ISSN: 2006-1013

The Nigerian Accounting Horizon
Department of Accounting, University of Jos
Website: https://nahjournal.org.ng Volume 10, No. 1, 2025

Structural Capital, Relational Capital and Firm Value of Listed Consumer Goods Companies in Nigeria

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Abstract
The study examines the effect of structural and relational capital on the firm value of listed consumer goods companies in Nigeria from 2014 to 2023. Using longitudinalresearch design, firm value was measured by Tobins Q, and panel multiple regression analysis was employed to assess the relationships. The findings reveal that structural capital efficiency has a positive and significant effect on firm value, emphasizing the critical role of investments in infrastructure, technology, and intellectual property in enhancing operational efficiency and firm value. Conversely, relational capital efficiency exhibits a negative but insignificant effect on firm value, indicating that the current strategies for managing relationships with stakeholders do not significantly contribute to firm valuation. Based on these findings, the study concludes that structural capital efficiency has a positive significant effect on the firm value of listed consumer goods companies in Nigeria while relational capital efficiency, on the other hand, has a negative but insignificant effect on firm value. The study recommends prioritizing investments in structural capital while reassessing and improving relational capital management strategies to enhance the overall value of Consumer goods companies in Nigeria.

Keywords: Structural Capital, Relational Capital, Firm Value, Consumer Goods Companies.

Introduction
Firm value is crucial as it reflects the overall health and performance of a company, impacting its ability to attract investments, secure financing, and achieve sustainable growth. The decline in firm value poses risks not only to the companies themselves but also to the broader economy, affecting employment, consumer confidence, and market stability. The value of firms within the consumer goods sector in Nigeria is facing significant challenges. Despite the increasing demand for consumer goods, many companies are struggling to enhance and maintain their firm value. These challenges include competitive pressures, fluctuating market conditions, and inefficiencies in business operations.

Structural capital plays a vital role in determining firm value by enhancing operational efficiency and innovation within an organization. Structural capital encompasses the non-human knowledge assets of a firm, such as organizational systems, processes, intellectual property, and infrastructure. These elements provide the foundation for firms to operate efficiently, achieve competitive advantages, and adapt to dynamic market demands. For instance, Albort-Morant et al. (2018) highlighted that robust structural capital is positively linked to innovation capabilities, which drive productivity and profitability. Similarly, Amiri et al. (2022) found that firms with advanced technological frameworks and efficient internal processes reported higher financial performance and market valuation. In the context of consumer goods companies in Nigeria, the effective utilization of structural capital can streamline production processes, reduce waste, and ensure consistent product quality, ultimately contributing to enhanced firm value.

Furthermore, structural capital facilitates knowledge sharing and organizational learning, which are vital for innovation and competitiveness (Bontis, 1998). By codifying and organizing knowledge in databases and other systems, organizations can capture and disseminate best practices, lessons learned, and innovative ideas across the company (Kaplan & Norton, 2004). This knowledge sharing culture fosters innovation, enables faster decision-making, and helps organizations adapt to changing market conditions, ultimately contributing to higher firm value (Talaromi&Nezhad, 2013).

Relational capital reflects the value embedded in a firm's relationships with external stakeholders, also significantly impacts firm value. This intangible asset includes customer loyalty, supplier relationships, brand reputation, and collaborative networks. Relational capital helps firms establish trust, increase stakeholder satisfaction, and maintain competitive advantages in the marketplace. According to Delgado-Verde et al. (2021), relational capital positively affects firm performance by enhancing customer retention and facilitating market penetration. Furthermore, Wang and Hu (2023) noted that firms with strong relational capital are better equipped to weather external uncertainties, as they can rely on established networks for support and resources. For Nigerian consumer goods companies, relational capital is particularly critical due to the highly competitive and consumer-driven nature of the industry. Strong customer relationships and brand loyalty enable firms to sustain demand and command higher market shares. However, firms often struggle to develop and maintain relational capital due to fluctuating consumer preferences, weak supply chain integration, and limited resources for marketing and branding efforts.

