

Article

Causality Nexus of Foreign Direct Investment and Economic Growth in Tanzania: An Empirical Investigation

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Abstract: This paper sought to examine the causality nexus of Foreign Direct Investment (FDI) and Economics Growth in Tanzania. Specifically, the research aim to assess the impact of FDI to manufacturing, agricultural and service sectors. Moreover, the study employed time series data from 1993 to 2023. FDI inflow is always considered an important economic growth catalyst in developing economies. Neoclassical growth theories proposed that FDI enhances economic growth by augmenting capital stock and technology. According to the neoclassical models, FDI does not enhance the long-run growth rate but instead is related to the output level. Autoregressive Distributed Lags (ARDL) models was employed to determine the long-run and causal relationship between variables of interest in all three models of the study. The findings of the manufacturing output model suggest that FDI has positive and statistically significance effect to manufacturing sector in both short run and long run. In agriculture and service sector models only short run estimation was captured due to lack of co-integration pattern among variables. The findings indicated a positive and statistical significant unidirectional causality running from FDI to both agricultural and service sectors output. Based on the findings of the study the policy implication is that Tanzania should emphasize FDI-led growth policies to enhance sustainable economic growth to realize the desired economic objectives at the macro level.

Keywords: Foreign Direct Investment, Gross Domestic Product, Autoregressive Distributive Lag Model, Economic Growth.

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1. Introduction

It is clear that Foreign Direct Investment hereinafter referred to as FDI is doing a supreme role as it taken as a major contributing factor in growth of a Tanzania economy. Tanzania government is taking deep measures to ensure FDI is increasing in a higher rate. By looking at the development process in general, FDI has done an attractive and meaningful job to make sure that Tanzania economy is progressing [1]. At the state level there is a lot of debates going on policy makers and academicians on how FDI is helpful on domestic economy for sustainable growth and development. Transfer of technology to domestic country is one of the key and prospective elements of FDI; this is mainly through provision of direct capital financing. Many world economies invite FDIs to their respective government and largely help in integrating their local firms and international firms in backward and forward linkages [2].

One of the achievements that Least Developing Countries (LDCs) acquired is to put a nourishing atmosphere of bringing and attracting foreign private capital. In a nutshell, various efforts has been taken in that, such as regulating price fluctuation, opening of their economy, and ensuring of existence of proper macroeconomic environment. These efforts might happen through construction of infrastructures and providing well and deserved

social services. It is acceptable that now day's FDI bring positive effect to developing countries which are taken as an implemental factor for economic growth and strengthening of the economy [3].

FDI has the potential to fill the saving gap existed in many LDCs, especially where local private sector investment is insufficient as a result of financing constraints. Moreover, the potential contributions of FDI to local economies reach much further than just providing capital; it is also expected to create quality employment [4], bring new technologies that increase efficiency and productivity, improve transport and communication system, and affect domestic investors through spillover effects [5]. However, FDI, and particularly investments of large scale, continue to raise concerns over market share dominance, exclusion of smallholder farmers in agricultural sector, and limited linkages with the local economies in case of export-oriented projects [6]. In particular, foreign private investments which involve process of land acquisition have been criticized for negatively affecting the rights and livelihoods of local communities, leading to conflicts over scarce land resources, or being motivated largely by speculative rather than productive objectives [7]. Furthermore, the extent to which FDI has welfare-enhancing impacts depends in the country, to a great extent, on the host country's degree of openness and its macroeconomic environment for business [8].

The main purpose of this paper is to empirically examine the causality nexus of FDI and economic growth in Tanzanian context focusing on agricultural, manufacturing and service output. The findings of the research of this nature have vital policy implication for economic growth and development of the economy. The fiscal policy adjustments impact upon investment in the private sector, hence it becomes crucial to look into such dynamics for development of relevance policies in both developed and developing countries. The impacts of FDI to Tanzania economic growth have impelled a hot debate and highly needs a closer methodological and contextual exploration. This study has overcome some of the methodological difficulties posed by uses of normal econometrics techniques such as Ordinary Least Square (OLS) with non stationary variables, among other techniques that are not suitable for time-series data analysis by adopting Autoregressive Distributive Lags Model (ARDL) approach which is a more robust technique and focus on three different sectors rather than only one.

