



Intellectual Capital Accounting and Financial Performance of Listed Manufacturing Firms in Nigeria

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DOI: <https://doi.org/10.55248/gengpi.2022.3.11.28>

ABSTRACT

The study examines the relationship between intellectual capital accounting and financial performance of listed manufacturing firms in Nigeria. The study analyzed intellectual capital accounting in the dimension of human capital efficiency, while financial performance was analyzed with return on capital employed and earnings per share. Ex-post facto research design was adopted for the study. The population of this study was listed manufacturing firms in Nigeria Stock Exchange from 2014 to 2018. The Pearson Product Moment Correlation Coefficient and multivariate regression were used for data analysis and the study concluded that Human capital efficiency significantly relates with return on capital employed and earning per shares of listed manufacturing firms in Nigeria. It was recommended that Nigerian manufacturing firms must develop strategies to adequately invest in different intellectual capital components.

Keywords: Intellectual Capital, Human Capital Efficiency, Structural Capital Efficiency

1. INTRODUCTION

The continued existence of any corporate entity in this ever dynamic and highly competitive business world is rooted on the robust and sound financial performance as it shows the financial health of the organization. Financial performance is the momentary measurement of policies and operations of firms at a given period of time (Gasperato, 2014). It is usually declared in the annual financial reports and presented to the stakeholders. The important is that financial performance is the life-blood and very crucial to any firm particularly manufacturing firms whose activities have been accorded global recognition and attention in recent time. The economies of both developed and developing countries of global business have tremendously advanced toward fostering accelerated economic growth, development and stability in recent time through manufacturing activities (Yitzhaki, 2016). Any nation with sustainable manufacturing sector plays incredible role in employment generation, provision of goods and services, creating a better standard of living, as well as immensely contributing to the gross domestic products of many countries. Prior to independence, agricultural products dominated Nigeria's economy and accounted for the major share of its foreign exchange earnings. Initially, lack of capital investment permitted only modest expansion of manufacturing activities (Ariyo, 2015). The key players in manufacturing activities are in the private sector. It is also important to note that the financial performance of the manufacturing firms in Nigeria has considerably shrunk and unimpressive leading to high mortality rate of these firms. It is plausible that the untimely collapsed of manufacturing firms has inclined and tilting to the sensitivity of the knowledge-based economy of the global business driving by the forces of intellectual capital as a critical asset which propels the fortune of the entity.

Every business organization requires resources in the form of physical, financial and intangible assets. Lack of, or inadequate resources of any kind may place a firm in a vulnerable position, and might undermine its success. With increase in interest on knowledge based assets which serves as a key factor affecting companies growth in this modern economy, more attention has been placed on the importance of intellectual capital (IC). Companies that make use of new knowledge, technologies, innovation, skills, personnel experience and organizational structure tend to gain more competitive advantage and value creation. Intellectual capital when combined with tangible assets in manufacturing and production companies sharpens competitive advantage. It also helps in providing accurate, timely, and understandable information to motivate the lean transformation throughout the organization, and for decision-making leading to increased customer value, growth, profitability, and cash flow (Beredugo & Mefor, 2012).

Bornemann, (1999) found that firms, that managed their intellectual capital better, had achieved stronger competitive edge than the general firms. Smith, (2015) defined Intellectual capital as combination of the Intellectual property (IP) held by a business and the people in that business that can exploit and increase it. The term became more widely known in the context of assessing the wealth of organizations. Paolo, (2012) classified intellectual capital as follows: Human capital, structural capital and relational capital. Human capital is the value that the employees of a business provide through-the use of skills, know-how and expertise. Human capital is an organization's combined human capability for solving business problems and exploiting its Intellectual Property (Padrini, 2017); Structural capital, non-physical

assets, processes and databases of the organization that enable human capital to perform. Structural capital incorporates procedures, licenses, and trademarks, just as the organization's picture, organization, data framework, and restrictive programming and databases and relational capital, comprising of such components as customer relationships; supplier relationships (Edvinsson, & Malone 2017); trademarks and trade names (which have value only by virtue of customer relationships) licenses, and franchises. The notion that customer capital is separate from human and structural capital indicates its key importance to an organization's worth Levey&Wrape (2017). Similarly, Pablos (2020), asserts that with the initiation of knowledge-based economy, the traditional bases sources of competitive advantage that depend on tangible assets in creating firm value and sustaining competitive advantage begun to erode. Furthermore Santos, (2011) added that, Physical and financial capitals and production facilities are no longer factors that generate sustainable competitive advantage. Intangible assets especially knowledge is gaining a noticeable attention unlike before in achieving competitive advantage for the firm to compete advantageously. Thus, organizations and governments are focusing on intangibles as differentiators for the sustainable competitive advantage of both businesses and nations. Though organizations and governments have begun to see that intellectual capital is a critical factor in generating a sustainable competitive advantage in recent years, intellectual capital has not been widely explored (Pedrini, 2017). The global economy has brought focus to the regional aspects of economic growth and has changed the perspective of economic growth from production (output) aspects to resource (input) aspects, as production has become more knowledge-based (Bontis, 2014). Stahle&.Bounfour, (2018) stated that, in developing economies, IC components can function as pillars that support economic growth and additional efforts to increase intellectual capital levels affect the economy positively. Despite the crucial role of the manufacturing sector in development, Nigeria is Still backward as indicated by the several declines of the manufacturing sector contribution to the real GDP, also from the financial reports of some manufacturing firms. With this, there seem to be weakness in overall financial performance of manufacturing companies in Nigeria which has resulted in low ROCE and EPS. The weakness was as a result of inadequate recognition and reporting of intellectual capital by manufacturing firms. It is on this background that this study examined the relationship between intellectual capital accounting and financial performance of quoted manufacturing companies in Nigeria.

