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# The role of comprehensive variables in the economic performance of the different sectors of the economy - a comparative study between Algeria and some countries.

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## Abstract:

This research paper aims to study the concept of competitive theory through the use of macroeconomic variables relying on statistical techniques, standard and economic, to measure economic and development performance within the various economic sectors, within a sample of countries, and it is considered a comparative study between them where they represent the same characteristics and advantages of These countries.

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The results of the study showed that Algeria is less competitive compared to Indonesia and Saudi Arabia, and this is due to the fact that the study variables do not affect the national raw income, especially the value added variable for the industry sector, as the latter suffers from several problems.

**Keywords :** competitiveness, economic performance, developmental performance, national raw income, standard and statistical study.

**Jel Classification Codes : E61 ،F4 ،L6 ،N1 ،L8.**

## 1. INTRODUCTION

The Interest of concept the competitiveness has grown since the mid-1980s and early 1990s as a produce of the new system associated with the general trend towards adopting and implementing market economy mechanisms in various countries. Furthermore the issue of measuring competitiveness has become among the priorities in the agenda of developed and developing countries alike.

It has emerged in the economic literature and the interested parties to measure the competitiveness of many competitive definitions at the level of states that are different from competitive enterprise sector; Where he has these actors to find and develop indicators and models of vehicle quantity and quality to measure competitive states and determine their location on the ladder of global competitiveness rankings, and often these composite indicators of key indicators consists relate to the performance of certain sectors of the economy, and these indicators in turn consists of indicators sub-specialized issues and digital aspects or the quality of the performance of a specific economic sector.

In this context, **the question that could be asked is**:

**What is the appropriate model for measuring international competitiveness?**

To address this research is worth asking some questions subs, requiring special attention are as follows:

- ✓ What is the concept of international competitiveness?

- ✓ What are the determining factors of international competitiveness?
- ✓ What are the most important indicators of the success of countries and the development of their competitiveness?

**Methodology:**

Due to the nature of the topic the approach will be a quantitative description approach, as it is descriptive when examining various theoretical concepts related to competitiveness, but when analyzing and evaluating the competitive position of the countries under study, we use the quantitative approach through indicators to measure competitiveness, and we use usual the least squares method (OLS) to estimate the functions and different formula and then choose the formula that gives the best results economically and statistically record.

**Previous studies:**

I have dealt with the subject of many studies and international competitiveness indicators measured, as well as periodic reports issued by various international bodies and organizations dealing with assessment of the competitiveness of the countries of capacity, and the most important of these studies mention the following:

**1-** The study (**Raphael Chiappini**), (**2010**) entitled: (**Comment mesurer la Compétitivité structurelle des pays?**), The study dealt with the effect of structural competitiveness on the development of exports of goods and

services to 11 countries in the euro area during the period (1996-2008). In his study of the world competiveness yearbook, he concluded that the index has a positive effect on the export performance of the Eurozone countries, and thus shows the differences in the trade performance of the region's countries.

**2-** the study (**Mercedes Delgado, Christian Ketels, Michael E. Porter, and Scott Stern**) (**2012**) entitled (**The Determinants Of National Competitiveness**), competitiveness is based on two concepts: The Foundational Competitiveness, which is the expected level of per capita product and depends on the following indicators: (social infrastructure, political bodies, and monetary and fiscal policy). Investment attractiveness, which is the relative cost of factors of production in enhancing a country's competitiveness.

**This study differs from previous studies**, as it examines how to formulate a global model that includes simple standards for measuring international competitiveness, which can be relied upon in measuring competitiveness based on gross domestic product. It also includes developed and developing countries and focuses on the period (1990-2018), namely The period that we consider is the most suitable for analyzing and measuring competitiveness in light of the new trends of the global economy.

## 2. Description and formulation of the study model

We express the dependent or dependent variable of the Gross Domestic Product (GDP) index, estimated in millions of US dollars for the period (1990-2018).

The independent variables include all the economic indicators that we referred to in the second chapter, with the exception of the population variable, foreign direct investment, inflation rates, and the exchange rate. These main variables indicating international competitiveness, especially foreign trade variables, were satisfied based on what has been indicated by internationally published research, which mostly emphasized the importance of Commercial results only, so that the search does not branch out and deviate from its framework of competitiveness. We proceed to form and explain the independent variables according to our study model according to the following picture: **Pc:** Average annual per capita income in US dollars.

**Agr%:** the percentage of the agricultural sector's contribution to the formation GDP.

**Ind%:** the percentage of the industrial sector’s contribution to the formation of the gross domestic product.

**Ser%:** percentage of the service sector’s contribution to the formation of the GDP.

**Exp:** The value of exports is estimated in millions of US dollars.

**Imp:** The value of the imports is estimated in millions of US dollars.

### 2.1. Formulating the study form

With respect to the standard study model, we rely on multiple equations and simple, the purpose of which show the effect of individual variables were or combined, and we mean that the applicable equations in most of the standard studies which can rely on their ability to create identical economic relations with economic theory and these standard models are Follows(Régis Bourbonnais , 2011, P52).

