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# HUMAN CAPITAL EFFICIENCY AND FIRM VALUE USING PANEL REGRESSION

**BY**

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**ABSTRACT**

This study evaluated human capital efficiency and firm value of quoted Non-financial firms in Nigeria. Its core objective is to evaluate the effect human capital efficiency has on firm values. The study employed secondary data and panel regression models which were subjected to descriptive Statistics, Correlation Matrix, and Hausman test for interpretations. Data was collected from (76) quoted Non-financial firms from the year (2011-2020). The study was anchored in Resource-based theory. Findings hold that there is a negative influence of capital employed efficiency as it has positive but not

significant influence, firm size (FISZ) has negative and significant influence and firm age (FIRA) has positive and non-significant influence on firm value of non-financial firms in Nigeria. Concluding, only human capital employed efficiency and firm age influenced firm value positively and thus the study recommends that the human capital component of intellectual capital should be trained and educated regularly to build capacity.

Firms' specific growth and sustainability policy should be strongly placed using corporate governance code and other enhanced internal innovative processes to ensure that their existence is not affected by age.

**KEYWORDS:** **Human Capital, Efficiency, Structural Capital, Capital Employed, Firm Value.**



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## INTRODUCTION

Currently, there seems to have been a considerable shift from traditional "product-based organizations" to knowledge-intensive organizations."Organizations tend to perceive particular traditions, practices, and concepts in divergent ways as a result of this change. Cash, goods, assets, the company's net worth, or other valuables are perceived as "capital" in traditional product-based corporations. Instead, knowledge-intensive businesses consider their assets to be "intangibles" or "intellectual capital" (Hendricks, 1976). Intangibles and intellectual capital have been identified as two ideas in certain previous investigations. However, these are separate disciplines that represent the same object, such as "Intangibles" in accounting and "Intellectual capital" in management (Marr andMoustaghfir, 2005). Regardless of the discipline, all of these notions constitute the company's "hidden value."

Human capital refers to the totality of a person's inherent ability to produce goods and services (Eide & Showalter, 2010). It is a collective assessment of an individual's or a group's knowledge, education, skills, competencies, passion, and other traits that influence their prolific ability and earning potential to produce goods, services, or ideas in market contexts. Any nation's long-term development, economic competitiveness, and growth require significant investments in human capital. As a result, every country should make a significant investment in human capital, in addition to other investments and policies, to enhance efficiency and economic growth. Human capital serves as a vital aspect in the effective execution of corporate objectives at the micro-level, not simply as a primary facilitator in increasing firm productivity (Bontis et al., 2000; Yusuf, 2013).

Human capital-rich companies are in a better position to develop resources and competencies (Barney, 1991). Nonetheless, the amount to which a firm develops and preserves human capital points to its overall performance and long-term value creation (Ruz et al., 2017). As a result, even if a company has enormous financial resources, superior technologies, and sophisticated infrastructure, creating a competitive advantage without an effective workforce, it may be difficult to achieve improved firm value. Human capital is the most important asset that exists within a firm. It represents the human factor in an organizationwherebythe combination of intelligence, skills, knowledge, aptitudes, and expertise that gives the organization its distinctive character which those traits contribute to production and profitability, thus improving organizational performance (Bontis et al., 2000 Tayles et al., 2007; Gazor et al., 2013). Additionally, Yusuf (2013) argued that the ability of a corporate


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organization to successfully implement business strategies solely depends onthe efficient use of intangibles asset, particularly human capital. It is believed that all other factors of production and service no matter how sophisticated must be superintended by human beings. In any case, for an impactful workforce, there should be adequate and effective training and updated and constant skill retooling to enable for efficient use of resources to positively influence firm value.

**Statement of Problem**

Despite claims in various climes, that human capital is the most important asset of companies; the values of nonfinancial firms have continued to dwindle. This is in the face of the daunting insecurity, health, and environmental challenges in Nigeria. These firms now resort to the replacement of the human capital asset with technology. This has prompted an investigation into the claim of human capital is the most valuable. Again, it is startling that some firms that pride themselveson having well-equipped human capital have their firm value falling more than it rises. This study hopes to bridge the gap of providing empirical results and literature for the period reviewed.

**THE OBJECTIVE OF THE STUDY**

This study is undertaken with the grand objective of assessing the impact which human intellectual capital has on firm value.

**The specific objectives are to;**

i. Determine the influence of capital employed on firm value.
ii. Ascertain the impact of human capital on firm value.
iii. Investigate the effect of structural capital on firm value.

**Research Question**

**i.** Do capital employ influences firm value?
**ii.** How does human capital impact firm value?
**iii.** How does structural capital affect firm value?