1.1 Objectives of the Study

This study broadly investigated the relationship between intellectual capital accounting and financial performance of listed manufacturing firms in Nigeria. The specific objectives include;

- i. to assess the relationship between human capital efficiency and return on capital employed of the listed manufacturing companies in Nigeria.
- ii. To evaluate the relationship between human capital efficiency and earnings per share of the listed manufacturing companies in Nigeria.

In line with the focus of the research objectives, the following hypotheses were formulated.

HO₁. There is no significant relationship between human capital efficiency and return on capital employed of listed manufacturing companies in Nigeria.

HO₂. Human capital efficiency has no significant relationship with earnings per share of listed manufacturing companies in Nigeria.

2. Review of Related Literature

This study interest, is relating intellectual capital and financial performance. It requires a revisit of various theories that will buttress the research constructs. The theory that underpins this study includes knowledge-based theory. Knowledge Base theory originates from the strategic management literature, this perspective builds upon and extends the resource-based view of the firm (RBV) first advanced by Penrose (1959) and later extended by others (Barney 1991, in Conner 2019). The knowledge-based theory of the firm considers knowledge as the most significant resource of a firm Njuguna, (2014). Its academicians contend that since knowledge-based resources are usually difficult to mimic and socially mind boggling, heterogeneous knowledge bases and capabilities among firms are the major determinants of sustained competitive edge and superior corporate performance (Award, 2017). This knowledge is inserted and help through multiple entities including organizational culture and identity, policies, routines, documents, systems, and employees. Though, the resource-based view of the firm recognizes the key role of knowledge in firms that achieve a competitive edge, exponents of the knowledge-based view argue that the resource-based perspective does not go far enough. Information technologies play a vital role in the knowledge-based view of the firm in that information systems can be used to synthesize, enhance, and expedite large-scale intra- and inter-firm knowledge management (Alavi, 2011).

2.1 Intellectual Capital

Intellectual capital is as old as man. Nevertheless, Ofurum and Aliyu (2018) opined that it has basically gained recognition as an important asset in the last few decades. Galbraith (2016) defined intellectual capital as a form of knowledge, intellect, brain activity which uses knowledge as a source of value creation. Stewart (2017) described intellectual capital as the total supplies of the aggregate information, development, innovations, protected innovation rights, understanding, association learning and fitness, group correspondence frameworks, client relations, brands that are able to create values for a firm. Also, Sudarsanan, Sorwar and Marr (2013) considered intellectual capital as the group of resources that are credited to an organization and fundamentally contribute to an improved competitive level of this organization by adding value to defined partners. Roos and Roos (2017) define intellectual capital as the hidden assets of the company not fully captured on the statement of financial position such as the intangibles assets, patents, intellectual property rights, copyrights and

franchises. (Holland 2016, Lovingsson 2017) defined intellectual capital as a residual being the difference between book value of the firm and its market value. Similarly, intellectual capital was also defined as a set of intangibles (resources, skills, abilities capabilities, and competencies) that drives business performance and value creation (Bontis, 2018). Other early writers on intellectual capital use management processes terms as their approach to defining the construct. Intellectual capital represents knowledge transformed to something of value to the organization. Booth (2018) contends that intellectual capital is the ability to translate new ideas into products or services and it comprises people related assets, non-people related (market assets) and internal assets. It can be argued, therefore, that intellectual capital represents an intangible resource that has created or acquired by the firm and can be used to provide future economic benefits to the entity. Sveiby (2017) classifies the intellectual capital into three major components: Human Capital, Structural Capital, and Relational Capital.

2.1.1. Human Capital: Human Capital comprises of the skills, competencies and abilities of individuals and group. Human Capital is interpreted as employee values creating potentials depicted in knowledge, competencies, skills, experiences, abilities and talents of firm's employees and managers. Human capital captures knowledge, professional skills, experience and innovativeness employees within an organization, (Boujelbene & Affes 2013). According to Rastogi (2010) the idea and point of view of human capital stems from the way is not a viable alternative for information and learning, inventiveness and abilities and capacities and that they should be determinedly sought after and on the company's ecological setting -and competitive logic. Nielson, Bukh, and Gormsen (2016) submit that human resources capital is the core of IC components and include skilled staff, knowledge and management philosophy the company's performance affected.

2.1.2. Structural Capital: This is the supportive infrastructure that empowers human capital to function in an organization. Structural capital is possessed by an organization and stay with it even when the worker leaves the organization. (Edvinsson & Malone (2017) further gap structural capital into organizational capital, Process or procedure capital and Advancement capital. Structural capital comprises of trademarks, licenses, patents, the executive's style, organization notoriety, picture, corporate culture, organizing, reputation, image, networking, mission, vision. It is the contrast between non-thinking and thinking assets that utilization altogether different administration techniques, for example, culture, authoritative procedures, innovation, absorptive limit and data frameworks to accomplish corporate objectives (Namvar, Fathian, Gholamin, and Akhavan, 2011).

