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THE NEXUS BETWEEN STRUCTURAL CAPITAL EFFICIENCY AND AGENCY COSTS: EVIDENCE FROM LISTED NON-FINANCIAL FIRMS IN NIGERIA

The study investigated the nexus between structural capital efficiency and agency conflicts using sample of sixty-six (66) non-financial firms listed on the Nigerian Stock Exchange between 2010 and 2019. These 660 firm-year observations were extracted from the annual reports of the sample firms for various years. Agency costs is proxy with asset turnover rate and operating expense ratio as alternative measure for robustness analysis. Structural capital efficiency was obtained following Pulic (2000) estimation of value-added intellectual capital coefficient. Descriptive statistics tools of mean and standard deviation as well as bi variate tool of correlation coefficients were used for preliminary analysis of the study. The hypotheses were tested using panel feasible generalized least square regression. The results of the analysis reveal that structural capital efficiency has significant positive impact on asset turnover rate while it has significant negative impact on operating expense ratio implying that results obtained are robust to alternative proxy for agency costs. It is therefore recommended that the management who wish to satisfy the interest of their principal can leverage on the efficiency of their structural capital to achieve the goal. In addition, the shareholders should monitor the efficiency of structural capital in their subscribed firms since it automatically helps to limit the agency problem. Also, potential investors should consider the efficiency of the structural capital within a firm in making their investment decisions.

Key words: agency costs, agent, non-financial firms, principal, structural capital efficiency.

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Құрылымдық капиталдың тиімділігі мен агенттік шығындары арасындағы байланыс: Нигерияның қаржылық емес фирмаларының мысалында

Зерттеу Нигерия қор биржасында 2010 жылдан 2019 жылға дейін белгіленген алпыс алты (66) қаржылық емес фирмалардың іріктемесін қолдана отырып, құрылымдық капиталдың тиімділігі мен агенттік шығындары арасындағы байланысты зерттеді. Бұл 660 жылдық бақылау фирмалардың әр жылдардағы жылдық есептерінен алынған. Агенттік шығындар сенімділікті талдау үшін баламалы шара ретінде активтер айналымы жылдамдығының және операциялық шығындар коэффициентінің жанама көрсеткіштері болып табылады. Құрылымдық капиталдың тиімділігі зияткерлік капиталдың қосылған құнының Pulic (2000) коэффициентін бағалаудан кейін алынды. Зерттеу барысында орташа және стандартты ауытқудың сипаттамалық статистикалық құралдары, сондай-ақ жұптық корреляция коэффициенттері қолданылды. Гипотезалар ең кіші квадраттардың панельдік жалпыланған регрессиясы арқылы сыналды. Талдау нәтижелері құрылымдық капиталдың тиімділігі активтердің айналым жылдамдығына айтарлықтай оң әсер ететіндігін, сондай-ақ операциялық шығыстар коэффициентіне айтарлықтай теріс әсер ететіндігін көрсетеді, бұл алынған нәтижелер агенттік шығындар үшін баламалы көрсеткіштерге төзімді екендігін білдіреді. Сондықтан өз қызметкерлерінің мүдделерін қанағаттандырғысы келетін басшылық мақсатқа жету үшін өзінің құрылымдық капиталының тиімділігін пайдалана алуы ұсынылады. Сонымен қатар, акционерлер өз фирмаларындағы құрылымдық капиталдың тиімділігін бақылауы керек, өйткені бұл агенттік мәселелерді автоматты түрде шектеуге көмектеседі. Сонымен қатар, әлеуетті инвесторлар инвестициялық шешімдер қабылдаған кезде компания ішіндегі құрылымдық капиталдың тиімділігін ескеруі керек.

Түйін сөздер: агенттік шығындар, агент, қаржылық емес фирмалар, қызметкерлер, құрылымдық капиталдың тиімділігі.

