

Firm Size and Capital Structure of Selected Listed Firms in the Oil and Gas Industry in Nigeria

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ABSTRACT

The ability of a business to get loans and use internal resources to purchase assets that would increase its size is a key factor on how strong the relationship between firm size and capital structure holds true. In light of this, this study examined the effect of capital structure on firm size of a few listed oil and gas businesses in Nigeria, ten-year (2011 to 2020) being the research period. Data were obtained from audited financial statements of seven firms from the industry. The data were on total assets, leverage, non-current liability finance, and total liability finance. Hausman test confirmed the suitability of fixed effect model. The results showed that equity financing significantly increases firm size. A significant positive effect was also found for Total Liability Finance. Contrarily, Non-Current Liability Finance and Leverage both exhibited positive but not statistically significant effects on company size. These results supported certain previous studies while refuting others. The conclusion is that capital structure has a positive and significant effect on firm size and that other factors significantly affect firm size. In order to maximize firm size for the overall benefit of shareholders, this study advised that capital structure and the other factors that have been identified as having effect on firm size should be properly taken into account.

Keywords: Capital structure; Equity Finance; Firm size; Leverage; Non-Current Liability Finance

1. Introduction

Long-term obligations, short-term liabilities, and equity capital are all components of a company's capital structure, which is utilized to finance its operations. It illustrates the various components of the financial resources a business uses to finance both its continuing operations and growth. Due to company risk, liquidity, age, growth, profitability, size, and asset structure, the composition of capital structure varies for different firms (Al-Najjar & Taylor, 2008). By utilizing a strategic combination of multiple funding sources, the capital structure's main goal is to maximize shareholder wealth while lowering total cost of capital to the lowest level achievable. Choosing and managing an ideal capital structure is one of a financial manager's most crucial responsibilities. Conflicts between risk and profit could result from this (Uremadu & Onyekachi, 2018). Because choosing the right balance between debt and equity has an impact on current operations and future growth, which may in turn have an impact on the firm's assets and size, choosing the right capital structure is one of the most challenging

decisions any organization can make (Salam & Shourkashti, 2019).

Despite being capital-intensive, the Nigerian economy has benefited greatly from the oil and gas sector's investments and infrastructure upgrades, as well as its contribution to other industries. Nearly 90% of the country's foreign exchange profits and 83% of its GDP are generated by this sector (Anande-kur & Agbo, 2021).

In spite of the industry's contributions to the economy, none of the recent works in Nigeria have, to the best of the researchers' knowledge addressed it. Such include: Joshua et al. (2018); Vaz, (2021); Miko & Para (2019); Nuraddeen & Ibrahim (2019); Umoh et al. (2021); Uremadu & Onyekachi (2018); Igbinovia, & Ogbeide, (2019); Ihejirika et al. (2020); Yakubu & Gbenga (2019). Few others discussed how capital structure is determined: Anande-kur & Agbo, (2021); Aremu et al. (2013); Owolabi & Inyang (2012). This causes a vacuum, which is filled by this work.

2. Literature Review and Hypothesis Development

The amount of money a company may set aside for the manufacturing of its various goods and services is determined by its size. The type and distribution of a firm's various assets can also be used to define its size. Asset value is used to evaluate businesses. A company that has a high value is more appealing to investors. Highly regarded companies are more certain of obtaining better sources of funding, particularly from outside sources. Such businesses persuade third parties to provide the necessary financial support required for operational activities by leveraging their highly valuable assets and their position in the industry. Capital structure and business size are consequently positively correlated with each other (Afinindy et al, 2021). The results of this association are somewhat contradictory. Alzomaia (2014), Baltac & Ayaydin (2014), Kurshey & Strebulaey (2015), Sanil et al (2018), Shah & Hijazi (2004), and Shah & Khan (2017), among others, are some of the studies that verified a favorable link. Awan & Amin (2014), Basseyy et al (2014), Harc (2015), Kalam & Khatoon (2021), Masnoon & Saeed (2014) and Qayyum (2013) are a few of the works that produced a negative relationship. The research by Osaretin & Michael (2014) failed to find any associations.

Ho: Capital structure has no significant effect on firm size of selected listed Oil and Gas industry in Nigeria.

