Dynamics of Firm Value, Financial Performance, Leverage, and Governance: A Panel Data Analysis of Listed Indian Firms

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Abstract

This research examined the effect of accounting-based performance measures, capital structure and corporate governance on firm value, measured by Tobin's Q, of listed Indian firms in fast-moving consumer goods (FMCG), automobiles (auto) and information technology (IT) sectors for a period from 2004 through 2017. The study used panel least squares dummy variables (LSDV) method to show that sales growth, return on equity, debt-equity ratio and corporate governance were statistically significant predictors of firm value for the sectors under the study. The fixed effects model was found to be more robust than pooled regression model by the Wald test, confirming that the dynamics between the dependent and the explanatory variables were different for each of the sectors. As the impact of variables on firm value was different for the manufacturing and services sectors, a key implication of the study is that managers should take into consideration the sectoral effect while estimating firm value.

Key words: corporate governance; debt-equity ratio; dividend payout ratio; firm value; income growth; least squares dummy variables (LSDV) method; return on assets; sales growth

JEL classification: C12; C33; G32

1. Introduction

The relation between firm value and financial performance metrics has been researched to an appreciable extent in the past [e.g., Sinha (2017) and Kim, Kwak, and Lee (2015)]. The financial ratios and metrics that have been of interest to researchers studying firm value include the return on equity, the return on assets, sales growth, income growth, the earnings per share, the dividend per share, the market price of the stock, the economic value-added, and the market value-added. These measures of financial performance provide the lenders, investors, regulators,

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and analysts the information about the value of the firm and its fundamental strength. However, most of the prior studies examined firm value by considering only one or two metrics of performance. For instance, Kwon (2018) investigated the association between financial performance and firm value, O'Connor and Byrne (2015) examined the relationship between corporate governance and firm value, while Hauser and Thornton Jr.(2017) studied the impact of dividend on firm value. In comparison, there are very few studies that have evaluated firm value by considering multiple aspects such as accounting performance, capital structure, and corporate governance. The present study proposes to bridge this gap by providing a more comprehensive empirical analysis of the extent of the impact of varied drivers on firm value. Toward this end, this study has attempted to analyze the impact of corporate governance (govscore hereinafter) and some key measures, namely, sales growth, income growth, return on assets (ROA hereinafter), debt-equity ratio (D/E hereinafter) and dividend payout ratio (DPR hereinafter) on the value of the firm, as measured by Tobin's Q (TQ hereinafter). The variables have been selected on the basis of comprehensive review of the existing literature. The choice has been made with a conscious decision to represent different aspects of firm value, examined in isolation in the past. The objective of this research is to examine whether firm performance, capital structure, and corporate governance have an effect on firm value and identify the metric that has the most significant impact on firm value from amongst the variables selected for analysis. Analysis has been performed using panel fixed effects least squares dummy variables (LSDV hereinafter) model on time series cross-sections, inputting firm value as the dependent variable and all other variables as the independent variables.

The findings of the study reveal that sales growth, ROA, D/E and govscore are the statistically significant explanatory variables for predicting firm value. Further, empirical rejection of pooled regression model and acceptance of panel fixed effects LSDV as the better fitted model indicates that the dynamics of firm value estimation are different across the selected sectors. The novelty of the study lies in the fact that it provides a comprehensive measure of firm value in terms of accounting, financial

and governance measures taken together for the selected sectors in Indian economy. Since firm value is a key metric, quantification of the magnitude of its key drivers covering all aspects of business can prove to be valuable and insightful for future researchers, investors, regulators, and firms endeavoring to understand better and enhance firm value. Furthermore, the study extends the technique of panel data to firm value computation. Though panel data has been considered to be a useful tool in evaluating secondary financial data, yet very few studies have utilized it for firm value measurement [e.g., Muller-Kahle, Wang, and Wu (2014) and Ramadan (2015)].

Rest of the paper is arranged as follows: Section 2 deals with the theoretical framework and research objectives, data description is given in Section 3, research methods are discussed in Section 4, followed by results and discussion in Section 5, robustness test in Section 6, summary and implications of the study in Section 7 and limitations and future research areas in Section 8.