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**Взаимосвязь между эффективностью структурного капитала
и расходами агентства:
на примере определенных нефинансовых фирм Нигерии**

В исследовании изучалась взаимосвязь между эффективностью структурного капитала и расходами агентств с использованием выборки из шестидесяти шести (66) нефинансовых фирм, котирующихся на Нигерийской фондовой бирже в период с 2010 по 2019 год. Эти 660 наблюдений за год взяты из годовых отчетов фирм за разные годы. Агентские расходы являются косвенными показателями скорости оборачиваемости активов и коэффициента операционных расходов в качестве альтернативной меры для анализа надежности. Эффективность структурного капитала была получена после оценки Pulic (2000) коэффициента добавленной стоимости интеллектуального капитала. Для предварительного анализа исследования использовались инструменты описательной статистики среднего и стандартного отклонений, а также парных коэффициентов корреляции. Гипотезы были проверены с помощью панельной обобщенной регрессии наименьших квадратов. Результаты анализа показывают, что эффективность структурного капитала оказывает значительное положительное влияние на скорость оборачиваемости активов, а также оказывает значительное отрицательное влияние на коэффициент операционных расходов, что означает, что полученные результаты устойчивы к альтернативным показателям для агентских затрат. Поэтому рекомендуется, чтобы руководство, желающее удовлетворить интересы своих сотрудников, могло использовать эффективность своего структурного капитала для достижения цели. Кроме того, акционеры должны контролировать эффективность структурного капитала в своих фирмах, поскольку это автоматически помогает ограничить агентские проблемы. Кроме того, потенциальные инвесторы должны учитывать эффективность структурного капитала внутри фирмы при принятии инвестиционных решений.

Ключевые слова: агентские издержки, агент, нефинансовые фирмы, сотрудники, эффективность структурного капитала.

Introduction

The contemporary corporate settings in which the firm shares are held by diverse investors, and the owners are separated from the management make agency conflicts not impossible. The complexity of the corporate business requires that the principal delegates the day to day running of the business to the manager who is expected to maximize the welfare of the shareholders. In the process of discharging this duty, manager could have incentives to pursue self-interest objectives at the expense of shareholder's wealth maximization. Hence, it creates agency conflicts. These agency conflicts may be between the principal and agents which is referred to as principal agent conflict or type I agency costs (Jensen & Meckling, 1976) or between majority shareholders and minority shareholders which is known as principal-principal conflict or type II agency costs. Furthermore, agency conflicts can result from poor management investment and financing decisions and low dividend payout (Wijaya, 2016).

Agency conflicts in corporate organization is accompanied by several intended and unintended consequences which may impede the growth and survival of the firm. One of the consequences of

agency conflicts is the loss to the shareholders' wealth (Jensen & Meckling, 1976) with implications on the demand for the firm share and ability to attract needed capital for the firm expansion.

Theoretical arguments situated within agency theory suggest that agency conflicts in corporate organizations can be mitigated through three ways (Eisenhardt, 1989; Jensen, 1986). The first is the alignment of the interest of the principal and agent which can be achieved through the acquisition of the firm share by the managers so that the agent can also be interested in firm value maximization which is the interest of the other shareholders. Hence, managerial ownership could influence agency conflicts between the principal and the agents. There can also be alignment of interest if the remuneration of the principal is tied to the performance of the firm. The second way involves monitoring and control as posited by efficient monitoring hypothesis under which the principal (shareholders) adopt efficient monitoring mechanism to limit the opportunistic behavior of the agent (management). The variables involved under monitoring approach include board size, board independence, concentrated ownership and institutional ownership.

The resource dependence however argued that the efficiency of structural capital within an organization could help to reduce agency conflicts (Tseng & Goo, 2005). Their argument is premised on the fact that firm characterized with better structural or organization capital have prospects to identify adequate investment and financing opportunities which can result to improved shareholders wealth maximization and reduction in agency conflicts. There is overwhelming empirical evidence that efficiency of corporate structural capital enhances firm performance which in turn improved dividend payout by management to the principal. The global corporate environment is becoming highly competitive almost every day, hence resources that promote value-creation for company in order to compete favourably have been subject of concern.