2.1.3 Relational Capital: It represents the potential an organization has due to ex-firm intangibles (Bontis, 2019) and defines the value of relationships with suppliers, allies and customers are classified into the forms of brand equity and customer loyalty (Stewart, 2019). He submits that brand equity defines a promise of quality for which a customer agrees to pay a premium price and the value of brands is measurable in financial terms while the customer loyalty accounts for a base of customers that is measurable and depicted in a premium price. It is the knowledge inserted in relationships with customers, suppliers, industry partners or any other stakeholder that influence the organization's life (Edvinsson and Malone, 2017).

2.2 Measurement of Intellectual Capital

Measurement of intellectual capital has become a critical factor for understanding and unleashing the real advantages of intangibles, knowledge and intellectual assets. Despite the increasing recognition of intellectual capital in driving firm value and competitive advantages, there is no one acceptable measure of IC. In traditional accounting measures, assets refer mainly to financial and physical capital Edvinsson and Malone, (2017). IC measurement Covers important non-financial contents such as customer satisfaction, innovation and human capital. There is significant difference between the two approaches: IC measurement looks to the future while financial accounting looks backwards (Sveiby, 2017). However, Bontis (2011) more in-depth views, is that IC is a vital resource for strategic marketing and business management and its quantification has great benefit as an internal management tool rather than an external communication to investors. As indicated by Goh (2015), the following are approaches of measuring intellectual capital. To name a few;

- 1.2.1. **Market to Book Value Method:** This links the market price of a company to its book value. It is the intrinsic value of an organization inclusive of tangible assets and intellectual capital. This method is a simple measure that treats the overall intellectual assets of an organization as a single asset. "This method suffers from a few disadvantages because of its flawed assumption (i) That there is no mispricing in capital markets and (ii) that balance sheet historical value of assets proxy for their current values (Goh, 2015)." Another drawback of this measure is it does not segregate intellectual capital into its different components. Since this method is based on market valuations, it values a business on a going concern basis. Whereas accounting practices provide for differential guidelines for valuation of different categories of assets. "This prevents comparison of intellectual capital across different industries and countries due to underlying differences in accounting practices.
- 1.2.2. **Norton Balanced Score Card (BSC)** The Balanced Score Card (BSC) is premised on the concept that a business strategy can be viewed as a set of hypotheses about cause-and-effect relationships. The Balanced Scorecard gathers the aftereffects of human action over the long run and communicates them as both inner and outside measures (Effiong & Beredugo, 2015). The BSC also monitors the progress in the building of the capabilities and acquiring of intangible assets for future growth (Kaplan & Norton, 2016). According to Kaplan & Norton (2016), the BSC was developed out of the recognition that the ability of a company to mobilize and exploit its intangible assets has become far more decisive than investing and managing physical or tangible assets. Empirically, it has been argued that the validity of the balanced score card claim to be a causal model of financial performance has a mixed empirical support in literature. This lack of empirical support seems to emanate from the difficulty in isolating financial performance as a result of management's strategy selection ability and management's ability to select the appropriate performance measures for a given strategy.
- 1.2.3. **Calculated Intangible Value (CIP):** This approach was conceptualized by Stewart (2019) and is based on computation of super profits for valuation of a company. It is based on the assumption that a company can only earn average returns based on the

physical capital employed in the business. If anything over and above this average return is earned it has to be contributed to the firm's intellectual capital. Estimation of CIV involves the following steps: Calculate company's pre-tax profit earnings for the past three years: Compute the average value of firm's tangible assets from year end balance sheets for last three: Calculate the ROA for three years by dividing the pre-tax profits with the average value of. Similarly compute the industry average and if the company average is higher than industry average then go to the next step. Compute the supernormal profits for the firm. First multiply industry average of ROA by firm's tangible assets. Then subtract it from firm's average pre-tax earnings: Calculate the company's after-tax excess return: Compute the net present value of the after-tax excess return using cost of capital as a discounting factor. The advantages of this approach are that, it is simple to understand and easy to compute because of readily available data from financial reports of companies. It also facilitates intra-firm as well as inter firm comparison and can information reported can be used by external stakeholders for sound decision-making. But a major drawback of this approach is that it is based on averages. Also, the method does not differentiate between physical capital and financial capital and as such fails to identify the individual components of intellectual capital.