**Hypotheses**

$Ho_{1:}$ capital employed does not significantly influence firm value


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$Ho_2$: human capital does not impact firm value significantly

$Ho_3$: structural capital does not significantly affect firm value

## CONCEPTUAL FRAMEWORK

### Human intellectual capital:

Intellectual capital is an intangible asset owned by human resources and the organization of a company. It might be knowledge, information, or experience (Stewart, 1997). The information, experience, invention, innovation, market share, and communities that may affect the firm's intellectual capital are all collected and synergized (Akpinar 2014).

The difference between the market worth of a company and the value of its replacement asset is also known as intellectual capital. The market worth of a company is equal to its book value plus its intellectual capital. Intellectual capital is divided into three dimensions by experts in the field: (1) human capital, (2) structural capital, and (3) external (customer) capital.

Human capital refers to the firm's intangible assets, such as intellectual aptitude, creativity, and invention, which are owned by its personnel. Human capital is a crucial issue in the knowledge-based sector because it is the most expensive resource in the production process.

Capital Employed efficiency. Capital employed (CE) refers to the tangible assets that make up a company's capital. It includes both physical and financial assets. Fixed assets and raw materials are represented in the physical part, while other existing assets after employees leave the company are represented in the financial part (Basso et al., 2010). CE, according to Pulic (2004), refers to both physical and financial capital, such as net asset book value.

Chen et al., (2005); Mosavi et al., (2012); Rehman et al., (2014); Rehman et al., (2012) compute CE by adding physical and financial assets together or subtracting intangible assets from total assets.

Capital employed efficiency measures how effectively financial capital is employed to create value for a company. The book value of the organization's net assets is frequently used to calculate CE (capital employed)


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**The following is how CEE is defined:**

CEE =VA/CE, where VA denotes added value and CE denotes capital employed (Ovechkin, Romashkina, and Davydenko,2021). Capital utilized efficiency is defined as revenue minus cost of revenue divided by total assets minus intangible assets in this study.

**Efficiency**

Efficiency is sometimes stated mathematically as r=P/C, where P signifies the amount of useful output ("product") created per the amount C denotes the cost of resources consumed. The efficiency of a system is defined as the relationship between resource inputs (labor, capital, or equipment expenditures) and intermediate outputs (numbers treated, waiting time, etc.) or final health outcomes (lives saved, life-years gained, quality-adjusted life years (QALYs)).

**The efficiency of Human capital**

In terms of the usefulness of its output to total input, Ting and Lean (2009) consider innovation, capacity, creativity, know-how, and previous experience, teamwork capacity, employee flexibility, tolerance for ambiguity, motivation, satisfaction, learning capacity, loyalty, formal training, and education. The components that arose from the concept of intellectual capital are known as human capital (Bontis et al., 2000; Tayles et al., 2007).

Human capital is the most valuable asset a company can have. It reflects the human aspect in an organization, where a combination of intelligence, skills, knowledge, aptitudes, and expertise provides the organization its particular character, with those characteristics contributing to output and profitability, and therefore improving organizational performance (Bontis et al., 2000 Tayles et al., 2007; Gazor et al., 2013).

Yusuf (2013) also suggested that a corporation's ability to successfully implement the business strategy is wholly dependent on the effective utilization of intangible assets, notably human capital. HCE was defined by Ovechkin, Romashkina, and Davydenko(2021) as the ratio of value-added to the payments received by employees, such as wages, social security, and so on: HCE =VA/HC, where VA denotes added value and HC denotes total earnings and salaries. As a result, human capital efficiency is calculated as revenue minus revenue cost divided by staff cost. This implies that human capital efficiency is the ratio of staff costs to employee output in relation to the firm's value.


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**Structural Capital efficiency**

Organizational procedures, trademarks, databases, information systems, cultural features, and other parts of an organization's intellectual infrastructure make up structural capital. Processes, procedures, branding, intellectual property structures, and other hidden intangibles make up structural capital, which remains at a company after its people have gone home.

Innovation capital and process capital are always split into structural capital. Process capital refers to efforts that are utilized to increase the efficiency and quality of corporate processes. Innovation capital refers to a company's readiness to extend innovations through R&D (research and development). The ratio of VA to the part of VA referred to as structural capital is known as SCE (or SC). According to Pulic (2000), the more structural capital is involved in value generation, the less human capital is involved.

SC can be defined as the discrepancy between value-added and human capital based on this inverse relationship: HC = OP + D + A SC = VA

**The following formula is used to determine SCE:**

SCE =SC/VA, where SC is the difference between VA and HC (Equation (6)), or the total of OP, D, and A, and VA is the value-added.

Structural capital refers to a company's ability to reach out to the market, as well as the hardware, software, and other resources that help it do so. They are the infrastructure that supports employee success; structural capital is a link between human capital and intellectual capital (Sveiby, et al. 1998). Structural capital includes capital innovations, such as organizational innovation to generate new products and services, as well as capital processes, such as engineering, systems, processes, and equipment owned by the company (Van Buren, Mark e. 1999).