2. Theoretical Framework and Research Objectives

2.1 Firm Value

The firm value may be looked at as the sum of the market value of debt and equity [Modigliani and Miller (1958)]. It can also be measured in terms of share price, computation of the present value of cash flows, price to book value (P/BV) and TQ [Tobin (1978)]. Despite various alternative measures, TQ is one of the most frequently used metric to estimate firm value. In many studies employing firm value as the outcome variable, TQ has been used as the measure of firm value as it is considered to be an acceptable proxy. For instance, Heidarpoor and Malekpoor (2012) examined the relationship between variables like liquidity, the change in the share price, the return on equity, the leverage, the ROA and the size of the firm as independent and TQ as dependent variable for 100 Iranian firms registered in Tehran market Gamayuni (2015) argued in favor of TQ as a better measure of firm value because it captures the management efficiency in the effective utilization of resources. Furthermore, since TQ is mathematically computed as the ratio of the sum of the market value of equity and total debt divided by total assets of the firm, it can be taken to be a good representation of firm's value in the context of its asset size. Thus, the use of TQ as a measure of firm value is justifiable on the basis of both, extant literature as well as finance theory.

2.2 Firm Value, Accounting Measures, Financial Metrics, and Corporate Governance

Prior studies have examined firm value by considering its various determinants from accounting measures, financial metrics, and corporate governance**.** For instance, Asiri and Hameed (2014) examined the effect of financial ratios on firm value. They used ratios such as profitability, liquidity, efficiency, and debt, and found that ROA was the largest statistically significant factor in explaining value followed by financial leverage. Sudiyatno, Puspitasari, and Kartika (2012) also found that the

ROA had statistically significant positive impact on the firm's value.   Karaca and Savsar (2012) analyzed the effect of 16 financial ratios on firm value of 36 firms in Turkey and found that ratios impacted firm value. Baba (2014) also investigated the impact of accounting ratios on firm value of listed firms in Malaysia. He used multiple regression analysis to find that both liquidity and profitability ratios had a significant effect on firms' value. Özdemir and Öncü (2018) studied the relationship between firm values of firms in the metal sector and accounting information for a period from 2010 through 2015 and found that accounting information explained 84 percent of firm values these firms.

The quality of corporate governance in listed firms has also been a topic of interest to researchers around the world. Corporate governance was found to impact the firm's value in studies by Bebchuk and Weisbach (2010) and Gompers, Ishii, and Metrick (2003). Wang (2015) used the multi-regression model to examine the relationship between intellectual capital valuation, as measured by TQ, and corporate governance for the tourism industry in Taiwan. The results of the study revealed that TQ was positively impacted by corporate governance. In his study, Paul (2017) used OLS regression to show that TQ and ROA as performance measures were positively impacted by governance-related compliances in the FMCG sector. Hachana and Cheik (2012) applied panel data regression to test the association between governance, performance, and CEO power for Tunisian listed firms for the period 2000 to 2007 empirically. Furthermore, Sinha (2017) studied the effect of capital structure decisions on firm value of eleven power companies listed on the Bombay Stock Exchange of India.   The study used TQ to measure firm value and D/E to measure leverage. It found that leverage had a negative impact on the firm value. Impact of capital structure on firm value was also studied by Chowdhury and Chowdhury (2010) in their study based on firms in four key sectors listed on Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE) of Bangladesh. The study revealed that DPR and D/E had a positive impact on the firm value measured in terms of the stock price of the stocks under the study. In corporate finance literature also, it has been argued that an increase in leverage will cause the

firm value to rise [Ross (1977)]. On the other hand, Stulz (1990) countered that increase in debt could have both a positive and negative effect on the value of the firm, even if there were no corporate taxes and bankruptcy costs.