- 1.2.4. **Market Value Added and Economic Value-Added** Market Value Added (MVA) reflects how much wealth a company has generated for its shareholders. It is computed by finding out the excess of a company's market capitalization over the total common shareholder equity. Economic Value Added (EVA), on the other hand is a measure of firm's economic profits being the residual wealth calculated by deducting the cost of capital from its operating profit. EVA is an important indicator of a company's growth and helps in identifying opportunities in an organization. It also helps in setting organizational goals, capital budgeting, motivating employees, corporate valuation etc. While MVA is used as a wealth metric, EVA is more commonly used as a performance metric. As such both the models suffer from the inherent weakness that they do not have a specific measure of intellectual capital.
- 1.2.5. **Skandia Navigator** Skandia Navigator is a non-monetary measure of the knowledge resources of a company and was devised in 2017 by Leif Edvinsson, corporate director of intellectual capital at Skandia, a Swedish Financial Services Company. The model is based on four strategic dimensions of a business- financial focus, customer focus, process focus and renewal and developmental focus. At the centre is the human focus, on the basis of which the entire model is driven. "According to Edvinsson, navigator can be viewed as a house. The financial focus is the roof. The customer focus and the process focus are the walls. The human centre is the spirit of the house. The recharging and improvement centre is the stage. With such a metaphor, the renewal and development focus become the critical bottom line for sustainability." These five focuses give rise to crucial success factors that can be used to measure change in quantitative terms. The financial focus indicators are primarily measured in monetary terms. Customer focus is based on a monetary or a non-monetary assessment of value of customer capital to the organisation. process focus lays emphasis on effective deployment of technology in the organization and measuring the same in terms of product quality as well as management quality. Renewal and development focus relates to innovation and up gradation based on investments in R & D and new technologies. Human focus, which is the key resource of any organisation, measures the human capital and its effectiveness in achieving strategic goals of a business. Reviewing the strengths and weaknesses of the navigator model, Bontis, (2014) observed that, Skandia's considerable efforts to create taxonomy to measure a company's intangible assets have emboldened others to look beyond traditional assumptions of what creates value for organizations. Skandia's model is particularly impressive in recognizing the value of customer capital in creating value for an organisation and how the very nature of has customer relationships has changed. At the same time, amongst its weaknesses, it is observed that Skandia assigns no dollar value to its intellectual capital but uses proxy measures of intellectual capital to track trends in the assumed value added. Also, the navigator model cannot be used as a generic standard for measuring intellectual capital among companies or across industries as the underlying metrics of the model might have different interpretations for different companies. Lastly, it has been emphasized that as Skandia follows a statement of financial position approach when measuring its intangible assets, it offers only a snapshot in time and cannot represent flows of an organization.
- 1.2.6. **Tobin's Q Ratio** James Tobin's Q ratio measures the aftereffect of human action over the long haul as communicated in the market value of a firm. The Q ratio can be regarded as the value of capital Comparative with its substitution cost. (That is, market value of equity and liabilities divided by the estimated replacement cost of assets). In evaluating Tobin's Q ratio, a positive ratio can be ascribed to the intangible value of intellectual capital Stewart (2017) opined that where Q proportion is more prominent than 1, organizations are probably going to put resources into comparable resources that are worth more than their substitution cost however where Q proportion is under 1, a benefit is said to be worth not exactly the expense of supplanting it. Bontis, (2014) argues that measurements, such as Tobin's Q distort the valuation of the modern knowledge-intensive organizations which rely on human capital and intellectual property and their noneconomic assets. It is further argued that better governance improves a firm's performance, whereas a better firm performance does not increase Tobin's Q. This is based on the framework that a firm's operating efficiency is obtained on revenue-based measures that assess managerial decisions in respect of a firm's output and its cost-based measures for assessing the level of its cost management.

2.3 Financial performance

Firm performance can be measured through different tools based on financial and non-financial viewpoints. Resources allocation processes can be well managed and distributed to appropriate channels with the aid of performance measurement tools. Chen (2015) for the most part, established that numerous performance measures have been based around financial aspects, discarding significant non-financial angles

including the importance of dynamic capability through accumulating marketing capability as well as research and development over time, to additionally enhance firm performance (Hsu & Wang, 2010). Other than that, the assessment of the performance of banks, for instance, usually employs financial indices, providing a simple description about the bank's financial performance in comparison to previous periods (Chen, 2015). By concentrating only on financial aspects, however, is not enough for executives to deal with the changing business condition. Performance can be measured by utilizing various techniques such as accounting based technique, which comprises of Return on Asset (ROA), EPS, ROCE and Return on Equity (ROE). In other examination by Pandya and Rao (2018), indicates that management scholars would prefer to use different accounting-based estimation to measure business performance. Most regular variables are ROA and ROE. This is positively valid as Paolo, (2012) in their underlying investigation, evaluated several alternatives by gathering data on Return on Assets (ROA), Return on Equity (ROE), and Return on Investment (ROI). Return on Capital Employed (ROCE). Return on capital employed is a measure of profitability which represents the earnings relative to the financial and physical capital invested in the organisation. It is calculated as Profit before tax (PBT) divided by Capital employed. Return on capital employed (de Pablos, 2020 & Bontis, 2014; Pandey, 2010) can also be referred to as Return on Assets (ROA). Thus, in calculating the ROCE, two key measurement factors stand out, namely: (i) Profit before Tax (PBT). This is the net profit of the organisation before interest and tax. It may also be referred to as earnings before interest and tax (EBIT). In effect, this is the return that the company has made in relation to its operations for the period under review. (ii) Capital Employed (CE) represents the amount of funds used by the company for the generation of wealth. In practical terms, capital employed should be equivalent to the net assets or total assets less current liabilities. (ii) Earnings per share (EPS) This is the proportion of the earnings which is attributable to one unit of the share invested in the business by a shareholder. It is determined as total earnings after tax divided by the number of ordinary shares. Though this ratio does not reflect how much dividend is paid or how much is retained in the business, (Pandey, 2010), it is yet a widely used investment-earnings analysis for the stakeholders. The preference over the use of earnings per share, over dividend per share is to articulate the real earnings per share irrespective of whether dividend is paid out or not. (Deberg & Murdock, 2014). Where such incomes are not delivered out as dividends, they are held for future extension and development of the business for all stakeholders.