Strong relational capital with customers can lead to higher levels of customer loyalty and retention. When customers have positive experiences and trust the firm, they are more likely to make repeat purchases and become long-term clients. Increased customer retention can stabilize revenue streams and reduce customer acquisition costs, positively impacting firm value (Aledwan, 2014). Firms that invest in developing and leveraging their intellectual capital tend to perform better, achieve sustainable growth, and enhance their overall financial and operational performance in both the short and long term.

Consumer goods companies in Nigeria face challenges in optimizing the benefit of intangible assets despite the significant contributions of structural and relational capital to firm value. Structural capital development is often hindered by outdated systems, inadequate infrastructure, and a lack of investment in innovation, which limits operational efficiency and adaptability. At

the same time, weak relational capital, stemming from insufficient customer engagement strategies and fragmented supply chains, hampers firms' ability to build trust and loyalty in a competitive market. These gaps not only reduce firm value but also threaten the long-term sustainability of consumer goods companies in Nigeria. While existing studies have explored intellectual capital broadly, there is limited empirical evidence focusing on the specific relationships between structural capital, relational capital, and firm value within the Nigerian context. This study aims to address these gaps by examining how these dimensions of intellectual capital impact firm value in consumer goods companies in Nigeria, providing insights for managers and policymakers to enhance corporate performance and competitiveness.

In meeting the overarching aim of the study, the following specific hypotheses were tested.

HO_1: Structural capital efficiency does not have significant effect on firm value among listed consumer good companies in Nigeria.

HO_2: Relational capital efficiency does not have significant effect on firm value among listed consumer good companies in Nigeria.

Literature Review

Concept of Structural Capital

Ramezan (2021) describes structural capital as "the embedded knowledge in the organization which is supportive to human capital, comprising both formal and informal structures such as culture, learning processes, and job performance enhancement".

Cohen and Kaimenakis (2021) state that structural capital is adopted by the organization and remains with it, providing a conducive environment, increasing knowledge facilities, and helping in productivity. Edvinsson and Malone (1997) defined structural capital as the foundation for innovation which creates an environment where ideas can be developed, tested, implemented and used to facilitate knowledge sharing and organizational learning. According to Bontis (1999) structural capital is essential for transforming individual knowledge into organizational value, as it ensures that knowledge is codified, stored, and leveraged effectively across the firm which enhances productivity but also fosters innovation and adaptability in a competitive environment. For example: tangible and intangible resources such as operational manuals, IT infrastructure, patents, buildings, hardware, software, processes, trademarks, advanced technological systems, organization's image, organization structure, information system, and proprietary databases that enable the smooth flow of information and knowledge amongst employees within a firm to collaborate more efficiently, leading to better decision-making and innovation (Anuonye, 2014; Abraham &Ofosu, 2018)). Firms with well-developed structural capital are more likely to respond effectively to market changes and maintain a competitive edge. However, in this study, structural capital are the supportive infrastructure that enables human capital to function in an organization.

Concept of Relational Capital

Wines (2021) describe relational capital as an intangible asset that is built up over time, between two people when understanding and trust are present and growing. The level of relationship capital available between

two people often starts small and grows with time. **Ramírez-Solis, et al. (2022)** state that relational capital "captures the quality of relationships within which economic exchanges take place and is crucial for an organization's success".

Introhive (2022) defines relational capital as "an asset that is difficult to measure, but its importance is also easy to underestimate. It is made up of a company's extended network of contacts and associations, including customers, partners, groups, suppliers. However, Altaweel and Sammak (2014) defined relational capital as the relationship between the organization and its customers that arise from meeting the needs and desires of customers, solve their problems and satisfy their needs. Hassan (2015) indicated that the relationship between the organization and all the parties that contribute to the development of ideas, and create new products and services. Relational capital is a set of relationships and values linking the organization with its customers through the achievement of their desires and meet their needs, and thereby the organization ensures customer satisfaction, and increase their loyalty and belonging to the organization through paying greater attention to customer views and comments and taking them into account (Prabowo, 2017). Relational capital represents external capital of the organization, which refers to the vital external relations established by the organization (Nwaiwu&Aliyu, 2018).