Substantial empirical literature have studied the factors that have the potential to mitigate agency problems. Some of the studies found results which suggest that that agency conflicts between manager and the shareholders is affected by corporate governance variables such as board size, board independence and CEO duality, results from some others revealed that agency conflicts are mostly influenced by ownership structure such as block ownership, institutional ownership and managerial ownership. In spite of the overwhelming evidence that by creating value addition in a firm through better firm performance, adequate investment and financing decisions, structural capital could mitigate agency conflict, there is no robust empirical evidence on the link between structural capital and agency costs. Only, the study by Wiyaja (2017) and (2016) empirically linked structural capital with agency costs.

Given the relatively very few empirical literature on the nexus between structural capital efficiency and agency costs especially within Nigeria context where no study of such nature could be found, investigating the impact of structural capital efficiency on agency costs would be worthwhile. Hence, the main objective of this study is to examine the impact of structural capital on agency costs using sample of listed non-financial firms in Nigeria. The outcome of this study is expected to contribute to the theoretical and empirical literature on agency problems in corporate organizations.

Literature Review

This section presents the review of various concepts that are essential to the proper understanding and conceptualization of this study. They are presented subsequently.

Agency Cost

This is part of the firm internal costs which arises due to agency problem. This term has been defined in various ways. For instance, it is described as the costs incurred by the owners or even management in order to organize and control the management performance in a way that fits the firm (Jensen, 1986). Agency costs have the potential to retard the corporate performance, destroy the shareholder's wealth in addition to its adverse effect on other corporate shareholders.

Several relative measure of agency costs have been developed in literature. They include the asset utilization ratio, operating expenses ratio, general and administrative expenses ratio, administrative expenses ratio, liquidity ratio and others. They are explained below:

Asset Utilization Ratio is also called asset turnover ratio and it is measured as the ratio of annual sales to the annual total assets based on the assumption that firms that management decisions creates more value for shareholders if the ratio is higher. This proxy measures the management shirking and poor asset management (Ang et al., 2000; Chen & Yur-Austin, 2007). It is also recognized as a measure of management capacity to efficiently utilize the firm's assets and it is inversely related to the agency costs (Ang et al., 2000; Chen & Yur-Austin, 2007; Singh & Davidson, 2003). This measured has attracted wide application in literature (Nguye et al., 2020; Rashid, 2015; Yim, 2020)

The Asset Liquidity Ratio is measured as the sum of cash and marketable securities scaled by the total assets, because management will have relatively lower access to cash that can be used for opportunistic decision, lower asset liquidity ratio is expected to mitigate agency problem. The proxy has been used in previous empirical literature (Garanina & Kaikova, 2016; Siddqisui et al., 2013).

Operating Expenses Ratio: This ratio is one of the widely used financial ratios to proxy agency costs in literature. It reveals the extent to which the firm operate efficiently. Higher operating expenses ratio implies poor management of the firm and agency costs as given sales unit attract relatively higher costs. Also, operating expenses reflect the management discretion in spending the resources of a firm (Alfadhil & Alabdullah, 2013). Thus, the higher this ratio, the higher the agency costs and vice versa. This proxy has been used in previous empirical literature (Chamidah & Asandimita, 2017).

Structural Capital

The term structural capital which is also called organizational capital has been defined variedly

in extant literature by different authors. Structural capital refers to organizational systems, culture, practices, processes and business routines (Marr & Moustaghfir, 2005). Structural capital is an organizational structure value of a company and knowledge that is stored in manuals, products concepts, information systems and organizational value (Chatzkel, 2002). It represents the form of intellectual capital which is an embodiment of the organization corporate culture, technology systems, intellectual property, the management process and learning capacity (Alhassan & Asare, 2016).

Theoretical Framework

This study is underpinned by resource dependence theory. Resource dependence theory as it relates to the agency conflicts between the principal and agent can be traced to Pfeffer and Salancik (1978). Resource based theory provides evidence on how firm resources should be managed to achieve competitive advantage (Priem & Butler, 2001). The resource dependence theory stresses the importance of intellectual capital that resides in a firm such as the expertise, industry experience, and knowledge as well as organizational capital on agency related costs through their impact on firm performance (Finkelstein & Hambrick, 1996; Zahra & Pearce, 1989). The expertise, industry experience and knowledge that reside within an organization constitute the human capital while the organizational structure is the structural capital embedded in an organization. By implication, the theory posits that human capital and structural capital within an organization has the potential to influence firm's financial and non-financial outcomes.