2.4 Intellectual capital and Financial Performance

Value added intellectual capital (VAIC) is a logical methodology designed to enable board, investors and other relevant stakeholders to effectively monitor and evaluate the efficiency of Value Added (VA) by a firm's total resources and each major resource component (Kurfi, 2017). Past research on intellectual capital has utilized Value Added Intellectual Coefficient (VAIC) as measurement of Intellectual Capital performance, it turns out with an outcome that shows the Value-Added Intellectual Coefficient (VAIC) theory as the approach to measure how much and how efficiently IC and capital employed create value based on the relationship of three significant segments: (1) capital employed; (2) human capital; and (3) structural capital. Furthermore, Ulum, (2014) analysed MVAIC to measure the performance of Indonesian banks and the outcome proved that MVAIC is a comprehensive model for measuring intellectual capital performance. The study by Maji and Goswami (2017) showed that MVAIC model to some extent captures the structural capital efficiency (SCE) of a firm more efficiently than the original model (VAIC) as the study aimed to investigate the modified Pulic's Value Added Intellectual Coefficient (MVAIC), which includes human capital (HC), structural capital (SC) relational capital and physical capital (CA) as the efficiency measure of capital employed and intellectual capital and their impact on firms' financial performance.

2.4.1. Human capital and financial performance

Financial performance in relation to HC implies outstanding activities or accomplishments which accrue to an enterprise as a result of HC measurement and application (Anuonye, 2015). The traditional monetary bookkeeping is unable to look at the real value of the firm where it only measures physical resources (Lina, 2014). Prior studies keep up that HC makes value for the organization (Fathi, 2013). For instance, the investigation of Gan and Saleh (2018) examined the relationship in the middle of HC and firm execution, and they found that HC significantly affected profitability and productivity of the firm. In the same vein, the study of Almusali and Ismail (2014) proved an HC and its consequence on financial performance of Saudi Arabian banks where they revealed that HC was positively connected with banks' financial performance. Additionally, Chen. (2005) found that HC had a significant influence on profitability.

2.4.2. Capital employed and financial performance

Capital utilized is viewed as the most grounded indicator of execution (Choudhury, 2010). Accordingly, Lina (2014) opined that a solid linkage between capital utilized backings that information tied up in relationship among representatives, customers, suppliers, cooperation accomplices and so forth tends to brief process and make improvements, better basic reasoning which will in general increment age and organization transport viability and also consumer loyalty (Appahmi and Bhuyan (2015) additionally settled a positive connection between capital employed and capital gains on portions of recorded organizations in Thailand securities exchange. Also, Khalique, (2016) conducted a research on the relationship of IC with the organizational performance of commercial banks in Islamabad, Pakistan. The results showed that capital employed has positive relationship with organizational performance, in fact numerous examinations found the relationship between capital employed and business performance positive, but the result is mixed and uncertain. This part of IC despite everything makes up a sensible linkage with business performance

2.5 Empirical Review

Onyekwelu (2016) studied the effect of Intellectual Capital on valuation of firms in Nigeria. The study was a panel study using time series

and cross-sectional data. The study covered ten years, Twenty one firms cutting across seven economic sectors in Nigeria Analysis was done using multiple regression tools. The study indicates that HCE had positive and significant effect on firm in Nigeria. SCE showed negative and no significant relationship while CEE has positive and insignificant effect on variables used in measuring corporate values.

Epetimehin and Eklundayo (2011) observe that intellectual capital as a vital corporate asset, will get away unless companies do something to stop the brain drain and to retain critical knowledge They opined that the survival of the insurance companies in Nigerian is dependent upon the resolve of the workforce to eliminate unethical practices which are resorted to avoiding liability under insurance policies; While Ekwe, (2013) discovered statistically strong relationship between the components of intellectual capital and market to book value M/BV ratio of banks quoted on Nigeria Stock Exchange Ekwe (2013) investigated the relationship between the IC indices (HSE, SCE and CEE) and growth in revenue of selected banks using VAIC The study adopted the ex-post facto research design and systematically conducted using longitudinal time series data generated and computed from the annual reports and accounts of the selected banks in Nigeria spanning from year 2000 to 2011. The multiple regression analysis results indicated that there was significant positive relationship between components of VAIC and the growth in revenue of the banks in Nigeria Issa and Ukoha (2017) examined the relationship between human capital development and corporate performance was investigated using Spearman's Rank Order Correlation Coefficient and using organizational culture as the moderating variable in food and beverages firms in Port Harcourt. The results of the analysis revealed that there were strong correlation between the dimensions of human capital development and the measures of corporate performance. Consequently, the study recommends the following: certain measures of skills development be allowed the employee with regards his or her role expectations as this has been revealed to facilitate increased responsibility and accountability, hence a decrease in blame shifts in the case of poor outcomes, The trust development is structured in a manner that enables adequate knowledge transfer with enhanced sharing of information between organizational groups and between employers and employees, this is as effective communication and transfer of information within the organization is shown to further equip the employees with the required tools and techniques for effectively carrying out his or her expectations at the workplace