Relational capital is often measured through indicators such as customer retention rates, market share, brand equity, and the quality of partnerships or networks. For instance, a company with strong relational capital might have long-term contracts with loyal customers, robust partnerships with suppliers, and a reputation for ethical practices that attracts investors and talent.

Concept of Firm Value

Hariati and Prihatiningtyas (2015) expressed firm value as the value of the equity market which is based on market prices that are often associated with the price of a company's stock in the capital market. Oktarina (2018) defined firm value as a firm value which is closely related to stock prices and which gives investors an insight into the risks and prospects of the company in the future. Firm value is very important because high firm value results in high prosperity of shareholders. Pratiwi et al. (2019) defined company value as an investor's perception of a public company that is often associated with stock prices. The company value can be measured in several ways, one of which is the value of the equity market. Pratiwi et al. (2019) further asserted that company value can be interpreted as an assessment conducted by investors on the level of success of the company in managing its resources. Company value can describe the condition of the company. The better the value of the company, the more attractive it would be to prospective investors.

Sundari and Sendiany (2021) opined that an important goal of a company is to optimize shareholder wealth and to maximize the value of its shares. Firm value can be interpreted as the company's performance which can be seen from the stock price due to supply and demand in the capital market and becomes a benchmark for public assessment of the company's financial performance. The increasing value of the company has the potential to increase investor confidence in investing in a company because it illustrates the company has the potential to have good prospects in the future and bring high returns on equity.

Empirical Review

Elfiswandi et al. (2019) explored the influence of intellectual capital on the financial performance of 25 listed banking companies in Indonesia from the year 2008 to 2013 using panel data regression predicated on an explanatory design. Findings showed structural capita, human capital and

relational capital positively influenced performance while CEE slightly influenced Net Interest Margin. The study cannot be generalised to the consumer gods companies which necessitated this study.

Halimatu et al. (2019) examined effect of structural capital on the performance of listed consumer goods companies (CGCs) in Nigeria, using panel data for a period of six years (2012 – 2017). Multiple regression analysis revealed that intellectual property rights had positive and significant effect on performance of listed CGCs in Nigeria. The period of the study is not recent which requires recent study that can reflect changes in the consumers operations.

Nnubia et al. (2019) investigated the effect of intellectual capital on the performance of non-financial firms in Nigeria. A sample of 21 non-financial Nigerian businesses listed on the NSE for ten years (from 2007-2016) was used in the study. The data were analyzed using the Ordinary Least Squares Method. The results showed that for the Nigerian listed non-financial firms, the explanatory variables capital employed efficiency, human capital efficiency and structural capital efficiency has positive and significant effect on measurement of performance. The study cannot be generalised to the consumer gods companies which necessitated this study.

Shubita (2019) applied the value-added intellectual coefficient (VAIC) model to test the impact of intellectual capital (IC) on firm value of 73 Jordanian manufacturing companies during the period 2005–2017. firm value was measured using the market capitalization over the total assets. The IC and its components: capital employed (CEE), structural capital (SCE), and human capital (HCE) of industrial firms have been analyzed, and their impact on firm value has been estimated using regression models. The results show that there is no relationship between IC and the market value; HCE is associated with the market value, and SCE and CEE are not associated with the market value. The study cannot be generalised to the consumer gods companies which necessitated this study.

Nguyen and Duong (2020) investigate the impact of intellectual capital on firm value in the context of Vietnam. The study sample covered 61 manufacturing companies listed on Vietnam stock market from 2013 to 2018. Three statistical methods approaches are employed to address econometric issues and to improve the accuracy of the regression coefficients include Ordinary Least Square (OLS), Random Effects Model (REM) and Fixed Effects Model (FEM). The study used value-added intellectual capital (VAIC) to measure the intellectual capital of a firm. The VAIC includes the sum of three components: Human Capital Efficiency (HCE), Structure Capital Efficiency (SCE) and Capital Employed Efficiency (CEE, including physical and financial capital). In the study, firm value is measured by Tobin's Q ratio. Some control variables such as leverage, firm size, growth rate, and state capital are used in the regression model that pointed out the impact of intellectual capital on a firm value. The empirical results show a statistically significant positive impact of value-added intellectual capital (VAIC) on a firm's profitability. The country of the study is different and the findings cannot be generalized to the consumer goods companies in Nigeria.