2. Materials and Methods

2.1 Literature Review

2.1.1 Theoretical Framework

[9] Pioneering contribution to growth theory has generated the theoretical basis for growth accounting. In this neoclassical view in which technical progress is exogenously determined, we can thus decompose the contribution to output growth of the growth rates of inputs such as technology, labour and capital or by incorporating a vector of additional variables in the estimating equation, such as exports, import, and openness.

[10] Modified Solow's model and assumed that the growth rate of technology diffusion is an increasing function of FDI in productivity. By distinguishing between factor inputs into a developed country (foreign capital) and a developing country (domestic capital), Findlay argues that an increase in foreign capital will eventually increases domestic capital. But, the findings suggest that the rate of technological transfer in a developing country is a decreasing function of both the relative technology gap and the share of FDI in the total capital stock in the country.

[11] Also modified Solow's model and argued that eliminating accumulation of human capital accumulation in Solow's model would result into biased estimation of the coefficient on saving and population growth in the country. Authors argued that cross-country variations in per capita income are a function of variations in the rate of saving, the level of labour productivity and the rate of population growth.

The endogenous growth models that began with the seminar work of [12] introduced a theory of technological change into a production process, in which technical progress is assumed to be endogenously determined. [13] Argues that endogenous growth theory emphasized two critical channels for investment and consequently to affect growth of the economy: First, through the impact on the range of available goods, and second, through the impact on the stock of knowledge accessible for research and development created by number of people work on knowledge sector in the country.

Endogenous growth models have been applied to examine the effect of FDI on economic growth through the diffusion of technology during production [14], [15]. FDI can also promote economic growth through creation of dynamic comparative advantages that leads to advancement in technology [16]. [17] were able to calibrated Romer's model and assume that endogenous technological progress is the main engine of economic growth in the long-run. [18] Argues that FDI accelerates economic growth through strengthening human capital in learning by doing model, the most essential factor in Research & Development effort; while other researchers in the same context emphasize on increase in competition and innovation will result in advancement in technology and increase productivity and consequently promote economic growth in the long run.

2.1.2 Empirical Literature Review on FDI – Growth Nexus

As for bi-directional causation between FDI and GDP, [19] using time series data from 1980 to 2018 for 25 African countries find that FDI Granger causes GDP and vice versa, consistent with the findings of [20] and [21]. [22] Using data from 1981 to 2018, find bi-directional Granger causes between FDI and economic growth in Nigeria. [23] Using panel data finds relationships among FDI, exports, and economic growth in twelve selected Sub-Saharan African countries over the period 1970 to 2013; in line with [24] and [25], both researches from Bangladesh. [26] Using two panels (eight from Europe and eight from Asia) developing countries look at the relationship between FDI, exports, and economic growth; find bid-directional Causality between GDP and FDI in developing European countries.

As for Causality from FDI to GDP, [27] using time series data from 1970 to 2015 examines three countries from West Africa and finds causality running from FDI to economic growth in Guinea Bissau and Sierra Leone, collaborating with the findings of [28]. [29] Using time series data from 1986 to 2018 investigate the impact of FDI on the economy of Bangladesh and found FDI Granger-causing the GDP. [30] Using time series data from 1980 to 2015 find a short-run unidirectional causality jointly running from FDI and other variables to economic growth and attribute it to consistent inflows of productive FDI into oil and gas, manufacturing and telecommunication sectors of the Nigerian economy. [31] Using time series data from 1986 to 2016 reexamine the causal relationships among FDI, economic growth and financial sector development in 45 African countries and find that FDI does Granger-cause GDP growth rate arriving to a conclusion that changes in FDI inflows could be used to predict GDP growth rates in Africa. Their findings are similar to those by [32] and [33].

As for Causality from GDP to FDI, [34] using time series data from 1985 to 2019 in Vietnam look at the relationships between FDI, state-owned investment, private investment, import, export, and economic growth and find that GDP Granger causes FDI. Similarly, a one-way causal relationship is found between GDP, private investment and FDI in the short run. [35] Using time series data from 1980 to 2010 in Ghana, find that GDP Granger causes FDI. Thus, GDP leads to FDI in the long run and can stir movements in FDI. These studies imply that past values of GDP significantly contribute to predicting current FDI.