The supporters of this theory argue that the employees of the firm have valuable resources including knowledge and technical expertise gained from different training attended (Ahmed et al., 2006; Kesner, 1988). These knowledge, experience and expertise increase their ability to comprehend different national and international contexts under which the firm can compete favourable while satisfying the interest of different stakeholders of the firm. By implication, human capital and structural capital which are both components of intellectual capital may add value to the firm in the form of agency costs reduction by attracting internal resources that are essential to the success of the firms (Maasen, 2002).

Review of Empirical Literature

Several studies have been conducted to examine the factors that can mitigate agency conflicts in corporate organizations. Majority of the studies focus on the role of corporate governance and

ownership structure while very few of the literature considered the role of structural capital efficiency in reducing agency costs.

Djamil et al. (2013) found in a study of listed 25 banks in Indonesian that structural efficiency has positive but insignificant impact on stock market return implying that structural capital efficiency does not significantly affect agency conflicts in the study area. Appuhami (2007) studied the impact of intellectual capital efficiency using sample of listed firms on Thai Stock Exchange. The results of the study show that structural capital efficiency has positive albeit insignificant impact on investors capital gain on shares.

Gao et al. (2020) examined if organization or structural capital has significant substitution effect on executive pay-for-performance sensitivity (PPS) using a sample of 30678 US firms between 1992 and 2015. The study was based on principal-agent model and it measured PPS with delta and the data were analyzed using difference in difference technique of analysis. The results of the analysis revealed that organization capital has significant negative impact on executive effort and compensation. In particular, it was found that both organizational capital and PPS have significant positive impact on stock returns, the positive impact of OC dominates the positive impact of the PPS which implies that OC reduces the marginal effect of executive effort on firm outcomes which lead the shareholders of firms with greater OC to reduce costly executive PPS. It was concluded that since high-powered managerial incentive is related to earnings management and accounting fraud, the results suggest that organization capital has the potential to limit agency conflict between the principal and the manager.

Johnson and Elliott (2011) studied the impact of social capital on organization outcome using a case study of UK high way agency. The results of their study revealed that structural capital efficiency significantly reduces the chances of an organization falling into crisis and helps firm in crisis to overcome it quickly. Marwick et al. (2020) studied the impact of organization capital on corporate cash holdings in a sample of 15795 US firms between 1981 and 2017. The results of their study show that structural or organization capital has positive impact on corporate cash holding implying that organization capital may deepen agency problem related to dividend payout in corporate firms especially if the cash holding is for agency motive rather than precautionary motive. Lev et al. (2009) reported that organization capital has significantly positive impact on stock market return.

Furthermore, extant empirical studies have also revealed that agency costs of entities are affected by some firm-level characteristics including firm size, financial age, and firm growth. Akway and Ramadan (2019) reported a significant positive impact of firm size on agency costs of listed non-financial firms in Egypt. Aras and Furtunal (2015) also reported a significant positive impact of firm size on agency costs measured by asset utilization ratio. Zhang et al. (2020) reported a significant negative impact of firm size on agency costs measured by operating expenses to sales ratio. Zhang et al. (2020) found a significant negative impact of firm performance on agency costs of listed Chinese firms between 2005 and 2015. Aras and Furtuna (2015) found in a study of listed firms in Borsa Istanbul that firm performance exerts a significant negative impact on agency costs such that better performing firms produce a higher asset turnover ratio.

Research Gap

The reviewed empirical literature reveals that the study linking structural capital with agency costs is relatively new in extant empirical literature and it remains almost shallow. Among the reviewed literature, only few focused on emerging market as most of the study are situated in advanced countries such as the US and UK. Therefore, this study contributes to the extant empirical literature by examining the impact of structural capital that resides in an organization on agency related problems using sample of listed non-financial firms in Nigeria. It is therefore assumed that this is the first of the study in Nigeria context.