**Firm Age**

In capital structure models, the firm's age is a typical metric of repute. As a company grows older, it establishes itself as a running corporation, increasing its capacity to take on more debt; thus, age is positively associated with debt. The age of a company is also thought to have an impact on its worth. The age of a company can be determined by how long it has been in existence or how long it has been in operation after its initial public offering.


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Ilaboya and Ohiokha (2016) discovered that the age of a company has a beneficial impact on its worth.As a result, the larger the firm's value, the longer it exists.

However, according to a study conducted by Onasis& Robin (2016), the age of a company has no bearing on its worth, hence the age of a company is not a guarantee of its high value.

In general, age refers to the length of time that a person or item has existed. Although some argue that listing age should define the company's age, Shumway (2001) defined firm age as the number of years since its inception. They argue that listing age is more cost-effective because it represents a watershed moment in the company's history. Shumway's claim is refuted from the standpoint of the company as a legal entity (Waelchi&Pdferer. 2011). A company is formed as a legal entity by incorporation (Pickering, 2011; Gitzmann, 2008). As a result, they contended that the year of incorporation should be used to determine the company's age.

For this study, firm age is defined as the difference between the current year and the year of stock market listing plus one, represented in nominal value.

**Firm Size**

According to El Mehdi (2014), business size has an impact on stock returns because as the firm size grows, profits remain stable due to economies of scale, and the ability to manage financial risk improves, favourably influencing stock returns. Firms with a stable and broad asset base have higher profitability, which leads to larger stock returns.

According to Aga et al. (2013), company size is the log of firm assets and the primary source of variation in shareholder value maximization. Because total assets are often significant compared to other financial variables, firm size is generally assessed by the number of total assets owned. Researchers use the value of the natural logarithm of total assets to calculate the size of a corporation.

Firm size is defined in this study as the natural logarithm of total asset. This metric is ideal for comparing the size of firms in the same country that use the same currency.

**Firm Value**

Firm value is one of the notions that has been established to account for the real value of businesses in a more realistic way than market value.In comparison to the concept of


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market value, firm value is a concept that demonstrates the worth of the firm purified from cash and cash equivalents, as well as financial debts (Ilgaz 2010).

Firm value = Market value – Total Financial Debts – (Liquid assets + Marketable Securities) was his formula.

The simple formula for firm value is: Firm value = Market Capitalization + Market Value of Debt – Cash and Equivalents. This can be extended as;

The extended formula is: Firm value = Common Shares + Preferred Shares + Market Value of Debt + Minority Interest – Cash and Equivalents

The investor's assessment of a company's success is referred to as firm value. It is reflected in the company's stock price. The rise in the stock price demonstrates the investors' faith in the company. They are willing to pay more in the hopes of getting a better return. The overall assets owned make up the firm's value. It is made up of the market value of shares as well as liabilities (Damodaran, 2002). The market price to book value ratio can also be used to determine the worth of a company. Investors' perceptions of companies, which are typically linked to stock prices, are referred to as firm value. High stock prices increase the firm's value.

According to Hidayah (2014), a high firm value will boost investor confidence in the company because it will be able to pay out large dividends. The creditor firm value is linked to the company's liquidity, i.e., the company is thought to be able to repay the creditor's loan. The amount of money required for an acquirer to buy a company at current market price, including cash, debt, and other factors associated with a corporation, is referred to as firm value (Bradburd et al., 2015).

Firm value is held in this study as market capitalization plus total liabilities less cash flow divided by total asset of the firm calculated in numbers and proxied by Tobin Q.

**Empirical Review**

Mohammad (2021) conducts an empirical study to see if intellectual capital has an impact on profitability while taking into account the interaction effect of human capital efficiency. The information was gathered from Bursa Malaysia's LEAP market over a three-year period from 2017 to 2019. To measure intellectual capital and return on asset (ROA) as a proxy for profitability, the modified Value-Added Intellectual Coefficient (MVAIC) technique was used. After controlling for business size and leverage, the empirical findings show that


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intellectual capital is positively and strongly associated with profitability. However, the data suggest that MVAIC components and profitability have a mixed connection. Human capital efficiency (HCE), capital employed efficiency (CEE), and return on investment (ROI) have a positive and significant relationship, according to the research. The link between structural capital efficiency (SCE) and return on assets (ROA) is considerable but negative. When it comes to ROA, however, relational capital efficiency (RCE) has been shown to be statistically insignificant. When HCE interacts with SCE and RCE, however, the results show that HCE positively moderates the effect of SCE and RCE on ROA.This is one of the few studies that look at the empirical relationship between intellectual capital and profitability in Malaysian SMEs, and it makes a unique contribution by taking into account an interaction variable. However, because the study only looks at one country and one industry, the conclusions can't be generalized.