As for non-causality, [36] examines the relationship among foreign direct investment (FDI), institutions and economic growth in sub-Saharan Africa in different country environs. They employ a two-step generalized methods of moments estimator with

Weidmeijer corrected standard errors and orthogonal deviations to examine the empirical relations. Obtained findings suggest that there is no granger causality between FDI and economic growth. [37] studying the BRICS economies, found no evidence of causality between FDI and GDP, like a few other studies [38] and [39]. [40] Using panel data from selected West African Countries from 1990 to 2016, study the causal relationship between FDI and economic growth. They find that no individual or joint causality runs from independent variables to a dependent variable and vice versa, implying that FDI does not Granger cause economic growth and vice versa is also true.

2.1.3 Synthesis of the Literature Review and Research Gap

Following review of different literatures it can be concluded that the impact of FDI on the economic growth of the host country is still controversial. An enormous number of studies have been done so far within Tanzania and abroad to find out the effects of FDI on the economy but there is no agreement on the causality. Some studies concluded with its findings that FDI has positive impact on the economy while others find a negative impact. Some studies came up with argument that impact of FDI highly rely on strong capacity of host country mainly politically, technologically and economically at large. All these provide opportunities for other researchers to go deep in analyzing of FDI and economic growth nexus.

This paper seeks to fill the existence gap in methodological and contextual sense. This is widely advantageous in adding findings and data to the existing literature and studies. Moreover, studies concerning FDI in relation to sectorial impact and uses ARDL model are highly very few. Many of the studies conducted concerning the assessment of FDI to economic growth are based in a singles sector of the economy such as agriculture, manufacturing or service sector alone. This is a gap this paper seeks to fill and extend the frontier of knowledge in that manner, investigation on FDI and economic growth nexus will focus on three different sectors agriculture, manufacturing and services sectors.

2.2 Research Methodology

2.2.1 Data

The variables of interest selected in this study based on the availability and reliability of data includes; Foreign Direct Investment (FDI), Gross Domestic Product (GDP), Inflation Rate and Real Exchange Rate. The data were obtained from Tanzania National Bureau of Statistics (NBS), Bank of Tanzania (BOT) and Tanzania Investment Center (TIC). The study use quantitative research design in which time series data are being used over a period of 1993 to 2023, the period has been chosen because of existence of policy changes particularly following new regime and adoption of different structural adjustment programmes.

2.2.2 Econometric Model

Literature focusing on econometric puts clear that the Ordinary Least Squares (OLS) estimates is biased in nature and that they are inconsistent especially when using time series data. This due to the fact that the OLS estimates are affected by the presence of endogeneity, for that reason they are unable to promise stable and robust forecasting [41]. This study applies Autoregressive Distribution Lags (ARDL) approach in order to deal with these shortcomings.

The inclusion of inflation and exchange rate as control variables in the empirical model of this study is informed by the advice of [42] in order to be able to increase GDP and cost-oriented anti-inflation programs have to be supported by high transfers from outside the country. There exist recursive relationship between FDI and economic growth accruable to the government. The relevance of FDI in the model is supported by the two-gap model of [43] which showed that developing countries are constrained with low level of foreign exchange earnings and domestic savings. The expectation is that, in combining with other variables, FDI provides an optimal avenue to break the vicious circle of poverty,

solve the two gaps simultaneously and increase growth of the economy. The functional relationship is expressed as:

$$GDP = f(FDI, RER, INF) \quad (1)$$

Where: *GDP* is the growth rate of real Gross Domestic Product looking at three sectors agriculture, manufacturing and services; *FDI* is the foreign direct investment; *RER* is the real exchange rate, and *INF* is the rate of inflation.

The generalized ARDL (ρ, q) model is specified as follows:

$$Y_t = \alpha_{0j} + \sum_{i=1}^{\rho} \delta_j Y_{t-1} + \sum_{i=0}^q \beta'_j X_{t-1} + \varepsilon_{jt} \quad (2)$$

Where; Y'_t is a vector and the variables in $(X'_t)'$ are allowed to purely $I(0)$ or $I(1)$ or cointegrated. β and δ are coefficients, $j = 1, \dots, k$; α is a constant. ρ and q are optimal lag orders; ε_{jt} is a vector of the error term, unobservable zero mean white noise vector process (serially uncorrelated or independent). The dependent variable is a function of its lagged values, the current and lagged values of other exogenous variables in the model.