2.2 Theoretical Review

2.1 Pecking – order Theory

Steward Myer and Nicolas Majluf introduced the pecking-order idea in 1984. The thesis is predicated on the idea that managers and investors have asymmetric information. As the cost of borrowing rises the instant funds are acquired from outside parties that do not have all the necessary knowledge on the borrower, businesses naturally seek financing from sources that have the least amount of information asymmetry. The POT application presupposes that internal funds will be used before external funds, which are typically the final resort. Therefore, when internal sources of funding are insufficient, businesses turn to external sources of funding (Karadeniz et al. 2011). The theory rejects the notion of an ideal leverage ratio. This theory's applicability to this study is to determine the importance of equity to business size, as measured by total assets.

2.3 Empirical Review

Few studies on capital structure use business size as an independent variable; the majority focus on financial performance. Here is a review of some works that might be used as a guide for this investigation.

Using stratified sample techniques, Rahmi and Tania (2021) looked into and analyzed the capital structures of MNCs and local businesses in Bangladesh between 1996 and 2019. Findings demonstrated that both types of organizations had very low long-term debt to total capital employed ratios. Their sizes were significant. Doan (2020) used GMM to examine finance choices and performance in Vietnam. The control variable was the size of the company. It was discovered that the choice of finance was highly connected with firm performance. For the years 2007 to 2016, Sahari et al. (2019) collected empirical data on the association between capital structure and company performance among Malaysian food-producing firms. All of the study's variables were found to be significantly correlated with company performance using panel data analysis.

Over a ten-year period, Sanil et al. (2018)'s research was based on 108 publicly traded Malaysian companies (2006 – 2015). The study employed a fixed effect model of analysis to analyze the relationship between business size and capital structure and found that there was a beneficial correlation. For a ten-year period, Shah and Khan (2017) concentrated on listed non-financial enterprises in Pakistan (2005 – 2014). Their objective was to look at the variables that affect capital structure. The results of the fixed effect regression analysis showed a high and positive correlation between leverage ratio and business size. Alzomania (2014) examined aggregated cross-sectional data from 93 Saudi Arabian listed companies to discover the factors that affect capital structure. According to the study, there is a direct and positive correlation between business size and capital structure as well as a direct and negative correlation between asset tangibility and capital structure. Baltaci and Ayadin (2014) used quarterly data taken from 39 Turkish banks between the years of 2002 and 2012 to conduct their research on variables that are likely to affect capital structure. Leverage ratio and business size were found to be positively correlated via regression analysis.

Not all the studies produced associations that were favorable. From 2005 to 2016, Salam and Shourkashti (2019) used GMM to study the linear and inverted U-shaped relationships between capital structure and firm performance in Malaysia's emerging market. The findings showed a negative correlation between capital structure and company performance. According to Priyono (2017), the capital structure has no bearing on a firm's size. Using data from 2011 to 2014 and capital structure as a mediator variable, the researcher examined 14 publicly traded Indonesian enterprises. Harc (2015) established a significant but unfavorable correlation between business size and leverage using the Pearson Correlation Coefficient. 500 Croatian SMEs were employed in the research, which spanned the years 2005 to 2010. According to Masnoon and Saeed's (2014) research, there is no conclusive relationship between business size and leverage. The researchers used data from 2008 to 2012 to base their analysis on the top 10 listed auto companies in the KSE. Awan and Amin's (2014) research, which covered the years 2006 to 2012, found that there is a negative correlation between firm size and capital structure among 68 textile companies listed in Pakistan. Regression analysis on a panel of data was employed. Using correlation analysis, Qayyum (2013) discovered a substantial inverse relationship between company size and leverage for 70 listed Pakistani cement businesses between the years of 2007 and 2009.

Nigerian empirical research studies displayed a similar mixed pattern. Using a co-integration technique, Alphonsus et al. (2021) empirically investigated the effect of capital on the

profitability of commercial banks in Nigeria. On a sample of 14 commercial banks in Nigeria from 2008 to 2019, data were examined using the ordinary least square regression (OLS) model. The study discovered that, during the study period, the capital structure had a favorable and significant impact on the net profit of commercial banks in Nigeria.