Economic efficiency, according to Ovechkin, Romashkina, and Davydenko (2021), is a function of two categories of resources: those that are presented in financial accounts and those that are not. Intellectual capital is a term used to describe non-balance sheet resources (IC). The study looked into the connection between IC, its components, and financial viability. The system generalized method of moments was used to do the analysis for a large sample of Russian enterprises in the agricultural industry. They used the Value-Added Intellectual Coefficient (VAIC) and an approach they developed themselves in response to criticism of VAIC. When comparing the VAIC with the own-created approach to IC estimate, the latter was found to be more suited due to its benefits. Unlike VAIC, their method allows for the measurement of both efficiency ratios and IC stocks. The findings revealed that among the IC indicators used, the efficiency of structural capital utilization and the stock of human capital have the greatest impact on the profitability level of agricultural enterprises.

Hasan and Hasan (2019) looked into whether intellectual capital plays a role in the banking sector's financial performance in Iraq. By aggregating the capital-employed efficiency, human capital efficiency, and structural capital efficiency, we apply the value-added intellectual coefficient technique to quantify intellectual capital. They utilized two proxies to measure financial performance: return on assets and return on equity. They regressed two models, return on assets and return on equity, separately on the value-added intellectual coefficient approach, before regressing financial performance with each component of intellectual capital. Overall, the data show that intellectual capital has a major impact on the


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financial success of Iraq's banking sector. In addition, intellectual capital components such as capital-employed efficiency, human capital efficiency, and structural capital efficiency all have a positive and significant relationship with return on assets and return on equity, with the exception of structural capital efficiency, which has no effect on return on equity. In Iraq's banking sector, we similarly find that human capital efficiency has a far higher impact on financial performance than the other components.

In the Malaysian technology industry, Azlina Rahim, RuhayaAtan, and AmrizahKamaluddin (2017) investigated the relationship between human capital efficiency and business performance. Using accounting data, the study examined the annual reports of all technology businesses listed on Bursa Malaysia's Main Market and Ace Market in 2009.To quantify human capital efficiency, the study usedPulic's Value Added Intellectual Coefficient (VAICTM) technique. The findings revealed that there was little difference between the Main Market and the Ace Market in terms of human capital efficiency. According to the findings of the correlation research, human capital efficiency has a strong and positive relationship with company performance. The findings may be valuable to company executives in making better decisions on how to best invest their strategic asset, human capital.

Ozkan, Cakan, and Kayacan (2017) investigated the relationship between the performance of intellectual capital and the financial performance of 44 Turkish banks between 2005 and 2014. The value-added intellectual coefficient (VAIC) technique is used to assess a bank's intellectual capital performance. Human capital efficiency has a significant impact on the Turkish banking sector's intellectual capital performance (HCE). Development and investment banks have the highest average VAIC among bank categories. When the VAIC is broken down into its constituents, it is clear that capital employed efficiency (CEE) and human capital efficiency (HCE) have a beneficial impact on bank financial performance. CEE, on the other hand, has a greater impact on bank financial performance than HCE. As a result, banks in the Turkish banking sector should make better use of their financial and physical capital if they want to increase their profitability.

Sisodia, Jadiyappa, and Joseph (2021) used a positive methodological approach to explore if human capital improves business value. The output of a country is determined by its human and physical capital, according to the traditional theory of economic growth. The same theory holds true for firm output at the micro-level. As a result, a firm's human capital should play a


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substantial influence in its success and, as a result, its valuation. Human capital and corporate value have a favorable link, according to their findings.

Human capital adds value by improving the exploitation of current growth possibilities, providing future growth prospects, and lowering the volatility associated with firm growth rates. The research was carried out by Ahesha and Sujani(2012) with the goal of investigating the influence of human capital investment on the financial performance of Sri Lankan firms. Financial information in financial statements of listed companies under the Colombo Stock Exchange was used to achieve the study's goal. The exchange was utilized over a two-year period between 2009 and 2010. The study's sample consisted of 40 companies listed on the Colombo Stock Exchange. SPSS was used to do the data analysis (Statistical Package of Social Sciences). The findings revealed that there is a considerable link between human capital investment and corporate financial success (0.021).

In the context of Vietnam, Nguyen and Doan(2020) studied the impact of intellectual capital on corporate value from 2013 to 2018, using 61 manufacturing enterprises that were listed on the Vietnam stock exchange. Ordinary Least Square (OLS), Random Effects Model (REM), and Fixed Effects Model are three statistical methodologies are used to handle econometric challenges and increase the accuracy of regression coefficients (FEM). The intellectual capital of a company is measured using value-added intellectual capital (VAIC) in the study. VAIC (value-added intellectual capital) is a useful metric for determining how well a company uses its material, financial, and intellectual capital to grow. Human Capital Efficiency (HCE), Structure Capital Efficiency (SCE), and Capital Employed Efficiency (CE) are the three components that make up the VAIC (CEE, including physical and financial capital). Tobin's Q ratio is used to calculate firm value in this study. In the regression model that revealed the impact of intellectual capital on a firm's value, control variables such as leverage, firm size, growth rate, and state capital were utilized. The empirical findings revealed that value-added intellectual capital (VAIC) has a statistically significant positive impact on a firm's profitability. This proof gives managers a new perspective on how to increase the value of manufacturing enterprises listed on the Vietnam stock exchange.