3. Results and Discussion

3.1 Descriptive Statistics

In order to check if variables of interest are being normally distributed, descriptive or basic statistics of the data used in this study were computed. Table 1 provides summary statistics in terms of minimum, maximum, mean and standard deviation indices for every variable presented.

Table 1: Descriptive Statistics

Variable	Observation	Mean	Std. Dev	Minimum	Maximum
FDI	31	2.48	1.67	0.0002	5.66
INF	31	7.94	1.48	3.51	37.9
SGDP	31	40.57	5.72	30.76	49.09
AGDP	31	31.48	8.29	23.24	44.82
MGDP	31	8.43	1.17	6.27	10.98
LnRER	31	6.73	0.77	4.82	7.73

From the Table 1, real exchange rate (RER) variable was converted into logarithmic transformation in order to minimize the dispersion of the data and taking care of extreme values. FDI disclose a significant pattern indicating that data are normally distributed with a mean value of 2.5 and standard deviation of 1.7. It's also observed that agricultural sector output (AGDP) display higher standard deviation compared to other variables. Based on obtained summary statistics we can conclude that all data are clear in terms of distribution patterns.

3.2 Correlation Matrix

In order to determine how variables are correlated to each other spearman's rank correlation coefficients were estimated. When obtained coefficients have the values of over 0.8 in either direction, it will suggest that Multicollinearity problem exists and for a value of less than 0.8 the problem does not exist [44]. Table 2 presents spearman's rank correlation coefficients estimates.

Table 2: Correlation Matrix

Variables	MGDP	AGDP	SGDP	FDI	INFL	RER
MGDP	1					

AGDP	0.43	1				
SGDP	0.57	0.18	1			
FDI	0.54	0.76	0.63	1		
INF	-0.63	-0.72	-0.60	-0.78	1	
RER	0.68	0.27	0.72	0.62	-0.78	1

From Table 2 the estimates show there is positive and negative direction in terms of associations among variables of interest. For the magnitude of associations among all variables are below 0.8 in absolute value, therefore we can conclude that Multicollinearity problem does not exist in the chosen data set.

3.3 Unit Root Test

Before estimation of the regression models, unit root tests has to be conducted so as to determine if variables of interest are stationary or not stationary, in order to avoid getting spurious regression results. Table 3 shows the unit root test results at level and first difference for all variables.

Table 3: Unit Root Test Results

Variables	ADF test	statistics	5% Critical value	Decision	Integration Order
MGDP	1.53		-2.87	Non stationary	I(0)
AGDP	-1.51		-2.87	Non stationary	I(0)
FDI	-3.30		-2.85	Stationary	I(0)
SGDP	-0.89		-2.87	Non stationary	I(0)
INF	-0.68		-2.81	Non stationary	I(0)
LnEXR	-1.89		-2.87	Non stationary	I(0)
MGDP	-5.77		-2.87	Stationary	I(1)
AGDP	-2.90		-2.52	Stationary	I(1)
SGDP	-5.45		-2.87	Stationary	I(1)
INF	-7.24		-2.68	Stationary	I(1)
LnEXR	-5.56		-2.87	Stationary	I(1)

The results in Table 3 shows that only FDI was found to be stationary at level, that is, order zero of integration. As Augmented Dickey Fuller (ADF) test statistic is greater than critical value at 5% in absolute term. As seen at this level the remaining variables were found to have a unit root (non-stationary) since obtained ADF test statistic is less than 5% critical value in absolute term. This required first differencing of those non-stationary variables. All remaining variables were found to be stationary at order one, that is, after first difference.

3.4 The Impact of FDI on Manufacturing Sector of the Economy

3.4.1 Bounds Test for Co-integration Results

The Autoregressive Distributive Lag (ARDL) is used to examine the bound co-integration among the variables. Estimation of long-run relationship and Error Correction Model (ECM) is decided in this test. Bound test for co-integration is advantageous over the other test as the variables with different lag length can be included. Table 4 shows the bound

test ARDL critical values which express the relationship between dependent variables and independent variables.