In a ten (10) year study, Miko and Para (2019) looked at the impact of financial structure on the profitability of manufacturing enterprises in Nigeria (2008-2017). The Ordinary Least Square regression approach was used to analyze the data. The outcome showed that the profitability of manufacturing enterprises in Nigeria is significantly impacted by loan financing, equity financing, and debt to equity financing.

The effect of capital structure on the financial performance of listed manufacturing firms in Nigeria from 2005 to 2014 was studied by Ajibola et al. (2018). The results of the panel ordinary least square test demonstrate that capital structure affects financial performance favorably.

Adaramola and Olarewaju (2015) used descriptive and explanatory research approaches for their investigation of listed Nigerian insurance businesses. They discovered a strong correlation between capital structure and firm size. Cross sectional analysis was used by Oseretin and Michael (2014) to examine 20 companies listed on the Nigeria Stock Exchange. The relationship between firm size and capital structure could not be verified. Aremu et al. (2013) used pooled Ordinary Least Square regression data from Nigerian listed banks from 2006 to 2010 to find a statistically significant relationship between firm size and capital structure. Ogbudu and Emen (2012) used 110 publicly traded Nigerian companies over a ten-year period and performed panel regression to confirm a significant positive relationship between firm size and capital structure.

Paseda (2021) utilized OLS regression and updated weighted models using panel data drawn from 50 companies not listed in Nigeria to confirm a negative correlation between capital structure and firm size. The investigation took place between 1999 and 2014.

Between 2010 and 2018, Ihejirika (2020) examined the impact of corporate capital structure on the financial viability of listed firms in the premium sector of the Nigerian Stock Market. Panel data analysis results showed that firm size has a negative impact on ROA

Igbinovia and Ogbeide (2019) used descriptive statistics, correlation analysis, and the Panel Ordinary Least Square (OLS) regression technique to investigate the link between capital structure and firm value of a subset of listed manufacturing companies in Nigeria. It was discovered that there was a weak and unimportant correlation between firm value and a firm's size.

Bassey *et al.* (2014) used data from 28 agro-allied enterprises listed in Nigeria using OLS to confirm that there is a negative correlation between capital structure and firm size. The study was conducted between 2005 and 2010.

According to the literature review, capital structure is gaining more attention on a global scale. However, the majority of the research focuses on company performance and capital structure. Despite being a known metric of firm size, no one outside the topic considered total assets as a proxy for firm size. Additionally, the works are outdated. This leaves a gap for this study.

3. DATA AND METHOD

Descriptive statistics were used as the primary method of data analysis, followed by

correlation test, cointegration test, stationarity test, regression analyses (pooled, random, and fixed) and Hausman's test. Ex-post facto research design, was used in this study. This study's design was appropriate because it dealt with events and facts that had already occurred, and the data were easily accessible. The 12 Oil and Gas companies listed in the downstream sector of the Nigerian economy make up the study's population. This industry is distinct from others in that it is capital intensive and depends more heavily on leverage (Anande-kur & Agbo, 2021; Sanni et al, 2022b) than any other sector of the economy. Due to the fact that data were available for all seven companies for the whole 2011–2020 research period, they were purposively chosen. Oando Nigeria Plc, Conoil Nigeria Plc, Adrova Nigeria Plc, Eterna Nigeria Plc, MRS Nigeria Plc, Total Nigeria Plc, and Mobil Nigeria Plc are the seven businesses that were chosen. The data were taken from the companies' financial statements.

3.1 Model Specification

This study's model was adapted from Afinindy *et al.* (2021) and Priyono (2017) which employed total assets as a proxy for business size. Uremadu and Onyekachi (2018) used total liability finance, non-current liability finance, leverage, and equity finance as proxies for capital structure. According to the Pecking-order theory, which postulated that equity and other internally generated money should be used first before acquiring external funds, equity financing is the first independent variable in the equation. These are displayed as follows:

$$Firm\ Size = f(Capital\ Structure) \dots\dots\dots (1)$$

$$TA = \alpha_0 + \beta_1 (EF) + \beta_2 (TLF) + \beta_3 (LEV) + \beta_4 (NCLF) + \mu \dots\dots\dots (2)$$

$$LOGTA = \alpha_0 + \beta_1 (LOGEF) + \beta_2 (LOGTLF) + \beta_3 (LEV) + \beta_4 (NCLF) + \mu \dots\dots\dots (3)$$

Logging the data improved their normality and made their scale smaller in conformity with Leverage (LEV).