Ousama et al. (2020) investigated the relationship between the intellectual capital (IC) disclosure reported in the annual reports and firm value of the companies listed on the Qatar Stock Exchange. The study is based on a panel data for six years from 2010-2012 and 2016-2018. The regression model is based on Ohlson's model, which has been modified by including IC information. The study found that there is a significant relationship between IC information and firm market value.

The country of the study is different and the findings cannot be generalized to the consumer goods companies in Nigeria.

Novita et al. (2023) examined the effect of intellectual capital and corporate governance on firm value. The population of this study was all banking companies listed on the Indonesia Stock Exchange from 2015-2019, out of which a purposive sample of 26 companies were selected as samples with a total data of 130 companies. Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed as the method of data analysis. Findings indicated that intellectual capital and corporate governance affect company performance. Intellectual capital does not affect firm value. Company performance and corporate governance affect firm value. The country of the study is different and the findings cannot be generalized to the consumer goods companies in Nigeria.

Theoretical Framework

Knowledge-Based View Theory

The Knowledge-Based View (KBV) of the firm was primarily developed and popularized by **Robert M. Grant.** His influential work, particularly the 1996 paper titled *"Toward a Knowledge-Based Theory of the Firm.* Knowledge is the life-wire of any organization such that it is unique, valuable, rare and not easy to replicate as it provides the firm with a capability and competence needed to achieve a competitive advantage via knowledge workers who are embodied in the human capital and structural capital of the firm. Drucker (1999b) states that the most important contribution management needs to make in the 21st century is similarly to increase the productivity of knowledge worker. The knowledge-based view of the firm identifies the primary rationale for the firm as the creation and application of knowledge (Demsetz, 1991).

The transition of society from the industrial era to the knowledge era has shifted the importance from tangible assets to intangible ones. Hall (1992) in a survey of CEOs found that employee know-how and reputation were viewed as the most critical intangible resources for the firm. Therefore, the ability of firms to generate and exploit new forms of knowledge is vitally important (Anand, 2007). The relevance of the theory to this study is that it considers cost of education, training, development and even workers' medical treatment as investments towards improved productivity of individual workers and also creates a sort of competitive advantage which ultimately results in improved organizations corporate value. Thus, if these are investments like other physical assets which are reflected on the statement of financial position, considerable effort must also be made to reflect such value of knowledge in human capital on the statement of financial position.

The Knowledge-Based View (KBV) Theory explains the relationship between structural capital, relational capital, and firm value by emphasizing knowledge as a key organizational resource. KBV views a firm's ability to acquire, create, and utilize knowledge as the foundation of competitive advantage and long-term value creation. In this context, structural and relational capital are critical components of a firm's intellectual capital, working together to enhance organizational performance and market value.

The interplay between structural and relational capital is central to KBV's explanation of firm value. Structural capital provides the systems and processes that enable the organization to effectively manage and utilize the knowledge embedded in its external relationships. Relational capital, in turn, enriches the firm's knowledge base by facilitating access to external resources and

expertise. For example, a firm's ability to co-create innovative solutions with partners is enhanced when it has the structural capacity to institutionalize and operationalize the insights gained from these collaborations. Moreover, structural capital ensures that the benefits of relational capital are sustainable by codifying stakeholder relationships into systems and processes, making them less dependent on individual interactions.

Ultimately, KBV highlights that the combined effect of structural and relational capital significantly enhances firm value. Structural capital ensures that knowledge is efficiently captured and utilized within the organization, while relational capital ensures a steady inflow of new knowledge and opportunities from external sources. Together, these forms of capital drive innovation, improve operational efficiency, and strengthen competitive advantage, all of which contribute to long-term profitability and market value. Thus, KBV shows the importance of leveraging both internal and external knowledge resources to create and sustain firm value in today's knowledge-driven economy.