Worthwhile, in most of the studies discussed above and in the extant literature, hardly any studies exist that have attempted to evaluate if the combined impact of the commonly used determinants of firm value such as financial performance, leverage, and corporate governance is same or different across sectors. Such a study can be useful in taking decisions related to firm value in the context of a particular sector. Thus, based on the above review of literature, two gaps emerge. First, there are no comprehensive models of firm value that capture its multi-dimensional nature. Second, there is a limited debate on the sectoral differences in the impact of varied determinants of firm value. Furthermore, most of the prior studies have utilized multiple regression to examine the determinants of firm value. However, some of the recent studies [e.g., Dawar (2014) and Muller-Kahle et. al. (2014)] have utilized panel data analysis for its empirical examination. Panel data models are considered to be quite efficient on account of their substantial number of data points (N, T), which leads to an increase in the degrees of freedom and reduction in the collinearity among the explanatory variables. In fact, panel data models are quite popular in applied research as they are more effective than cross-sectional approaches and have various advantages [Hsiao (2007), pp. 3-6]. Therefore, in addition to examining the determinants of firm value, the present study seeks to compare two-panel data methods to confirm which gives better fitted model to estimate firm value. Based on the literature reviewed in the preceding discussion, the objectives of the study are summarized through the following five research questions: **RQ1:** Do firm performance measures, namely, sales growth, income growth, and ROA, have a positive effect on firm value of listed firms in auto, FMCG, and IT sectors in India? **RQ2:** Does corporate governance of a firm has a positive impact on firm value of listed firms in auto, FMCG and IT sectors in India? **RQ3:** Given the tax implications of debt and signaling impact of dividends, do higher leverage and DPR positively impact the firm value of the listed firms in auto, FMCG, and IT sectors in

India? **RQ 4:** Is the impact of the explanatory variables, namely, sales growth, income growth, ROA, corporate governance, DPR and D/E on the dependent variable (TQ) same across firms in all three sectors under the study? **RQ 5:** Does the LSDV method give a better fitted model for firm value determination as compared to the pooled regression method?

3. Data Description

3.1 Sample and Variable Measurement

To achieve the objectives of the study, accounting data has been collected from data sources like CMIE (Centre for monitoring Indian economy) ProwessIQ, Ace equity and other published sources for the selected firms in the three sectors of the Indian economy, namely, FMCG, Automobile, and IT for calculation of variables used in the study. ROA, D/E, DPR, income growth, sales growth, and TQ have been measured using the information contained in the financial statements. In comparison, the govscore has been generated on the basis of the parameters of corporate governance proposed by Sarkar, Sarkar, and Sen (2012). The score is generated using four indicators of governance, namely, the board of directors, the ownership structure, the audit committee, and the external auditor. The study has assigned equal weights to each factor instead of simply replicating the calculations proposed by them. Data extracted for each firm in the sector for a period from 2003-2004 through 2016-2017 for each year has been averaged across the seven variables under the study.

3.2 Descriptive Statistics

The mean, median, standard deviation, minimum, maximum, and Jarque-Bera values of dependent and independent variables are calculated for all three sectors. The mean, median, and standard deviation reveal the statistical nature of the time series under the study. The Jarque-Bera statistic is used to understand the distribution of the series. The Jarque-Bera statistic tests the null hypothesis that data

is normally distributed. The probability values of the Jarque-Bera statistics confirm that the null cannot be rejected for any parameter except income growth at 5% level of significance. Thus, the variables are largely normally distributed. Firm value is found to be more than the benchmark value of 1, with a mean score of 1.86. This shows that the selected sectors have performed quite well during the period under the study. It also indicates that the firms in these sectors are overvalued. Sales have grown at an average of 152.6 percent with a maximum growth of 1323.24 percent. This implies the sales of these sectors have been growing rather fast. Income growth of the selected sectors has averaged approximately 700 percent with a minimum of -10 percent. ROA seems to be on a lower side at 11 percent, indicating issues with efficiency in asset utilization. DPR has been around 50 percent, and D/E is averaging at approximately 40 per cent from 2004 through 2017 for the sectors under the study. The average governance score of 53% indicates good governance in the selected sectors.

4. Research Methods

The present study has used the fixed effects model for analysis as it eliminates various time-invariant unobserved individual factors that cause estimates to have omitted variable bias. Of the various fixed effects models that are available, namely the covariance model, within estimator, individual dummy variable model, and the LSDV model, the present study has used LSDV as it helps understand fixed effects easily. LSDV has been applied by adding the dummy for each sector such that each dummy is absorbing the effects particular to each sector. Dummy for auto has been dropped to avoid the dummy variable trap. Further, the fixed effects model is compared with the pooled regression model using the Wald test to determine the model with a better fit. Wald test is used to test the null of 'pooled regression is better,' and the decision is taken on the basis of the p-value of F-statistic being significant at 5% level [Wald (1939)]. Worthwhile, pooled regression treats the entire data set as one, where the possibility of heterogeneity amongst the