According to Yusuf (2013) "Our employees are our greatest asset" has become a regular statement in bank annual reports and accounts, but there has not been enough attention paid to the value and contribution of this "great asset" to the banks' total success. Human capital efficiency had no discernible impact on the EPS and ROE of the Nigerian banks studied.


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According to the findings, efficient human capital utilization has no substantial influence on banks' return on equity.

Furthermore, a bank's size has no bearing on its return on equity, and bank return on equity cannot be predicted by human capital efficiency or bank size.

Nassar (2018) used data from 27 listed companies from 2004 to 2015 to investigate the impact of intellectual capital on firm performance of real estate companies listed on the Borsa Istanbul. As a measure of intellectual capital, the Value-Added Intellectual Coefficient (VAIC) approach was used (IC). The impact of intellectual capital (VAIC), human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE) on market, productivity, and financial performance is investigated using an OLS regression. The data reveal that SCE is a fundamental driver of value development in real estate enterprises, with a positive significant relationship between MB, ROE, and EPS prior to the crisis and ROA and ROE post-crisis. Before the crisis, HCE had a positive significant relationship with ROA and ROE, but a negative significant relationship with MB and ATO after the crisis. After the crisis, CEE has a negative big impact on ATO. Before the crisis, VAIC had a large beneficial impact on ROA, ROE, and EPS, and after the crisis, it has the same relationship with ROE. Despite the positive results of leveraging intellectual capital to create value, real estate Turkish enterprises continue to rely on it in a limited way.

Adegbayibi (2021) stated that due to the paradigm change towards the knowledge economy, where performance and competitive edge are no longer solely a matter of machines and tools, but of brains and harnessing those brains, the long-term neglect of intellectual capital by corporate management is a big concern. In light of that, this study looked at the impact of intellectual capital on performance parameters of Nigerian listed non-financial enterprises from 2007 to 2017. Data was gathered from secondary sources such as audited annual reports from sampled companies and the Nigerian Stock Exchange fact books. Intellectual capital was proxied by data such as human capital efficiency, structural capital efficiency, and capital employed efficiency, while financial success was proxied by return on equity and return on assets. Purposively selected sample sizes of fifty (50) out of an initial population of eighty (80) listed non-financial enterprises on the Nigerian Stock Exchange as of December 2018. Descriptive statistics and panel regression analysis were used to analyse the data collected. Human capital efficiency, capital employed efficiency, and firm size all had a significant positive effect on return on equity, while human capital efficiency, structural


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capital efficiency, capital employed efficiency, and leverage all had a significant negative effect on return on assets, according to the study's findings. The findings were that intellectual capital has a strong positive impact on financial performance metrics. To improve financial performance and preserve a competitive edge, the study advocated a policy framework for management to increase intellectual capital usage through investments in human and customer capital.

Githaiga (2019) discovered that the global economy has transitioned from a production-driven economy to one focused on information and knowledge. As a result, knowledge resources, particularly human capital, are viewed as important drivers of competitive advantage and better performance. The study investigated the impact of human capital on company performance from 2008-2017, data was collected from 31 commercial banks in Kenya and analyzed using descriptive and inferential statistics. Human capital had a positive and substantial effect on business performance (= 0.447, -value 0.0000.05), according to the study. Practitioners and regulators should be aware of the findings.

Rezende and Silva (2021).The study's goal was to discuss Value Creation using the VAICTM technique, using the firms in the B3 (BMandFBOVESPA) Corporate Sustainability Index (ISE) portfolio as a research field. After 10 years of ISE history, we chose the year 2016 as a starting point. The VAIC components were extracted and calculated using the International Financial Reporting Standards (IFRS) for the year ended December 31, 2015. The hypotheses allowed the following to be confirmed: there is interdependence between Invested Financial Capital, Intellectual Capital, and Value Creation; there are dimensions of Value Creation capable of differentiating and clustering observations; and (iii) company allocative efficiency can vary according to clusters. The size of the population/final sample is 29 businesses. The implications concern the theoretical existence of Value Creation based on both tangible and intangible assets, as well as the ability to categorize companies in order to gain a better understanding of the foundations for appreciating the value and pricing of assets traded on stock exchange platforms.

Gunawana and Ramadhani (2018) investigated the impact of intellectual capital on a company's financial performance. The structural capital efficiency (SCE), human capital efficiency (HCE), and capital employed efficiency were the independent variables (CEE) The size and leverage were employed as control variables for non-financial enterprises registered


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on the Indonesian Stock Exchange. Purposive sampling was used to pick samples, and a total of 232 firms were found. HCE has a negative influence on financial performance, SCE has a significant positive effect on financial performance, and CEE has a major positive effect on financial performance, according to the findings. The study's drawback was that the sample was confined to enterprises in the non-financial sector that were listed on the Indonesia Stock Exchange. Future studies are expected to employ different metrics to assess the company's intellectual capital and worth, as well as expand the research database and look into different industries.