Methodology

Data and Sampling

This study used secondary data and the population of this study consists of all the listed non-financial firms in Nigeria. According to the Nigerian Stock Exchange data base, there are one hundred and twelve (112) listed non-financial firms in Nigeria as at 31st December 2020. These 112 non-financial firms therefore constitute the population of this study.

Pertaining to the sample size and sampling method, the study relied on purposive sampling technique to select the firms that made up the sample of the study. Specifically, the sample was selected based on certain established criteria which are that: the companies have been listed as at 2011, they have not been delisted or suspended up till the time of this study, they have not undergone merger process, they have not had interrupted up operation and has

consistently publish its annual reports. Among the 112 listed non-financial firms in Nigeria, only 66 fulfilled criterion these criteria, hence the sample size of this study is 66 listed non-financial firms in Nigeria.

Table 1 – Sample Firms by Sectoral Representations

S/N	Sector	Number	Percentage
1	Agriculture	2	3.03
2	Conglomerates	5	7.58
3	Construction/Real estates	4	6.06
4	Consumer goods	15	22.73
5	Health care	7	10.61
6	ICT	3	4.55
7	Industrial goods	11	16.67
8	Oil and Gas	6	9.09
9	Services	13	19.70
Total		66	100

Note – compiled by authors

Estimation Techniques

The data generated for the study were analyzed using panel regression method. The use of panel regression is informed by the nature of the data which is characterized with time and unit dimensions. The method has been recognized to be suitable for data with such characteristics (Baltagi, 2010). The pre-estimation diagnostic test for normal distribution shows that the variables are not normally distributed, hence the study used panel feasible generalized least square (FGLS) to estimate the models specified for the study. In addition to correcting for the non-normal distribution, the feasible generalized least square also corrects for the presence of serial correlation and heteroskedasticity. The method is known for higher estimation efficiency, less collinearity, and more accuracy in measuring the effects of individual samples due to the availability of larger data set compared to cross-section and time-series approaches.

Various post estimation tests including test for multicollinearity, serial correlation test and heteroscedasticity test were conducted to ensure that required assumptions are not violated. Specifically, the tests for the presence of multicollinearity using variance inflation factor, Wooldridge tests for serial correlation in panel data was used to test for the presence of heteroscedasticity while Breusch-Pagan test was used to test for the presence of

heteroscedasticity. The normal distribution was tested using Shapiro-Wilk test for normality.

Model Specification

The model specification for this study would be guided by the objective of the study and the lessons learned from both theoretical and empirical literature reviewed. Considering that the main objective of this study is to examine the impact of structural capital on agency conflicts, the model for this study is stated as follows:

$$AGC = f(SC, X) \tag{1}$$

Where:

$$X = (AGE, FMZ, FG) \tag{2}$$

Given (2), (1) becomes

$$AGC = f(SC, AGE, FMZ, FG) \tag{3}$$

(3) could be represented in linear form as

$$AGC_{it} = \tau + \sigma SC_{it} + \lambda AGE_{it} + \beta FG_{it} + \omega FMZ_{it} + \mu_{it} \tag{4}$$

Where

$$\mu_{it} = \rho_i + \varepsilon_{it} \tag{5}$$

Where:

- AGC_{it} is the agency costs of firm i at time t
- SCE_{it} is the structural capital efficiency of firm I at time t.
- AGE_{it} is the age for firm i at time t
- FG_{it} is the firm's i growth at time t
- FMZ_{it} , is the firm size of firm i at time t

Variable Measurement

Dependent Variable

The dependent variable of this study is agency costs which represents the agency conflicts in a corporate organization. The study would rely on the

definition of agency costs by Gogneni et al. (2013). According to these authors, agency costs measure should reflect inefficient asset utilization which results from poor investment decision, and operating costs and wasteful spending which results in higher expenses. In line with their submissions, the study would measure agency costs using asset turnover ratio to be measured as the ratio of sales to assets a reflection of how management efficiently utilize assets at their disposal. In addition, the study would measure agency costs using operating expenses ratio given as the ratio of operating expenses to sales since it reflects the production costs efficiency of the organization (Chinelo & Iyiegbuniwe, 2108; Wijaya, 2017; Luo et al., 2018).