cross-sections and the time series nature of the data are ignored. In addition to this, in the present study first, the fixed effects model is estimated without dummies using the method proposed by Baltagi and Chang (1994). The model is based on the hypothesis of individual- specific heterogeneity. In this model, F-statistic tests the null that all intercepts are the same, and the rejection of null indicates the need to model individual heterogeneity. Thus, fixed effects models accommodate heterogeneity among the cross-sections by allowing each cross-section to have its own intercept value. The fixed effects model in the present study assumes that the slope, that is, the coefficient of each explanatory variable, is identical across all the sectors, and only the average within-group effect is reported. Thus, the coefficient of each explanatory variable represents its effect averaged across the sectors under the study.

Furthermore, panel fixed effects model is based on the assumption that time-invariant characteristics are unique to the cross-sections and they should not be correlated with other cross-section characteristics, and, therefore, their residuals should not be correlated with the others. If the residuals are correlated, then this model is not suitable as it might lead to spurious inferences. In the present study, the residuals of the LSDV regression have been tested for auto-correlation using the Wald test and cross-dependence or contemporaneous correlation has been tested using Breusch-Pagan (1980) LM test, Pesaran (2004) scaled LM test and Pesaran (2004) CD test. Additionally, before running the panel models, the correlation matrix is generated for each sector to check for multicollinearity.

5. Results and Discussion

5.1 Correlation Matrix

A correlation matrix is generated for all the independent variables under the study to verify the degree of correlation among them. The correlation between most pairs of variables is positive except D/E, which has a negative correlation with all other variables and ROA, which has a negative correlation with govscore as well. However, most pairwise correlations among the variables are far from the perfect negative or perfect positive and are, thus, low enough to be used as independent variables for regression. Reasonably low correlations (below 0.5) between pairs of explanatory variables have been used to confirm the absence of multicollinearty, as suggested by some prior studies [e.g., Vatcheva, Lee, McCormick, and Rahbar (2016)]. At the same time, the author is aware that using pairwise correlations among the independent variables to ascertain multicollinearity is by and large inadequate, as argued by prior literature [e.g., Belsley (1991)]. Further, high pairwise correlation doesn't always indicate the existence of multicollinearity.

5.2 Panel Fixed Effects Model

Regression is run for the entire panel data first without dummy variables first to understand the relationship between firm value as the dependent and income growth, ROA, sales growth, D/E, DPR, and govscore as the independent variables. The coefficients of explanatory variables are expected to be the same in the output of the LSDV model.

5.3 Panel Fixed Effects LSDV Model

Regression is rerun for the entire panel data first with dummy variables for IT and FMCG. The coefficients with their probability are given in Table 1. Since the model used in the study assumes different intercepts but the same slopes for all sectors under the study, the values of coefficients are averaged across the group.

With reference to RQ 1, sales growth has a positive effect on the value of the firm, and the effect is statistically significant at 95% confidence level for the selected sectors. This result is consistent with the findings of Baba (2014), Karaca and Savsar (2012) and Özdemir and Öncü (2018). Income growth has negative association with firm value. This result is not tenable as it is not supported by real life phenomenon. Any increase in income cannot be expected to decrease firm value. However, the result is not statistically significant and can be ignored. Furthermore, ROA has a positive association with firm value for the selected sectors, and it is statistically significant. This result is also consistent with the findings of the previous studies, including those by Asiri and Hameed (2014) and Sudiyatno *et al.* (2012). It is important to note here that the values of coefficients represent the common slope across sectors, thereby reporting the average effect of that explanatory variable for the firms under the study.

With reference to RQ2, as anticipated, the association of govscore with firm value is positive and quite high as compared to the coefficients of other explanatory variables. It is also statistically significant, in consonance with the findings of various previous studies including those by Bebchuk and Weisbach (2010); Gompers *et al.* (2003) and Wang (2015).   Coming to RQ3, DPR has negative coefficient with firm value, but this result has no interpretive value as it is statistically insignificant at 5% level.   D/E has a negative coefficient with firm value, but it is statistically significant at 5% level. This indicates that an increase in debt decreases firm value for the sectors under the study. However, many studies, including those by Chowdhury and Chowdhury (2010) and Heidarpoor and Malekpoor (2012) have found the impact of leverage to be positive on firm value. One possible explanation could be that in India, debt is perceived to be bad, and the same gets reflected in firm value, as also found in a study by Sinha (2017).