Oforum and Aliyu (2018) empirically examined the relationship between intellectual capital and financial performance of quoted banks in Nigeria. The study adopted ex-post facto research design. Data used in the study were collected from the published annual financial statements of fifteen (15) commercial banks' websites and the Nigeria Stock Exchange as at December 31, 2016. Using a modified, (public,2020) VAIC Model and the findings of this study revealed mixed results as some elements of Intellectual Capital were not significantly related to revenue growth and return on investment. It further depicted that Human Capital Efficiency Index significantly related to return on investment. This study concluded that intellectual capital has not fully related to the financial performance of quoted commercial banks in Nigeria. It is recommended that International Accounting Standards Board (IASBs) should incorporate intellectual capital elements in standards as capital investments instead of being merely expensed in income statement.

Asadi (2012) examines the connection between intellectual capital and value creation criteria of 59 companies listed in Tehran Stock Exchange for a period of five years. The results indicate that there are significant relationships between the independent variables of intellectual capital and dependent variables of economic value added, cash value added, market value added, and refined economic value added. Lina (2014) associated the IC components towards company performance, where the listed companies in Indonesian Stock Exchange were examined between the periods of 2009 to 2011 Result indicated that HC and SC had no impacts towards firm performance while CE had a significant relationship with firm performance. As indicated by Bornemanne,(2019) firms, which are able to manage their intellectual capital will achieve stronger competitive advantage than other competing enterprises Brennem and Connell (2018) guarantee that management of intellectual capital plays a vital role in achieving long-run business performance of an enterprise's The empirical works related to this study are reviewed based on the objectives of the study, by employing the Value Added Intellectual Coefficient (VAIC) technique reviewing the intellectual capital components, he suggests measure that are of importance for improving a firm's efficiency and resources in the United Kingdom

Isanzua, (2015), investigated the intellectual capital of banks operating in Tanzania, for the period of four years from 2010 to 2013 Annual reports have been used to obtain the data on VAIC in determining intellectual capital and its three major components like HCE, SCE and CEE The results revealed that Intellectual capital has a positive relationship with financial performance of Tanzanian banks and also when the VAIC was divided into its three components it was discovered that the financial performance is positively related to Human capital efficiency and Capital employed efficiency but is negatively related to structural capital efficiency.

Avci and Nassa (2017) investigated the relationship between intellectual capital and financial performance of financial companies listed in Borsa Istanbul, using data of 44 listed companies over 2004-2015 VAIC method is used as a measure of IC: An OLS regression is utilized to examine the impact of IC, HCE, SCE, and CEE on market performance, financial performance, and productivity performance The outcomes show that HCE has a positive significant connection with ROA. SCE show a positive significant relation ROE and a negative significant association with market to book ratio. Regarding to CEE, the results show that it has only a positive significant impact on market to book ratio and a negative significant influence on asset turnover ratio. Berzklane and Zelgalve (2014) using the same model avers a statistically significant and positive relationship between IC and company value for companies in Latvia and Lithuania whereas such correlation were not observed for companies in Estonia. Banimahd, Mohammadrezaei and Mohammadrezaei, (2012) suggests, IC indicators has significant and positive relations with accounting based performance indicators such as profitability and productivity indicating that profitability and productivity have significant and positive relations with all other independent variables (firm size, leverage ratio and physical capital

intensity) while market value has a relationship with firm's size. It also reveals no relationship between market valuation and IC. Njuguna, (2014) aimed to determine how intellectual capital affects the financial performance of Kenyan state corporations. The study adopted a descriptive research design used primary data which was collected through self-administered questionnaires and employed a multiple regression analysis technique. The findings of the study indicate that the company culture which contains valuable practices of conducting business is the major benefit resulting from organizational intellectual capital. The findings also indicated that employees being very highly skilled in their jobs as the major way of human capital to improve the firm's performance.

3. METHODOLOGY

The research design is ex-post facto. In this research, most of the data used were obtained from already published financial reports of the sampled manufacturing companies. These documents included annual reports and accounts, NBS reports; CBN bulleting and facts book from the Nigerian Stock Exchange (NSE), newspaper reports, internet reports as well as other relevant financial and business publications. The data gathered from these reports reflect the historical performances of the companies under study. Accordingly, the cause-and-effect relationship between dependent variables (financial performance measured by (ROCE and EPS) and independent variables, intellectual capital accounting proxy by human capital efficiency (HCE), structural capital efficiency (SCE), relational capital efficiency (RCE) and capital employed efficiency (CEE) was examined. The study involves a test of relationship, the Pearson's product moment correlation (PPMC) and multiple regression technique is adopted to test both relationship variables and the level of influence the independent variables wield on dependent variables. The Statistics Package for Social Sciences (SPSS) 25 for windows is the statistical computer software used to run the analysis of the cross-sectional data of this study

$$Y = a + B_1X_1 + B_2X_2 + \dots + B_nX_n + E$$

Where:

Y	=	the dependent or outcome variable
X ₁ , X ₂ X _n	=	set of independent variables or predictors
a	=	constant term
B ₁ , B ₂ , B _n	=	coefficients of the predictor variables and
e	=	the error term

This study adopted the econometric model as put forward by Roychowdhury (2016), Cheng and Warfield (2015); and Yusuf and Abubakar, (2017). Therefore, for the purpose of this study we postulate that financial performance is a function of intellectual capital. Thus, the following regression equations are the functional form of our model as given as follows:

Functional form of the model:

$$\text{ROCE} = f(\text{HCE}, \text{SCE}, \text{RCE}, \text{CEE}) \dots \dots \dots (2)$$

$$\text{EPS} = f(\text{HCE}, \text{SCE}, \text{RCE}, \text{CEE}) \dots \dots \dots (3)$$

Where,

ROCE = Return on Capital Employed and EPS Earnings per Share respectively.

HCE, SCE, RCE, CEE = human capital efficiency, structural capital efficiency relational capital efficiency and capital employed efficiency respectively

Mathematical form of the model

$$\text{ROCE} = a_0 + a_1\text{HCE} + a_2\text{SCE} + a_3\text{RCE} + a_4\text{CEE} \dots \dots \dots (4)$$

$$\text{EPS} = B_0 + B_1\text{HCE} + B_2\text{SCE} + B_3\text{RCE} + B_4\text{CEE} \dots \dots \dots (5)$$

The above equations are trans-modified into econometrics form by adding constant terms (a₀, B₀) and error terms (E, u) in the model below:

Econometrics form of the Model

$$\text{ROCE} = a_0 + a_1\text{HCE} + a_2\text{SCE} + a_3\text{RCE} + a_4\text{CEE} + E \dots \dots \dots (6)$$

$$\text{EPS} = B_0 + B_1\text{HCE} + B_2\text{SCE} + B_3\text{RCE} + B_4\text{CEE} + u \dots \dots \dots (7)$$

Where

HCE	=	Human capital efficiency
SCE	=	Structural capital efficiency
RCE	=	Relational capital efficiency
CEE	=	Capital employed efficiency
ROCE	=	Return on capital employed
EPS	=	Earnings per share
a ₀ B ₀	=	Constants
a ₁₋₄ , B ₁₋₄	=	Coefficient of the predictor variables
e, u	=	error terms

4. DATA PRESENTATION

Descriptive statistics

The table below presents the descriptive statistics results with the minimum, maximum, mean and the standard deviation of variables used in our statistical models.

Descriptive Statistics Results

	Minimum	Maximum	Mean	Std. Deviation
HCE	1.14	6.01	2.7100	1.55667
SCE	7.52	35.14	15.4620	7.71866
RCE	1.66	4.28	3.0300	1.75323
CEE	4.48	35.79	12.4360	9.61035
ROCE	.29	3.73	1.5690	1.03328
EPS	1.47	8.44	4.4230	2.75920

Source: Authors' Desk, 2022 SPSS 25

Extract of Correlation Matrix Results

		HCE	SCE	RCE	CEE	ROCE	EPS
HCE	Pearson correlation	1					
	Sig. (2-tailed)						
SCE	Pearson correlation	.608	1				
	Sig. (2-tailed)	.062					
RCE	Pearson correlation	.630	.876	1			
	Sig. (2-tailed)	.051	.001				
CEE	Pearson correlation	.463	.904	.753	1		
	Sig. (2-tailed)	.178	.000	.012			
ROCE	Pearson correlation	.659	.099	.028	.162	1	
	Sig. (2-tailed)	.038	.786	.939	.656		
EPS	Pearson correlation	.076	.241	.161	.353	.176	1
	Sig. (2-tailed)	.834	.502	.656	.344	.626	

Correlation is significant at the 0.05 level (2-tailed).

Correlation is significant at the 0.01 level (2-tailed).

Source: Authors Desk, 2022 via SPSS 25

The results shown that HCE positively and negatively related with ROCE and EPS as flagged by the coefficients 0.659 & -0.076 respectively. This means that intellectual capital accounting of manufacturing firms strongly improves and nosedive the level EPS respectively. Conversely, fraily depicted very negative positive relationship with and EPS highlighted by coefficients of -0.099&-0.241 respectively. RCE depicted very positive and negative relationship ROCE EPS highlighted the coefficients of 0.028&-0.161 respectively. This implies that intellectual capital accounting of listed manufacturing firms Nigeria show substantial relationship thinly improves and decreases and EPS respectively. Similarly, CEE demonstrated negative and positive and with coefficients -0.162 0.335 respectively. This suggests that intellectual capital in Nigeria decreases ROCE enhances the level EPS.

Regression

This research work, further conducted a multivariate regression analysis to determine the actual nature relationship between the predictor and criterion variables of the study. The findings are presented below.