Methodology

The study adopts longitudinal research design. The population of the study comprised of the seventeen (17) entire listed consumer goods companies on the Nigeria exchange group from 2014-2023. The sample size comprised of 14 consumer goods companies. The data on intellectual capital components and firm value is sourced from audited annual reports of the companies. Panel multiple regression was used to determine the effect of structural and relational capital on firm value of listed consumer goods in Nigeria. The study also conducted descriptive analysis of the variables, correlation matrix, multicollinearity test using Variance Inflation Factor, heteroskedasticity test and normality test of the variables. The linear model for the study is specified as:

$$FV_{\text{it}} = \beta_0 + \beta_1 SCE_{it} + \beta_2 RCE_{it} + \beta_3 FS_{it} + \varepsilon_{it}$$

Where;

FV_{it} = firm value of firm I at time t
SCE_{it} = Structural capital efficiency of firm I at time t
RCE_{it} = Relational capital efficiency of firm I at time t
FS_{it} = Firm Size of firm I at time t
βo = constant
β_1- $\beta 3$ = coefficients of estimates
$\mathcal{E}$ = error term
i = firm
t = time

Table 1

Measurements of Variables

Variable	Measure	Validity Construct
Firm Value (FV)	Tobins Q = Market Value of Firm / Cost of Firm's Assets	Thenmozhi (2000); Stern (1991)
Structural capital Disclosure (SCE)	Log of structural capital efficiency in the annual report	Jihene (2013); Umar (2017)

Relational Capital Disclosure (RCE)	Log of relational capital efficiency in the annual report	Altal (2016); Anuonye (2014).

Note. Compiled by the Researcher.

Results and Discussion

Table 2

Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
FV	140	0.285754	0.170035	0.021877	0.900291
SCE	140	9.217431	1.027663	6.704897	11.80582
RCE	140	8.588488	0.8253024	6.540705	10.81976
FS	140	7.919857	0.623729	6.450942	9.435637

Note. Stata output Version 17.

The result shows that consumer goods companies had a high firm value with maximum value of 0.9. With positive firm value, it shows that the companies were performing better while the minimum firm value is 0.02. This also shows that the companies had positively increase the firm value. The mean value of 0.285754 shows that the companies had 28.6% increase in firm value over the past ten years.

Structural capital efficiency which is the supportive infrastructure that enables human capital to function has a mean of 9.217431 while the maximum and minimum is 11.80582 and 6.704897 respectively. In the same way, relational capital efficiency has a mean disclosure of 8.59 while the maximum and minimum is 10.82 and 6.54 respectively.

The firm size (FS) which is used to control the outliers in the model shows a mean value of 7.919857 while the maximum growth in the asset of the companies is 9.435637 with a minimum of 6.450942. The deviation from the mean is 0.623729. The observation of 8 shows the total cross-section and time series information obtained from the company's annual report for the period of ten years.

Table 3

Correlation Matrix

	FV	SCD	RCD	FS
FV	1.0000			
SCE	-0.2392	1.0000		
RCE	-0.3140	0.4417	1.0000	
FS	0.009905	0.423632	0.011412	1.0000

Note. Stata output, Version 17.

The relationship between the variables is check with the correlation result above. The test helps in ascertaining the direction of the relationship between the variables. It was found that structural

capital efficiency is negatively correlated with firm value to the extent of 23.9% and relational capital efficiency is negatively correlated with firm value to the extent of 31.4%.

Table 4: *Hausman Specification*

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 5.85

Prob>chi2 = 0.5573

(V_b-V_B is not positive definite)

***Note*. Stata output Version 17**

The Hausman test is a statistical procedure used in panel data analysis to determine whether to use a fixed effects model or a random effects model. The test examines if the unique errors (or individual effects) are correlated with the regressors. In the Hausman test, the null hypothesis assumes that the random effects model is appropriate, implying no correlation between the individual effects and the regressors. The alternative hypothesis suggests that the fixed effects model is suitable, indicating the presence of such a correlation. It was found that random model regression is appropriate because the p-value of Hausman specification is greater than 5% level of significance.