Table 1. Coefficients of LSDV Model

Dependent Variable: firms_value		Method: Panel LSDV	
	Coefficient	Prob.	Implications of the result
Intercept*	12.15	0.001	This is the intercept of the firm value curve in the omitted sector(Auto)
Sales Growth*	0.01	0.05	Each 1 unit growth in sales causes the firm value to increase by 0.01 units
Income Growth	-0.00	0.26	Not significant as an explanatory variable at 5% significance level
ROA*	1.59	0.001	Each 1 unit increase in ROA causes the firm value to increase by 1.59 units
DPR	-2.70	0.821	Not significant as an explanatory variable at 5% significance level
D/E*	-0.80	0.049	Each 1 unit increase in D/E causes the firm value to decrease by 0.80 units
Govscore *	18.80	0.007	Each 1 unit increase in govscore causes the firm value to increase by 18.80 units
FMCG Dummy	3.41	0.000	This is the FMCG intercept relative to the auto intercept
IT Dummy	0.26	0.056	This is the IT intercept relative to the auto intercept

*indicates the variables statistically significant at the 5% significance level.

5.4 Pooled or Panel Fixed Effects LSDV Model: The Better Fitted Model

With respect to RQ5, after estimating LSDV, it needs to be verified whether this model, which accommodates differences in cross-sections, is better fitted for predicting firm value of firms in India as compared to the pooled regression approach that runs the regression for the data as a whole. This is examined in the present study by applying the Wald test for coefficient restrictions. The test has been explained in the section on methodology. When the coefficients of the dummy variables are tested, the null of the pooled regression model which implies all dummy variables should be zero (C(8)=C(9)=0) is rejected and the alternate of fixed effects model is accepted on account of low p-value (at 5% significance level) of the test statistic of the Wald test. This confirms that the panel fixed effects LSDV is the better fitted model. The results of the test are exhibited in Table 2.

Table 2. Best Fitted Model: Pooled Regression or LSDV?

Wald test (coefficient diagnostics)		
Null: pooled regression model meaning all dummy variables will be zero (C(8)=C(9)=0)		
Alternate: Fixed effects model		
Test Statistic	*Value*	*Probability*
F-statistic	10.3632	0.0003
Chi-square	20.7264	0
p-value of F stat is significant at 5% level		
Outcome: Fixed effects model is the better fitted model		

5.5 Residual Diagnostics of Panel Fixed Effects LSDV Model

Since the LSDV model is found by empirical analysis to be the better fitted model for estimating firm value, diagnostic tests are run to ascertain that its results are not spurious. For this purpose, the residual series of the LSDV regression is tested for autocorrelation through Wald test and for cross-sectional dependence using Breusch-Pagan LM, Pesaran scaled LM and Pesaran CD tests. Wald test statistic examining the null of residuals or errors to be uncorrelated could not be rejected on account of the high p-value (at 5% significance level) of the test statistic. All three residual cross-section dependence tests used in the study test the null of no cross-section dependence (correlation) in residuals, which could not be rejected on account of the high p-value (at 5% significance level) of the test statistic for all three tests. Thus, the results of the LSDV model can be accepted as the residuals are uncorrelated and do not have cross-sectional dependence.

6. Robustness Test

In order to analyze the robustness of the model used in the study, the model applied to the complete panel is run three times again on a partial sample, dropping one cross-section every time. The coefficients and the p-values generated by running the LSDV model for auto and IT, auto and FMCG and FMCG and IT are exhibited in Table 3. In all three estimations, it is observed that large variations do not exist in the coefficients and their statistical significance. The values are found to be quite close to the values estimated with the complete panel. The robustness test, thus,

reinforces the suitability of panel LSDV model for drawing inferences about determinants of firm value for the firms listed in the three selected sectors in India.