Extract of the Regression Results of Model 1

Table 16: EPS $a_0 + a_1HCE + a_2SCE + a_3RCE + a_4CEE + E$

Variables	Standardized Coefficient		
	B	t-statistic	P-value
HCE	1.158	4.155	0.005
SCE	-0.987	2.947	0.026
RCE	0.037	0.094	0.001
CEE	0.167	4.056	0.007

R2 = 0.834Adj R2 = 0.702

F = 6.294 (0.034)

Significant at 5% (0.05) level of significance

Source: Authors Desk, 2022 via SPSS 25

The result of the multivariate regression is presented in table 15 of model 1 and appendix helps to explain the empirical statistical relationship between the dependent variable (return on capital employed) and the independent variables. The explanatory power R^2 of the regression model shows that HCE, SCE and CEE revealed strong ability to predict financial performance proxy - return on capital employed as they accounted for about 83.4% of the cross-sectional variations in the dependent variable of ROCE. This implies that the remaining 16.6% variation in ROCE cannot be explained because it may be related to other variables which are not depicted in this model. The implication is that there may be number of variables which can have impacts on financial performance of listed manufacturing firms in Nigeria that needs to be studied. The Adjusted R Square (adj. R^2) is another important factor in regression analysis. Adjusted R^2 tells how well the data points fit a regression line showing the percentage of variation explained only by the independent variables that actually affect the dependent variable. A value of 0.702 in this study indicates true 70.2% of variation in the outcome variable is explained by the predictors in the model. The F-ratio in the ANOVA tests whether the overall regression model is a good fit for the data. The table shows that the independent variables proxies statistically and significantly predict the dependent variable, $F = 6.294$, $p(0.034) < 0.05$ (i.e., the regression model is a good fit of the data). Specifically speaking, model 1 equally conveys the analysis results of hypotheses 1, and 2 of this study as represented and discussed below:

HO1: There is no significant relationship between human capital efficiency and return on capital employed of listed manufacturing firms in Nigeria.

Table of model 1 showcases that HCE with (B 1.158 & $P=0.005$) positively related with ROCE. This means that a unit change in the human capital efficiency would increase ROCE by about 1.158 of the listed manufacturing firms. Interestingly, the p value of 0.005 is less than 0.05% standard alpha value. Therefore, the null hypothesis was rejected and on the basis of this, the study concluded that HCE significantly relates to ROCE of listed manufacturing firms in Nigeria in the period of this study.

HO2: There is no significant relationship between human capital efficiency and earning per share of listed manufacturing firms in Nigeria.

Similarly, model 1 shows that HCE with (B=-0.987 & $P=0.026$) negatively relates with EPS. This suggests that a unit change in the human capital efficiency will shrink EPS by about 0.987 of the manufacturing firms. However, the relationship is also significant as the p-value of 0.026 is less than 0.05% standard alpha value. Thus, the null hypothesis was rejected and on the basis of this, the study concluded that HCE is significantly relates to EPS of listed manufacturing firms in Nigeria in the period of this study.

5. DISCUSSION OF FINDINGS

The study examined the relationship between intellectual capital accounting and financial performance of listed manufacturing firms in Nigeria. Equipped with the outcomes from the hypotheses tested, it was established that intellectual capital accounting substantiates statistically significant relationship with financial performance of listed manufacturing firms in Nigeria in the period of this study. The result of the analysis revealed that human capital efficiency (HCE) is significantly connected with return on capital employed. This implies the effectiveness of employees in manufacturing firms in Nigeria particularly in the aspect of service rendering added value that enhances financial performance (ROCE). It also signifies the efficiency of employees when compared with the outlay for the salary and benefit. For the employees to be effective on their responsibilities, training, motivation and workshop are needed to ensure they get the critical skills and knowledge to carry out their daily activities and to be able to compete with their counterpart. In view of this outcome, the null hypothesis 1 was rejected. This finding is similar to the findings of Ofurum and Aliyu (2018), Ekwe (2013) and Onyekwelu (2016). However, it contradicts with the finding of Onafalujo and Akinlabi (2011) added factor of a company's stock market performance is negative and significant only for high technology industries. In addition, analysis result revealed that there is significant relationship between human capital efficiency and earnings per share. This implies that the value created using the money paid to make convenient environment to the employees, customers, suppliers and management has significant effect on the earnings of the firm. Under utilization of supportive facilities provided within the organization by the employees and other stakeholders will affect business performance and to achieve robust financial performance, management of each manufacturing firms should encourage the use of companies' database, processes, brand, and new technology to fullness to gain wider competitive advantage which in turn, will impact business performance. Taking into account, the significant relationship, null hypothesis was rejected. This study tallies with the submission by Onyekwelu and Ubesie (2013) in which human capital efficiency has a positive and significant effect on market /book value. Based on the findings made from this study, the following recommendations are therefore made:

Nigerian manufacturing firms must develop strategies to invest adequately in different intellectual capital components (HC, SC, RC & CE) for sustaining competitive advantage in this current knowledge economy in order to achieve robust financial performance. Management of manufacturing firms must as a matter of survival, strategically and deliberately train, retrain and retain staff for a long time to avoid losing the intellectual assets possessed by them. This could be achieved by developing a well-articulated training program in order to guarantee needed core competence by managers and workers for maximum productivity and healthy financial performance. It should be stressed that the insignificant level of CEE may be due to insufficient regards for the Relational Capital where the CEE originated has the greatest influence on financial performance indicators. Therefore, in the present business environment, Nigerian manufacturing firms should keep close ties with their investors, capital contributors, debenture holders, suppliers, customers and other external parties for better performance.

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