Independent Variables

The main independent variable of this study is structural capital efficiency. To measure the structural capital efficiency, the study would rely on the approach proposed by Pulic (2000) who constructed a measure of intellectual capital using value added intellectual coefficient (VAIC). According to Pulic (2000), the structural capital is given as

$$SC = VA - HC \tag{6}$$

And structural capital efficiency is expressed as

$$SCE = \frac{SC}{VA} \tag{7}$$

Where VA represents value added, SC is structural capital and SCE stands for structural capital efficiency.

Control Variables

The study would follow previous studies (Luo & Chen, 2018; Wijaya, 2017) by introducing three control variables which may systematically affect agency costs into the model. They are the firm growth, firm size and firm age. Firm growth would be measured with growth of sales revenue, firm size would be measured with log of total assets while firm age is to be measured as the number of years a firm has been listed.

Table 2 – Variable Measurement

Variables	Nature in the Model	Measurement
Agency Costs1 (AUR)	Dependent	The ratio of turnover to total assets
Agency Costs2 (OPE)	Dependent	The ratio of operating expenses to total assets
Structural Capital Efficiency (SCE)	Independent	CSR are dummy variables which proxy disclosure of social information as in annual reports with “1” and “0” for otherwise

Table continuation

Variables	Nature in the Model	Measurement
Firm Growth (FG)	Control	The growth of sales revenue
Age	Control	Natural log of the year a firm is listed on the stock exchange
Firm Size (FS)	Control	Natural log of Total Assets

Note – compiled by authors

Results and Discussion

Descriptive Analysis

This section presents the results obtained from descriptive analysis of the variables used in this study. The table contains the mean as well as the maximum and minimum value of all the variables used by this study.

The results presented in Table 3 reveals that the average asset turnover ratio of the listed non-financial firms in Nigeria within the period under consideration is 0.987 with a minimum and maximum of 0.001 and 8.035 respectively. The average operating expense ratio, which is also a measure of agency cost is found to be 38.633 with a minimum and maximum value of 1.061 and 38633 respectively as well as standard deviation of 184.561 which indicates wide

variation in the operation expense ratio among the firms in the sector. Averagely, the structural capital efficiency is 0.561 with a minimum and maximum of -15.875 and 18.677 respectively. The estimated standard deviation of 1.331 reveal wide variation in the structural capital efficiency of the non-financial listed firms Nigeria. The average value estimated for firm size is 7.08 with a standard deviation of 0.834. The minimum and maximum value of the firm size are respectively 5.093 and 9.241 respectively.

Furthermore, the results indicate that the mean firm growth is 0.11.276 with a standard deviation of 65.199 while its minimum and maximum value are -90.702 and 1354.255 respectively. Average firm age is found to be 27 years with a minimum of 1 and maximum of 55.

Table 3 – Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
AUR	660	.987	.782	.001	8.035
OPE	660	38.633	184.561	1.061	3836.728
SCE	660	.561	1.331	-15.875	18.677
FS	660	7.08	.834	5.093	9.241
FG	660	11.276	65.199	-90.702	1354.255
FA	660	27.312	13.171	1	55

Note – compiled by authors

The estimated correlation coefficients among the regressors are presented in Table 4. The estimated correlation coefficient of 0.127 in the results reveal that there is a weak positive relationship between asset turnover rate and structural capital efficiency implying that the higher the structural capital efficiency, the higher the asset turnover or lower the agency conflicts. The estimated correlation coefficient of 0.022 shows that firm size has relatively low positive relationship with the asset

turnover ratio implying that the higher the firm size, the higher the asset turnover ratio. The estimated correlation coefficient of 0.322 shows weak positive relationship between firm growth and financial reporting quality implying that firm that record higher growth are expected to produce higher asset turnover ratio. Also, the correlation coefficient of 0.110 indicates that firm age has a weak positive relationship with asset turnover ratio of listed non-financial firms in Nigeria.