Kamath (2015) investigated the impact of intellectual capital (IC) on financial performance and market valuation of Indian enterprises empirically. Thirty companies from the S&P BSE SENSEX index, which includes 30 companies from various manufacturing and service industries. The study included the fiscal years 2008-2009 to 2012-2013. The impact of IC on financial performance and market value of these select enterprises is investigated using multiple linear regression analysis. The data is evaluated using the VAICTM technique, and the results show that the IC of the firms does have an impact on financial performance and market value. This finding is critical for business management and policymakers to make IC disclosure and reporting a requirement in financial statements as the stakeholder can get the real picture of the true value of the firm.

Popoola, Edem, and Agbi (2019) looked at the impact of structural capital efficiency on the financial performance of Nigerian listed oil and gas companies from 2006 to 2018, with data from a secondary source. Internal capital efficiency (ICY) and external capital efficiency (ECY) were used to measure the independent variable, structural capital (SC), while Return on Assets represented the dependent variable, financial performance (ROA). Leverage was used as a control variable. Regression analysis was utilized for inference and hypothesis testing after various diagnostic tests. The regression study demonstrated that both ICY and ECY have a positive and substantial effect on ROA, meaning that these two factors are important in determining the financial performance of publicly traded oil and gas companies in Nigeria. To improve their corporate performance, managers of oil and gas companies should strengthen current intangible structures such as systems, routines, procedures, and customer relations, according to the study.

According to Mehraliana, Rasekha, Akhavanc, and Sadehd (2012), the growing discrepancy between the market and book value of many organizations has prompted researchers to look


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into the impact of intellectual capital (IC) on corporate performance.In a highly competitive world, IC is largely regarded as a crucial tool for delivering commercial success.Various models, including the Skandia Navigator, Tobin's Q, and value-added intellectual coefficient, have been proposed to measure the various characteristics of IC (VAIC). Using the VAIC established by Pulic (2000), the study's goal is to investigate the relationship between intellectual capital and pharmaceutical company market value, Human capital, structural capital, and capital-employed efficiency of pharmaceutical businesses were calculated using six-year data from audited financial reports on the Iranian Exchange Stock. The results of correlation and multiple regression analysis were inconclusive in proving the impact of IC on market value. In practice, IC efficiency can be used as a benchmark and strategic indicator to determine the worth of a company. The study was the first in Iran to use cross-sectional time-series data to quantify the influence of IC efficiency on market value.

Human capital efficiency and its impact on the financial performance of Dutch manufacturing enterprises were investigated by Parham and Heling (2015). Human capital efficiency has a favorable association with all three company performance indicators, including return on asset, return on equity, and employee productivity, according to the study. Employee productivity and human capital efficiency have a close relationship, according to the findings.

## THEORETICAL REVIEW

### Resources-Based Theory (RBT)

Wernerfelt (1984) proposed the resource-based theory of the firm as a combination of Selznick's (1957) and Penrose's (1959) ideas about the explanation of enterprises as systems that output resources. It implies that resources that are valuable, scarce, difficult to duplicate, and non-substitutable are the most advantageous for a company's long-term performance. These strategic assets can be used to build company capabilities that will lead to improved performance and value over time. It also asserts that businesses should position themselves strategically based on their resources and capabilities rather than their products and services.

The phrases tangible resources (physical assets), intangible resources (knowledge, skills, reputation, and business culture), and capabilities are all used in resource-based theory (what the firm can do). The theory asserts that an organization's strategic resources offer it with a golden opportunity to establish competitive advantages over its competitors, resulting in significant profit. RBT is an excellent choice for describing intellectual capital research,


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particularly when it comes to the relationship between intellectual capital, financial performance, and business value. In the context of intellectual capital, a company's intangible assets are divided into three categories: human capital, structural capital, and customer capital (Ulum, 2013). According to Pulic (2004), each organization has its own set of knowledge, skills, values, and solutions (intangible resources) that can be converted into 'worth' in the capital market. Intangible resources that are well-managed can help businesses gain a competitive advantage, boost productivity, and raise their market value. The approach focuses on a firm's resources, which include everything from employee capabilities to procedures to financial status, data, and expertise. Physical capital, which includes innovation, facilities, location, and raw material availability; human capital, which includes employees' knowledge, skills development, decision making, intellectual ability, connections, and personal knowledge; and organizational capital, which includes formal and informal reporting structures, formal and informal planning, control and coordination systems, and informal relations. The resource-based theory attempts to explain how enterprises can effectively build and deploy critical resources in order to maintain a competitive edge. The important resource qualities and competencies that contribute to persistent competitive advantage were simplified by Barney et al. (2001) into four: precious, rare, inimitable, and non-substitutable. The idea has been criticized for being tautological, among other things. Different resource configurations can create the same firm value; therefore, a competitive advantage isn't necessary. In the development of resource-based theory, the role of product marketing is undeveloped. This research is based on this idea, which shows that there is a link between strategic resources and company performance and value.