Table 5

Breusch and Pagan Lagrangian Multiplier Test for Random Effects

	Var	**Sd = sqrt (Var)**
FV	0.381053	0.6172949
e	0.0434237	0.2083836
u	0.1910452	0.4370872

Test: Var(u) = 0 chibar2(01) = 256.30

Prob> chibar2 = 0.0000

***Note*. Stata output Version 17**

The Lagrangian result is used to choose between random model and the pooled regression but the result support the choice of random model because the prob. value is less than 5% level of significance.

Table 6

Regression Result

R-sq:	0.7080
Prob> chi^2:	0.0000

FV	**Coef.**	**Std. Err.**	**z**	**P > |z|**	**HO Decision**

SCE	0.0303525	0.0149972	2.02	0.043	Not Accepted
RCE	-0.0178018	0.044723	-0.40	0.691	Accepted
FS	-0.0949031	0.024151	-3.929488	0.000	

***Note*. Stata output Version 17**

Discussion of Finding

The result shows that structural capital efficiency has positive significant effect on firm value of listed consumer goods companies in Nigeria. This indicates that when the companies spend more on the supportive infrastructure such as: buildings, hardware, software, processes, patents and trademarks, it will improve the firm value because the support the operations of the business. Studies that support the finding that structural capital efficiency positively and significantly affects firm value include those by Ogiriki and Oruh (2022), who found a significant positive impact of structural capital efficiency on economic value among listed consumer goods firms in Nigeria. Similarly, Akinadewo and Falana (2024) concluded that structural capital disclosure significantly influences the value of listed service firms. Nneji et al. (2023) also reported a positive effect of structural capital efficiency on Net Assets Per Share for listed manufacturing firms, suggesting that well-developed organizational structures and processes enhance firm value. Conversely, some studies present conflicting results. Ukpong et al. (2024) found no significant effect of structural capital efficiency on the cost of equity among listed manufacturing companies, implying a neutral impact on firm value. Onuoha (2022) also reported that while structural capital positively affected financial performance, it did not have a direct significant impact on firm value in the banking sector. These contrasting findings highlight that the effect of structural capital efficiency on firm value may depend on industry characteristics, measurement methods, and the specific aspects of structural capital considered.

The result indicating that relational capital efficiency (RCE) has a negative but insignificant effect on firm value with a p-value greater than the 5% level of significance suggests that, although there is a negative relationship between RCE and firm value, this relationship is not statistically significant. In other words, the observed negative effect could be due to random variation rather than a true underlying relationship. In this context, it means that the negative impact of relational capital on firm value is not strong enough to be considered meaningful or reliable based on the sample data. This outcome could be attributed to various factors, such as insufficient utilization of relational capital, ineffective management of customer and stakeholder relationships, or the possibility that other forms of intellectual capital (like structural or human capital) play a more dominant role in influencing firm value. It also suggests that firms might need to reassess how they leverage their relational assets to enhance value effectively.

In this study, **firm size** is used as a control variable, the essence is to account for the influence that the size of a company might have on the relationship between the structural and relational capital on firm value. Therefore, it was found that firm size has negative significant effect on firm value of listed consumer goods firms in Nigeria.

The coefficient of determination indicates that the independent variables used in this study explained 70% variation on firm value while the remaining variation is explained by other variables not included in the model. The prob, shows that the model is significant which indicates that the model is fit.

Conclusion and Recommendations

The study concluded that structural capital efficiency has a positive and significant effect on the firm value of listed consumer goods companies in Nigeria. This finding highlights the critical role of supportive infrastructure, such as buildings, hardware, software, patents, and trademarks, in enhancing business operations and improving overall firm value. Firms that invest in these areas are better positioned to increase their competitiveness and market valuation.

Relational capital efficiency, on the other hand, has a negative but insignificant effect on firm value. This implies that the current strategies for managing relationships with customers, suppliers, and other stakeholders are not significantly contributing to firm value. It suggests that while relational capital remains important, its effective utilization may require improvement or a strategic overhaul.

Based on these conclusions, it is recommended that consumer goods companies should focus on enhancing structural capital efficiency by increasing investments in infrastructure, technology, and intellectual property. These investments can strengthen their operational capabilities, foster innovation, and ultimately improve their market value.

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