Table 4 – Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) AUR	1.000					
(2) OPE	-0.134	1.000				
(3) SCE	0.127	-0.330	1.000			
(4) FS	0.022	-0.080	0.089	1.000		
(5) FG	0.322	-0.056	0.001	0.060	1.000	
(6) FA	0.110	-0.084	0.027	0.096	-0.035	1.000

Note – compiled by authors

For the second model, the estimated correlation coefficient of -0.330 shows that weak indirect relationship exists between structural capital efficiency and operating expense ratio implying that higher structural capital efficiency is expected to result to lower operating expense ratio of listed non-financial firms in Nigeria. In addition, the estimated correlation coefficient of -0.080 indicates that a weak negative relationship exists between operating expenses ratio and firm size. Also, the results reveal that a weak inverse relationship exists between operating expense ratio and firm growth given the estimated correlation coefficient of -0.056. The estimated correlation coefficient of -0.084 equally reveal that firm age has negative relationship with operating expenses ratio. Thus, the results of the correlation coefficient for the asset turnover rate and operating models reveal that all the variables reduce agency conflicts.

Also, the results of the correlation coefficient in Table 4 reveal that weak relationship exist among the explanatory variables as none of the coefficient has correlation coefficient that is up to 0.5 not to talk of the threshold of 0.9 for the multicollinearity to be suspected. The implication of this result is that the results obtained for each of the models is not expected to be affected by the problem of multicollinearity. However, the study further examines the presence of multicollinearity using the variance inflation factor (VIF).

The variance inflation factor (VIF) diagnostic test for multicollinearity is presented in Table 5. The results in the table show an estimated VIF of 1.021 for firm size, 1.011 for firm age, 1.008 for structural capital efficiency and 1.005 for firm growth. The average VIF is estimated to be 1.012. Since none of the estimated VIF values is close to the threshold of 10, there is no multicollinearity among the explanatory variables of study.

Table 5 – Variance inflation factor

	VIF	1/VIF
FS	1.021	.979
FA	1.011	.989
SCE	1.008	.992
FG	1.005	.995
Mean VIF	1.012	

Note – compiled by authors

Further, the results of the Shapiro Wilk test for normal distribution is presented in Table 6. From the results, all the variables used in this study has p value of Wilk statistics that is less than 0.05 implying that the test is statistically significant at 5 percent level of significance for all the variables. The implication of these results is that the null assumption that each of the variables is normally distributed is rejected at 5 percent level of significance. Thus, the variables are not normally distributed.

Table 6 – Shapiro-Wilk Test for Variable Normality

	W	p-value
AUR	0.786	0.000
SCE	0.284	0.000
FS	0.988	0.000
FG	0.336	0.000
FA	0.929	0.000

Note – compiled by authors

In addition, the study conducted Breusch-Pagan test for heteroskedasticity and Wooldridge test for serial correlation in panel data. The results of the Breusch-Pagan test suggest the presence of

heteroskedasticity given its estimated p value of 0.0423. similarly, the results of the Wooldridge test reveal existent of serial correlation in the model given its estimated pvalue of 0.0000. This study therefore corrects for the problem of serial correlation and heteroskedasticity by using panel feasible generalized least square which is heteroskedasticity and serial correlation consistent. In addition, the panel FGLS corrects for the non-normality of the data observed from the Shapiro-Wilk test.

Panel Feasible Generalized Least Square Regression Results

The estimated results obtained for the study using Feasible Generalized Least Square (FGLS) panel regression is presented in Table 7. The results in column 1 of the table is obtained using asset turnover ratio as proxy for agency costs where the higher the ratio, the lower the agency costs. In the results presented in column 2, agency costs is proxy with operating expense ratio where the higher the ratio, the higher the agency costs.