## METHODOLOGY

### Research Design

The study used historical accounting data from the sampled firms' financial statements to establish a causal relationship between the independent and dependent variables with the goal of determining the impact of human capital efficiency on the firm value of quoted non-financial firms in Nigeria from 2011 to 2020.


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**Nature and sources of data**

The data for the study were collected from secondary sources which include audited annual reports of the related quoted firms, journals, and periodicals from the Nigerian Stock Exchange limited.

**Population of study**

In this study, one hundred and seven (107) Nigeria-quoted non-financial firms were covered for the period 2011 – 2020 starting from 31st December 2011 and had rendered statutory annual financial reports as of 31st December 2020. These firms were chosen because of their consistent disclosure and publication of their annual reports.

**Sample Size**

This study used simple purposive sampling to select seventy-six (76) non-financial firms that are quoted on the Nigerian Stock Exchange limited as of December 2010.

Method of Data Analysis

The researcher subjected the collated secondary data set to descriptive statistics analysis, diagnostics, correlation matrix, and regression analysis.

**Model Specification**

This study adopted the model of Mohammad (2021) to explain the variables' interaction thus;

$ROAit = \beta0 + \beta1\ HCEit + \beta2\ SCEit + \beta3\ RCEit + \beta4\ CEEit + \beta5\ Sizeit + \beta6\ Levit + \varepsilon it$

modified it to $TobinQit = \beta0 + \beta_1 HCEit + \beta_2 SCEit + \beta_3 CEEit + \beta_4 Sizeit + \beta_5 Firagit + \varepsilon it$

Where: Tobin's Q= firm value; HCE= Human capital efficiency, SCE = structural capital efficiency, CEE = capital employed efficiency. SIZE= firm size, Fira = firm age, Є = is the error component for company i at time t assumed to have mean zero E [$\varepsilon_{it}$] = 0, β0= Constant, β= 1, 2,…5 are parameters to be estimate; i = non-financial firms, i = 1. . .5; and t = the index of time periods and t = 1. . . 5.

**RESULTS AND DISCUSSION**

This study investigates the influence of human capital efficiency and firm value in Nigeria. In this study, the firm characteristics variables were proxy by capital employed efficiency (CEEE), human capital employed efficiency (HCEE), Structural capital employed efficiency


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(SCEE), firm size (FISZ), firm age (FIRG), and firm value (TOBIN's Q) as the dependent variable. The research used an aggregate number of seventy-six (76) listed companies in the non-financial sector of Nigeria's economy for the period of eleven years (2011-2020). The period extended into the COVID-19 pandemic which are years of interest to the study. In testing for the formulated hypotheses in this study, we used balanced panel regression which is the most suitable techniquefor analyzing relationships with dependent variables with longitudinal and time dimensions. Also, the fixed and random effect models on the cross-section of interest in the estimation of our model after the Hausman test was conducted. We also performed preliminary pre-regression analyses such as descriptive statistics, normality test, variance inflation factor test, and correlation matrix. The results were analyzed as follows. The examined descriptive statistics for both the explanatory and dependent variables of interest. Each variable was examined based on the count, sum, mean, median (p50), maximum and minimum. Table 1 below mirrors the result of descriptive statistics for the study.

Table 1: Descriptive statistics

| stats | tobqceeehcee | scee | fira | fsiz | | |
|---|---|---|---|---|---|---|
| mean | .0766924 | 0.2364162 | 0.5751604 | 05751604 | 26.73947 | 7.111685 |
| p50 | 0.0017768 | 0.201 | 3.00075 | 0.7 | 28 | 7.0142 |
| max | 3.002161 | 5.8538 | -16.3314 | 18.6774 | 56 | 9.3059 |
| min | -.9062282 | -1.2159 | -16.3314 | -20.5332 | 2 | 5.2394 |
| sum | 760 | 760 | 760 | 760 | 760 | 760 |

The table shows that the mean value of firm value in the sampled non-financial firms was 0.0766924. The median firm value was 0.0017768. The maximum firm value was 3.002161 while the minimum value stood at -0.9062282. This, therefore, means that firms with a higher value or equal to the median value of 0.0766924 expressed as p50≥0.0766924 has improved firm value as a result of improved efficiency, while firms with a value ≤ -0.9062282 had deteriorating firm value. We also observed that the average firm age of sampled firm was 26.73 with a maximum of 56 and a minimum of 2 years respectively. This


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suggests that firms above 26.73 years are quite old while those below are seen to be young. The average firm size was 7.111222 with a maximum firm size latching around 9.3059 and a minimum of 5.2394 for the sampled quoted no- financial firms in Nigeria between 2011 to 2020.

