared	0.706871	Mean dependent var	0.574545
Adjusted R-squared	0.706346	S.D. dependent var	0.239697
S.E. of regression	0.129891	Akaike info criterion	-1.240681
Sum squared resid	9.431286	Schwarz criterion	-1.225246
Log likelihood	350.0111	Hannan-Quinn criter.	-1.234654
F-statistic	1348.009	Durbin-Watson stat	1.835779
Prob(F-statistic)	0.000000		

Source: E-Views 10.0 Regression Output, 2026

The panel least square regression model in table 3 indicates that:

SGR = 0.310543 + 0.063268VAIC

The regression model shows that there is a significant positive relationship between VAIC and SGR. The value of β_1 (VAIC) is 0.063268 which shows that 1% change in VAIC will cause a positive change in SGR by 6.33%. The R^2 is 0.706871 which shows that 70.69 % variation in SGR is explained by the explanatory variable (VAIC), while the remaining 29.31% variation in SGR is responsible by other factors outside the scope of this study model. Since, the value of Durbin Watson = 1.835779 is less than 2, this shows that the problem of auto-correlation does not exist in this model. Value of F-statistic equals 1348.009 with an associated P-value = 0.000000 shows that overall model is a good fit.

Decision: As the Probability F-value of the model = 0.000000 is significant at 5% level of significance. Thus, the study concludes that value-added intellectual coefficients has a significant and positive effect on sustainable growth rate of listed service firms in Nigeria at 5% level of significance.

CONCLUSION AND RECOMMENDATIONS

Based on the analysis of this study, the following findings were deduced:

i. Value-added intellectual coefficients has a significant and positive effect on sustainable growth rate of listed service firms in Nigeria at 5% level of significance ((β_1 = 0.063268; p-value = 0.0000).

As a result, the study recommends that:

i. Strategic human resources policies must also be carefully formulated and properly implemented to x-ray the possibility of including human assets in the statement of financial position of corporate entities and to promote intellectual capital reporting.

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