Where:

β_1 = Coefficient of LOGEF; β_2 = Coefficient of LOGTLF; β_3 = Coefficient of LEV; β_4 = Coefficients NCLF

μ = Error term

α_0 = Constant

LEV = Leverage

NCLF = Non-current Liability Finance

TLF = Total Liability Finance

EF = Equity Finance

TA = Total Assets, used to proxy firm size

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Descriptive Statistics

The descriptive statistics for the data used are displayed in Table 1. The variables' means are high and their standard deviations are small. Leverage is positively skewed while four of the variables—total assets, equity financing, non-current liability finance, and total liability finance—are negatively skewed. For any of the variables, the Jarque-Bera probability is not statistically significant at 0.05. This implies that all of the data are distributed normally (Sanni et al, 2022a).

Table 1: Descriptive Statistics

	LOGTA	LOGEF	LOGNCLF	LOGTLF	LEV
Mean	7.782493	7.224455	6.483883	7.636954	2.860364
Median	7.798340	7.250446	6.414550	7.658429	2.689574
Maximum	8.157168	7.646743	7.387892	8.061729	6.679252
Minimum	7.167666	6.766039	4.985844	6.948258	0.807391
Std. Dev.	0.198396	0.194878	0.510826	0.224932	1.270204
Skewness	-0.718809	-0.162621	-0.090562	-0.826156	0.631803
Kurtosis	4.069429	3.230308	2.741285	4.231316	2.866037
Jarque-Bera	9.363733	0.463238	0.290907	12.38497	4.709378
Probability	0.069262	0.793248	0.864630	0.082045	0.094923
Sum	544.7745	505.7119	453.8718	534.5868	200.2254
Sum Sq. Dev.	2.715894	2.620445	18.00511	3.491023	111.3258
Observations	70	70	70	70	70

Source: Authors' computation (2022)

4.2 Test of Variables

4.2.1 Correlation Matrix

Table 2 displays the correlations between the dependent variable and the independent ones. As seen by the results, which indicate that there is no multicollinearity among them, the correlation value being less than 0.7 (Sanni *et al.*, 2022). The findings also demonstrate a positive connection between all of the independent variables and the dependent variable (total assets). All of the independent variables have positive correlations, with the exception of leverage and equity finance, which exhibit negative correlations.

The correlations among the dependent variable and independent variables are shown in Table 2. The results suggest the absence of multi collinearity among them since the correlation value is less than 0.7 (Sanni *et al.*, 2022a). The results show further that there is a positive correlation between the dependent variable (total assets) and all the independent variables. Positive correlations exist among all the independent variables with the exception of leverage and equity finance that are negatively correlated.

Table 2: Correlation

	LOGTA	LOGEF	LOGNCLF	LOGTLF	LEV
LOGTA	1.000000	0.600355	0.213641	0.467109	0.355693
LOGEF	0.600355	1.000000	0.176161	0.547793	-0.377706
LOGNCLF	0.213641	0.176161	1.000000	0.201240	0.029594
LOGTLF	0.467109	0.547793	0.201240	1.000000	0.539892
LEV	0.355693	-0.377706	0.029594	0.539892	1.000000

Source: Authors' computation (2022)

4.2.2. Cointegration Test

The co-integration test result in Table 3 reveals two co-integrations between the variables ($p < 0.05$), which suggests a long-term link between them (Sanni, et al.2022).

Table 3: Cointegration Test

Alternative hypothesis: common AR coeffs. (within-dimension)				
			Weighted	
	<u>Statistic</u>	<u>Prob.</u>	<u>Statistic</u>	<u>Prob.</u>
Panel v-Statistic	5.432237	0.0000	-2.888246	0.9981
Panel rho-Statistic	3.007670	0.9987	2.858128	0.9979
Panel PP-Statistic	-2.165266	0.0152	-9.937744	0.0000
Panel ADF-Statistic	0.243055	0.5960	-3.746458	0.0001

Source: Authors' computation (2022)

4.2.3. Stationarity Test

The stationarity test results are displayed in Table 4. At the second difference I(2), all the data became stationary. The statistical characteristics of the system must remain constant across time for data to be considered stationary. The mean, variance, and auto covariance of second order stationarity do not change over time (Sanni, et al, 2022b).