Table 2: Shapiro-Wilk W Normality test

| Variables | Obs | W | V | Z | Prob>z |
|---|---|---|---|---|---|
| tobq | 760 | 0.79270 | 101.856 | 11.320 | 0.00000 |
| ceee | 760 | 0.51461 | 238.499 | 13.403 | 0.00000 |
| hcee | 760 | 0.64480 | 174.530 | 12.638 | 0.00000 |
| scee | 760 | 0.30505 | 341.469 | 14.281 | 0.00000 |
| Fira | 760 | 0.98701 | 32.792 | 8.545 | 0.00000 |
| Fsiz | 760 | 0.98701 | 6.383 | 4.538 | 0.00000 |

The Shapiro-Wilk W test for normality holds that the data were normally distributed as the Prob>z is 0.0000 for the variables at 5%.

**Table 3: Correlation Matrix**

| | tobq | ceee | hcee | scee | fira | fsiz |
|---|---|---|---|---|---|---|
| tobq | 1.0000 | | | | | |
| ceee | 0.1530 | 1.0000 | | | | |
| hcee | 0.0460 | 0.5909 | 1.0000 | | | |
| scee | -0.0064 | 0.0395 | 0.0896 | 1.0000 | | |
| fira | \| 0.1181 | 0.0899 | -0.0124 | 0.0070 | 1.0000 | |
| fsiz | 0.0479 | -0.0074 | 0.2557 | 0.0879 | 0.1121 | 1.0000 |

The result of the correlation reveals that the adopted variables are not correlated. That means none of them can be substituted for the other.

**Variance Inflation Factor**

The VIF of the study stood at 1.32 and below the threshold of 10. This suggests that multi co-linearity is ruled out amongst the variables of interest.


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**Test of hypothesis**

The hypotheses were tested using fixed and random effects, and a confirmatory test with the Hausman test to decide on an efficient option to interpret the result (0.0002). Here, the study adopts a fixed effect as the p-value > $\chi 2$ is less than .05 (Gujarati, 2004; AjiboladeandSankay, 2013). In table 1.3, we observed that the adjusted R-Squared valuewas 0.0517. This indicates that all the independent variables jointly explained 5% of what happened in the firm value dependent variable. The Prob > f= 0.0000 was also observed to confirm the fitness of the model adopted. In addition to the above, the specific findings from each explanatory are provided as follows:

$Ho_1$: Capital employed does not influence the firm value of Non-financial listed firms in Nigeria .

The fixed effect Panel regression presented above showed the result of the variable of capital employed efficiency as follows: (CEEE) (Coef. = -.0271526, t = -0.46 and P-value = 0.644). Following the results above, it is revealed that the effect of capital employed efficiency on firm value is negative and non-significant. Based on the result, the study accepts the null hypothesis.

$Ho_2$: Human capital employed efficiency does not significantly influence the firm value of Quotednon-financial firms in Nigeria.

The result showed the variable of human capital employed efficiency (HCEE) (Coef. = .0015041, t = 0.45 and P-value = 0.652). It is revealed that the effect of human capital employed on the firm value of non-financial firms in Nigeria is positive and nonsignificant. Based on the result, the study accepts the null hypothesis and concludes that human capital employed has no statistically insignificant effect on the firm value of quoted non-financial firms in Nigeria.

$Ho_3$: Structural capital employed efficiency does not significantly influence the firm value of Quoted non-financial firms in Nigeria

The result showed that structural capital employed efficiency (HCEE) (Coef. = -.0026645, t = -0.42 and P-value = 0.676). The effect of structural human capital employed on the firm value of non-financial firms in Nigeria is positive and non-significant. Based on the result, the study accepts the null hypothesis and concludes that human capital employed has no statistically insignificant effect on the firm value of quoted non-financial firms in Nigeria.


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This study investigates the influence of intellectual capital efficiency on the firm value of non-financial firms in Nigeria. The study shows that there is a negative influence on capital employed efficiency, human capital employed efficiency, has a positive but not significant influence, firm size (FISZ) has a negative and significant influence and firm age (FIRA) has a positive and non-significant influence on firm value of non-financial firms in Nigeria.

## CONCLUSION

This study explored the influence of intellectual capital on the firm value of seventy-six quoted firms in Nigeria for ten years under review (2011-2020).

This result concludes that only human capital employed efficiency and firm age influenced firm value positively.

## RECOMMENDATION

Based on the findings of this research, the following recommendations were made.

The human capital component of intellectual capital should be trained and educated regularly, innovated, nurture capacity, creativity, know-how, and previous experience, teamwork capacity, employee flexibility, and tolerance for ambiguity, motivation, satisfied, so as to enhance the usefulness of its output to total input.

Firm-specific growth and sustainability policy should be strongly placed using corporate governance code and other enhanced internal structural innovative processes to ensure that the firm does not extinct since age is of the essence

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