Table 4: ARDL Bounds Test for Manufacturing Sector Output

MODEL		ARDL LAG LENTH
MGDP = f(FDI, INFLATION,RER)		ARDL (1, 2, 0, 0)
Statistic	Value	K
F Test	7.38	3
Significance	I(0) BOUND	I(1) BOUND
10%	2.69	4.57
5%	3.67	3.96
1%	4.29	5.48

NB: K denotes amount of non-deterministic regressors in long-run relationship

From Table 4 the findings suggest that there is a long-run relationship between manufacturing sector output and the independent variables at 5% level of significance. It was decided due to fact that the F-statistic (7.38) is greater than the upper bounds critical values, This implies that there is a co-integrating relationship among the variables of interest.

3.4.2 The Short-run and Long-run Estimation Results

The long-run and short-run estimates were obtained after the estimation of Error Correction Model (ECM). The Error Correction Model is advantageous over the other models in the sense that is applied to seizure the speed of modification of previous dependent variable on the present one in terms of error correction term (ECT). Table 5 presents long-run and short-run estimation results for FDI and manufacturing sector output.

Table 5: Long-run and Short-run Estimation Results for MGDP Model

Variables	Coefficients	Standard Error	T-statistic	Probability
Long-run Estimates				
FDI	1.8230	0.5660	3.22	0.000***
Inflation Rate	-1.7860	0.3809	4.70	0.002***
Real Exchange Rate	-0.0106	0.00115	-1.38	0.208
Short-run Estimates				
FDI	0.0317	0.0137	2.31	0.001***
Inflation Rate	-0.7778	1.4403	0.54	0.630
Real Exchange Rate	-0.0014	0.0023	-0.60	0.663
Constant	1.1245	1.4675	0.77	0.437
ECT (-1)	-0.1628	0.5233	-0.340	0.050**

NB: R-squared = 0.987; Adjusted R-squared= 0.995; ** and *** Show statistical significance at 5% and 1% level respectively.

From the Table 5, the results shows that FDI has positive effects on manufacturing output both in long run and short run and the effect is statistically significant at 1% level in both circumstances. The findings indicate that in the long-run the inflation rate has negative effects on manufacturing sector output, which is statistically significant at 1% level of significance. On the other hand, although the inflation rate has negative effects on manufacturing output in short-run, the effect is not statistically significant. In addition, the findings indicate that real exchange rate has insignificant effect on manufacturing sector both in the short-run and long-run. The lagged value of error correction term (ECT-1) is negative and significant at 5% level of significance. This observation shows how the model will adjust to its long-run equilibrium position once exposed to any internal or/and external shocks. The model confirms that deviation from the long-run equilibrium level of

economic growth in the previous year will be corrected by approximately 16% in the next year for the system to regain its equilibrium once any disturbance occurs.

3.5 The Impact of FDI on Agricultural Sector of the Economy

3.5.1 Bounds Test for Co-integration Results

The ARDL engaged on the Agricultural output model to examine whether there is a long-run relationship among variables or not. The GDP in this model is being measure in terms of agricultural output. The findings of bounds co-integration test are shown in the Table 6.

Table 6: ARDL Bounds Test for Agricultural Output Model

MODEL		ARDL LAG LENTH
AGDP = f (FDI, INFLATION ,RER)		ARDL (1,0,0,0)
Statistic	Value	K
F Test	4.55	3
Significance	I(0) BOUND	I(1) BOUND
10%	2.61	3.77
5%	4.15	5.44
1%	5.28	6.67

From Table 6 the results suggest that there is no long-run relationship between agricultural output and the independent variables at 1% level of significance. It was concluded because the F-statistic (5.55) is lower than the upper bounds critical values; this indicates that variables are not co-integrated. Therefore, only short-run relationship is going to be estimated.

3.5.2 Short-run Estimation Results for Agricultural Sector Model

Based on obtained bound test of co-integration results on Table 6 which shows that there is long-run relationship among variables, only short-run estimates will be determined. Table 7 shows the short-run estimation results for agricultural output model.

Table 7: Short-run Estimation Results for AGDP Model

Variables	Coefficients	Standard Error	T-statistic	Probability
FDI	0.186	0.020	9.30	0.000***
Inflation Rate	0.003	0.0013	2.72	0.009**
Real Exchange Rate	-0.004	0.0038	-1.04	0.305
Constant	0.746	1.051	0.7098	0.540

NB: R-squared = 0.893; Adjusted R-squared= 0.820; ** and *** Show statistical significance at 5% and 1% level respectively.