Table 4: Stationarity Test

	LOGTA			LOGEF			LOGNCLF			LOGTLF			LEV		
	Stat	Prob	Station												
Levinin, Lin & Chu	-1.53894	0.0619	I(2)	-7.72312	0.0653	I(2)	-3.77454	0.2031	I(2)	-0.95201	0.1705	I(2)	0.38376	0.6494	I(2)
ADF - Fisher Chi	14.3926	0.4209	I(2)	37.2849	0.3297	I(2)	16.5560	0.2806	I(2)	13.8081	0.4641	I(2)	7.15815	0.9284	I(2)
Breitung t-stat	-0.6648	0.2531	I(2)	-1.4336	0.0758	I(2)	0.98148	0.8368	I(2)	-0.46329	0.3216	I(2)	-0.79989	0.2119	I(2)
All tests assume asymptotic normality.															

Source: Computations by the Authors (2021)

Source: Authors' computation (2022)

4.2.4 Hausman test

The results of the Hausman test in Table 6 demonstrated that the fixed effect model is the most suitable one for this study because neither the Breusch-Pagan Lagrange Multiplier (LM) nor the Hausman tests have p-values that are statistically significant at 0.05.

Table 6: Hausman Test

Tests	Chi2	P-Value
Breusch-Pagan Lagrange Multiplier (LM)	1.0346	0.032
Hausman test	8.349	0.043

Source: Authors' computation (2022)

4.3 Firm Size and Capital Structure

The outcomes of the three different regression analyses are displayed in Table 5: Regressions using random effect, fixed effect, and ordinary least square.

Table 5's findings demonstrate that capital structure generally has a significant effect ($p = 0.0000$) on business size, as measured by total assets. According to the adjusted R^2 of 0.976132, all of the capital structure elements included in this study account for up to 97.6% of variations in company size, with the remaining 2.4% being explained by other factors that were not taken into account. The absence of auto-correlation is confirmed by the value of Durbin-Watson, which is 1.817695, which is extremely near to 2 (Sanni et al, 2022b).

The results of the various capital structure proxying variables differ. The effect of equity finance is significant ($p = 0.0038$) and positive (coefficient 0.290594). Total liability finance likewise has a positive (Coefficient 0.620278) and significant ($p = 0.0000$) effect. Leverage has a positive (Coefficient: 0.010940) but insignificant ($p = 0.4860$) effect, while the effect of Non-Current Liability Finance is positive (Coefficient: 0.019570) and not statistically significant ($p = 0.1426$).

Table 5: Regression – Pooled, Random, Fixed

Variable	Pooled Coefficient Stand Error () Probability []	Random Coefficient Stand Error () Probability []	Fixed Coefficient Stand Error () Probability []
Constant	0.385491	0.385491	0.787899
	(0.154468)	(0.154468)	(0.233686)
	[0.0151]*	[0.0151]*	[0.0014]*
LOG EF	0.211077	0.211077	0.290594
	(0.078431)	(0.078431)	(0.095855)
	[0.0090]*	[0.0090]*	[0.0038]*
LEV	-0.005867	-0.005867	0.010940
	(0.011976)	(0.011976)	(0.015585)
	[0.6259]**	[0.6259]**	[0.4860]**
LOG NCLF	0.000964	0.000964	0.019570
	(0.007504)	(0.007504)	(0.013137)
	[0.8982]**	[0.8982]**	[0.1426]**
LOG TLF	0.770283	0.770283	0.620278
	(0.075042)	(0.075042)	(0.100427)
	[0.0000]*	[0.0000]*	[0.0000]*
Observations	70	70	70
R ²	0.976966	0.976966	0.982705
Adjusted R ²	0.975549	0.975549	0.976132
F – Statistics	689.2428	689.2428	149.5225
Durbin Watson	1.936401	1.936401	1.817695
Probability	0.000000*	0.000000*	0.000000*

*Significant at 0.05

** Not significant at 0.05

Source: Computations by the authors (2022)

4.4 Discussion of Findings

Leverage and non-current liability finance have positive but non-significant effects on firm size, but equity finance and total liability finance both have positive significant effects. The

findings support those of Adaramola & Olarewaju (2015), Alzomania (2014), Sanil et al., (2018) but differ from those of Paseda (2021) and Priyono (2017).