From the results in column 1, the estimated coefficient of 0.0735 indicates that structural capital efficiency has positive impact on asset turnover ratio while the corresponding p value of 0.000582 shows that the positive impact is significant at 1 percent level of significance. By implication, structural capital efficiency has significant positive impact on asset turnover ratio. Hence, the higher the efficiency of structural capital, the lower the agency costs among listed non-financial firms in Nigeria. This finding is consistent with resource dependence theory and it can be due to the fact that when the firm has efficient structural capital or organizational capital, it is positioned to better utilize the resources of the organization and then limit the conflict of between the management and the shareholders of the firms. The finding is also consistent with previous empirical literature that have established that agency conflicts is limited by the efficiency of structural. These include Lev et al. (2009) who reported that structural capital efficiency mitigates agency conflicts by increasing the stock returns of corporate firms. Also, the results is consistent with that of Gao et al. (2020) who found that efficiency of structural capital helps to mitigate agency conflicts of listed US firms by limiting the executive efforts and the need to pay executive higher compensation to the management.

For the control variables, the estimated coefficient and corresponding pvalue of -0.0189 and 0.581 respectively indicate that firm size has negative but non-significant impact on asset utilization ratio

implying that the size of the firm does not matter for agency conflicts. The respective estimated coefficient and corresponding p value of 0.00393 and 0.0000 reveal that firm growth has significant positive impact on agency asset utilization ratio implying that firm that record higher growth would be characterized with lower agency conflicts. Similar, the results indicate that older firms are faced with lower agency conflicts as the estimated coefficient of 0.00714 and corresponding p value of 0.0000957 show that firm age has significant positive impact on the asset turnover rate.

Table 7 – Estimated Panel Feasible Generalized Least Square Regression Results

	(1)	(2)
Variables	AUR	OPER
SCE	0.0735*** (0.000582)	-44.95*** (0.0000)
FS	-0.0189 (0.581)	-8.941 (0.274)
FG	0.00393*** (0.0000)	-0.158 (0.128)
FA	0.00714*** (0.000957)	-1.027** (0.0459)
Constant	0.840*** (0.000607)	157.0*** (0.00712)
Observations	660	660
Number of PID	66	66
pval in parentheses *** p < 0.01, ** p < 0.05, * p < 0.1 Note – compiled by authors		

Robustness Check

In order to test for the robustness of the results obtained from the baseline model of the study where agency costs are proxy with asset turnover rate, the study used alternative measure of agency costs which is the operating expense ratio, and the results are presented in column 2 of Table 6. The results in the table reveal that structural capital efficiency has significant negative relationship with operating expense ratio given its estimated coefficient of -44.95 with p value of 0.0000. By implication, the higher the efficiency of structural capital, the lower the operating expense ratio implying that higher structural capital efficiency reduces agency conflicts among listed non-financial firms in Nigeria. Thus, the results obtained using operating expense ratio as agency costs proxy is robust to the results obtained using asset turnover rate.

Conclusion

In this study, an attempt was made to examine the impact of structural capital efficiency on agency conflicts among 66 listed non-financial firms in Nigeria which were selected using purposive sampling technique. Structural capital efficiency was obtained following Pulic (2001) estimation of value-added intellectual capital coefficient and the study used asset turnover ratio as well as operating expense ratio to proxy agency costs for robustness analysis. The data collected were estimated using panel feasible generalized square regression method.

The results obtained from the study suggest that structural capital efficiency has significant positive impact on asset turnover ratio and negative impact on operating expense ratio. Thus, there is consistent

evidence that structural capital efficiency matters for limiting the agency conflicts among listed non-financial firms in Nigeria. Thus, the study concludes that efficiency of structural capital is a key strategic variable that must be given necessary consideration in designing policies aimed at limiting the extent of agency conflicts between the agent and the principal in the Nigerian corporate environment.

In line with the findings, it is recommended in this study that the management who wish to satisfy the interest of their principal can leverage on the efficiency of their structural capital to achieve the goal. In addition, the shareholders should monitor the efficiency of structural capital in their subscribed firms since it automatically helps to limit the agency problem. Also, potential investors should consider the efficiency of the structural capital within a firm in making their investment decisions.

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