Table 3. Robustness Test

	AUTO & IT		AUTO & FMCG		FMCG & IT	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Intercept*	10.223	0.048	14.034	0.004	12.241	0.006
Sales Growth*	0.009	0.057	0.009	0.037	0.010	0.048
Income Growth	-0.004	0.361	-0.046	0.810	-0.003	0.266
ROA*	1.340	0.040	2.537	0.048	1.281	0.035
Dividend Pay out	-2.107	0.193	-3.504	0.093	-2.707	0.068
Debt equity*	-0.952	0.019	-1.058	0.040	-0.892	0.028
Govscore *	14.825	0.023	20.489	0.024	15.863	0.050
Dummy	0.171	0.041	0.223	0.000	0.184	0.000

*indicates the variables statistically significant at the 5% significance level.

7. Summary and Implications of the Study

The study was undertaken with a view to identifying the predictors of the firm value of listed firms in India. Three sectors, namely, FMCG, auto, and IT, were identified for the purpose of the study on the basis of their importance in the Indian economy. Annual data of financial performance, leverage, corporate governance and firm value of firms listed on Bombay Stock Exchange and constituting their respective sectoral indices for a period from 2004 through 2017 were analyzed to answer the research questions.

7.1 Theoretical and Practical Implications of the Study

The present study has made a key contribution to the existing learning in four ways at the theoretical level. The first theoretical contribution of the study is that it invoked well-established finance theories and prior studies to develop a multi-factor model for predicting firm value. This comprehensive model overcomes the gap in prior literature, where the studies had limited their proposed frameworks to a lesser number of predictive factors, thereby offering limited insights into the complex conundrum of firm value.

Second, the study confirmed that the firm value of listed firms in India also

fluctuate in response to the same factors that had been found by prior studies to be significant in the context of different economies. This implies that while the findings of the study in terms of the magnitude of the association between explanatory and outcome variable are not generalizable, yet the model proposed by the study can be replicated by future researchers in the context of different sectors as well as geographies.

Third, the study revealed a negative association between firm value and D/E, in contradiction to the majority of existing findings. This finding has raised the question of considering the capital structure and its role in value enhancement in the perspective of the state of development of the economy the firm is based.

Last, the study contributes to the methodological level by providing a comprehensive implementation of LSDV. Guided by its objectives, the study employed the basic LSDV model that had dummies for the intercept, and the slope was common. This resulted in yielding values of coefficients that were averaged across sectors. However, future researchers can extend the study by including dummies for slope as well to generate different estimation equation for each sector.

The findings of the study also offer four useful inferences for practice and policy makers. First, from the perspective of individual investors and analysts, the model developed by the study helps them identify the key factors to evaluate any firm before they buy its equity. For instance, if a firm is too leveraged, the possibility of a fall in its equity price is there. There have been many recent examples of share prices falling due to the inability of the firms to service their debt.

Second, from the perspective of managers, the model developed by the study indicates the key deliverables they need to focus on to enhance the value of the firm. Third, from the perspective of lenders, the study brings forth the key factors that they should evaluate to understand the value that the firm is creating. This is important for lenders because a firm that has issues in the factors impacting its firm value is likely to be distressed and, eventually, it may not have the ability to service its debt.

Last, from the perspective of policy makers, the high contribution of govscore

to the estimation equation of firm value developed by the study reinforces the need to implement more stringent corporate governance regulations to protect the interests of investors and economy as a whole.

8. Limitations and Future Research Areas

The present study has contributed to the existing literature in terms of theory as well as methodology. However, like any study, it has certain limitations. First, the study is based on data drawn from secondary sources. Though extreme care was taken in ensuring data quality and accuracy, the possibility of errors in recording cannot be ruled out. This could have affected the results of the study. Second, the study is focused on three specific sectors in India. This imposes limitations on the generalizability of the findings to other sectors and countries. Another limitation of the study is that it has used only TQ to measure firm value. However, the scope of the study would have increased if two or more models, each using a different measure of firm value would have been tested using the same data.

Future researchers can work on overcoming these lacunas by drawing data directly from the annual reports of the firms. Furthermore, they can replicate the estimated model for other listed firms in India as well as abroad. As discussed before, future researchers can also extend the LSDV model to generate the sector-specific estimation equations. They can also replicate the same study using different measures of firm value to provide deeper insights into the measures of firm value.

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