This work supported the Pecking-order Theory (POT). Three financial resources for businesses are identified by this hypothesis. The majority of businesses prefer to use internal sources such as retained earnings and excess liquid assets first when raising additional funds. This is due to the fact that this kind of funding is generally more affordable and simpler to obtain quickly (Njeru, 2013; Mwende et al, 2019). Its positive significance in this work may be explained by this. Firms naturally prefer those with no risk or low risk as the next choice when using debts is absolutely necessary. These primarily take the form of non-current obligation funds, which in this paper are determined to be positive but not statistically significant. POT is significant since it informs the public about a company's performance. It demonstrates that a business that funds its operations internally is financially stable and, even if it borrows, will be able to pay its debts (Mwende, et al, 2019). This work's positive and significant total liability finance coefficient reflects this.

According to Jenson and Meckling (Paseda, 2021) when discussing the traditional conflicts between equity and liability holders, external finance sources have a higher level of assurance and confidence in repayment. In light of the findings of this investigation, the Trade-off Theory (TOT) predicts a favorable correlation between leverage and asset tangibility (Paseda, 2021). This is the case due to managers of highly indebted organizations' reluctance to sanction or appropriate abnormal benefits for themselves because they are aware that external loan sources are closely watching them (Grossman & Hart, 1982; Ihejirika, et al. 2020). Therefore, monitoring costs are higher for businesses that have fewer tangible assets and may purposefully pick a high liability level to lower perquisite usage. As a result, there might be a bad correlation between assets and leverage (Cerqueiro *et al*, 2016; Ihejirika, et al. 2020).

Theories of information and agency costs demonstrate how asset structure affects capital structure, hence validating their relationship. High non-current asset availability gives loan lenders the backup and safety buffer they need while also increasing the value of the collateral. As a result, businesses possessing these assets have access to funding for potential projects (Aggarwal & Padhan, 2017; Igbinovia & Ogbeide, 2019). Companies that have a high percentage of non-current assets are encouraged to borrow more money than companies that have a comparatively low percentage of non-current assets due to the incentives of acquiring loans that are relatively cheaper (Ibrahim, 2017).

Economy of scale and diversification are advantageous to large businesses. They have more ability and resources. They tend to be more indebted since they are resilient to negative changes in cash flow (Dada & Hazily 2016; Paseda, 2021). The effectiveness of management is gauged by how assets are used to produce favorable results. Asset turnover ratio is a reliable indicator of this type of management effectiveness. Since they may be quickly realized, liquid assets are desirable collateral for lenders since they can help a company meet its liability commitments (Muritala, 2012).

The survival, productivity, and profitability of a corporation are all dependent on the application of solid financial and legal policies. Ihejirika, et al. (2020) felt that firm size is vital for these factors as well. Some elements that significantly impact capital structure were found by Priyono (2017). These include the features of the sector a company operates in, the make-up of its assets, tax ramifications, the state of the market, internal business conditions, and profitability. Other factors include income stability, risk level, and stability of interest rates. According to Vaz (2021), there are primarily three internal aspects that affect firm size: legal form, location, strategic planning, objectives, and vision and mission. Motivation, risk-

taking inclination, and age are all entrepreneurship elements that determine firm size. Economic, political, technological, and social-cultural influences are examples of external variables.

5. CONCLUSION AND RECOMMENDATIONS

This study's conclusion is that capital structure has a positive and significant effect on business size. Varied capital structure compositions have different effects on business size as measured by total assets. In addition to capital structure, several factors are discovered to have effect on firm size. These include entrepreneurship, external, and internal variables. Many other elements, such as the sector in which a company works, the asset composition, tax ramifications, market conditions, internal business conditions, and profitability, can have effect on capital structure.

Most of the time, management aims to increase shareholder wealth. Therefore, management should employ an ideal capital structure for an ideal firm size. According to Pecking-order theory, equity funds, which are the least expensive forms of funding and have the biggest beneficial effects on business size, should be used as much as possible before external funds. To accomplish the overall business goals, management must effectively take into account all other variables that determine firm size. The firm's legal structure, location, strategic planning, goals, and vision and mission are some of these elements. Others include social-cultural, political, technological, and economic considerations.

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