From Table 7 the findings indicate that FDI has positive effects on agricultural sector output and statistically significant at 1% level in the short-run. The inflation rate has positive impacts to agricultural sector output and statistical significance at 5% level.

3.6 The Impact of FDI on Service Sector of the Economy

3.6.1 Bounds Test for Co-integration Results

The ARDL model was employed on the service sector output to determine whether variables of interest in the study used have a long-run relationship or not. In this case GDP is being measured as output from the service sector of the economy. The estimations of bounds test of co-integration are shown on Table 8.

Table 8: ARDL Bounds Test for Service Sector Model

MODEL		ARDL LAG LENTH
SGDP = f(FDI, INFLATION , RER)		ARDL (2,0,0,0)
Statistic	Value	K
F Test	4.05	3
Significance	I(0) BOUND	I(1) BOUND
10%	2.36	3.44
5%	2.88	4.13
1%	3.57	5.78

NB: K denotes amount of non-deterministic regressors in long-run relationship

The findings from Table 8 suggest that there is no long-run relationship between service sector output and the independent variables prescribed in the model. This is true due to the fact that obtained F statistics is 4.05 which is lower than critical values of upper bound at 1% and 5% level of statistical significance. Therefore, model estimation will be based only in short-run relationship.

3.6.2 Short-Run Estimation Results for Service Output Model

The findings of bound co-integration test on Table 8 show that there is no co-integration of the variables. This signifies that its only short-run estimation of the impact of independent variables to service sector output can be estimated. The Table 9 presents the short-run estimation results for service output model.

Table 9: Short-run Estimation Results for SGDP Model

Variables	Coefficients	Standard Error	T-statistic	Probability
FDI	0.194	0.0520	3.73	0.000***
Inflation Rate	-0.166	0.0624	2.66	0.013 **
Real Exchange Rate	-0.0008	0.0021	-0.37	0.625
Constant	0.575	0.4674	1.23	0.218

NB: R-squared = 0.781; Adjusted R-squared= 0.710; ** and *** Show statistical significance at 5% and 1% level respectively.

Table 9 shows the coefficients of ARDL for service sector output model. From estimated results, FDI has positive and statistical significant effect on service sector output at 1% level of significance. The inflation rate has a coefficient of -0.166 indicating that a rise in the inflation rate leads to a decrease in the service sector by that amount. The estimated coefficient is statistically significant at 5% level. Furthermore, real exchange rate found to have no statistically significant effect on service sector output.

4. Conclusion

This paper is concluded basing on the findings obtained on FDI and economic growth nexus with three different models of the manufacturing, agricultural and service sectors output. Theoretically, FDI is expected to close the savings gap in the domestic economy or lead to capital accumulation by increasing current savings, and consequently increasing economic growth in host countries where multinational corporations make direct investments. Following ARDL bound test of co-integration, FDI was found to have short-run positive relationship with the three imposed sectors and statistically significance at 1% level. For the manufacturing sector output, FDI has also found to have long-run positive relationship and the model confirms that deviation from the long-run equilibrium level of economic growth in the previous year will be corrected by approximately 16% in the next year for the system to regain its equilibrium once any disturbance occurs. The findings obtained from this study support the position of the neoclassical and FDI- led growth hypothesis, since unidirectional causality from FDI to economic growth was found. Given these results, we conclude that FDI is an important determinant of economic growth in Tanzania after focusing on different sectors of interest.

Therefore, Tanzanian policymakers should continue to develop, devise, and enforce judicious micro and macroeconomic policies that attract FDI inflows to promote economic growth of the country to attain desired sustainable economic development. Based on the findings of this study, it is recommended that the focus should also be on attracting more foreign private investment in the form of FDI so as to facilitate smooth flow at all economic levels to rapidly realize the desired economic objectives in Tanzania. Moreover, the government should continue to maintain conducive macro-economic environment, characterized by price stability and credibility of financial sector. Moreover, the country's primary and secondary financial markets need to be developed to facilitate smooth and

rapid technological diffusion in the economy for the country's prosperity and increase in per capital income as the aim towards moving to high income countries category.

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