- ✓ **Linear Model**

**Yi =** b0 + b1x1 + b2x2 +…… + bnxn + ui

i = 1, 2 , 3 …….n

Y: dependent variable. X1-Xn: Independent variants. bo: is a hard parameter.

b1-bn: landmarks representing the tendencies of the variables.

- ✓ **Power Model**

‹ i = 1 , 2 , 3 , ……n

We have previously defined the independent variables and the dependent variable, and then the parameter (A) represents the constant, and the exponential parameters or the foundations of the variables represent the parameters of the variables, which are the elasticity of factors or variables.(Régis Bourbonnais , 2011, P55).

It is known to econometrics specialists that it is not possible to estimate any regression model by the usual least squares method (which is considered the best unbiased linear method) in an exponential pattern except after it has been converted to linear form, and accordingly, the previous exponential form

can be converted to linear in a three-way pattern, i.e. by triple transformations It is known and is successively:

**A- Log - Log model**

$$LogY_i = LogA + \beta_1 LogX_1 + \beta_2 LogX_2 + ..... + \beta_n LogX_n + LogU_i$$

**B- Inverse Log (Log Y-)**

$$LogY_i = A + \beta_1 X_1 + \beta_2 X_2 + ..... + \beta_n X_n + U_i$$

**C- Semi Log (Y- Log)**

$$Y_i = A + \beta_1 LogX_1 + \beta_2 LogX_2 + ..... + \beta_n LogX_n + U_i$$

It should be noted that we show that the theoretical expectations for feature signals are as follows:

**Table No. (01): Signals of the study model parameters.**

| Variable | The nature of the signal |
|---|---|
| Average annual per capita income (Pc) | -+ |
| Percentage of the contribution of the agricultural sector to the formation of the GDP (Agr%) | + |
| Percentage of the contribution of the industrial sector to the formation of the GDP (Ind%) | + |
| Percentage of the contribution of the services sector in the formation of the GDP (Ser%) | + |

| | |
|---|---|
| Export value (Exp) | + |
| Import value (Imp) | - |

Source: Prepared by the researcher.

## 2.2. Estimating the competitiveness models of the sample countries

And as we have already said, the goal is to measure and analyze the determinants and indicators of the competitiveness of each country of the study sample using multiple regression models, and accordingly we will estimate the models described in advance during the period (1990-2018) using the statistical program (Eviews-8). In order to reach the closest formula that matches the data, we will use what is known as the general-to-specific modeling method, which depends in its content on formulating a model that is consistent with economic theory and includes all relevant variables. The purpose of assessing these relationships is to clarify the idea of competition between countries by making comparisons for each indicator with the countries of the group.(Arab Monetary Fund, 2008, p. 31).

## 3. Estimating the group models (Saudi Arabia - Algeria - Malaysia)

### 3.1. Estimating Saudi models:

When estimating the Saudi GDP models cited in the description and formulation of the study model, the researcher encountered standard problems, the most important of which is the existence of a linear correlation between the independent variables and a self-correlation of random errors,

and this problem was addressed by the dimensions of the variable causing that. It is a variable of the agricultural sector percentage (Agr%) from the estimated models. (Fattouh, B., Sen, A., 2016, 230).Table No. (02) Includes the results of this estimate. After comparing the estimate to the four formulas, the linear model was elected as the best estimated model to represent the relationship of the Saudi GDP with the explained variables.

**3.2. Model test:**

Student statistic (T) in Table No. (2) indicates the significance of the parameter of the export variable (Exp) at the level of (1%) and the significance of the parameters of the remaining variables (the proportion of the industrial sector in the formation of the output (Ind%), the proportion of the services sector in the formation of the output (Ser %), The value of imports (Imp), and the per capita income (Pc) at a significant level (5%). The value of (F) confirms the significance of the estimated model at the level of (1%), which indicates the strength of the variables in the model and their explanatory capacity for the changes occurring in the output.

As for the standard tests, it is by using the Klein test and by comparing the multiple correlation coefficient of (0.9984) with the simple correlation coefficients included in the following matrix:

Student statistic (T) in the following table indicates the significance of the parameter of the export variable (Exp) at

the level of (1%) and the significance of the parameters of the rest of the variables (the proportion of the industrial sector in the formation of the output (Ind%), the proportion of the services sector in the formation of the output (Ser%), The value of imports (Imp), and the per capita income (Pc)) are at a significant level (5%). The value of (F) confirms the significance of the estimated model at the level of (1%), which indicates the strength of the variables in the model and their explanatory capacity for the changes occurring in the output. This is supported by the corrected determination coefficient as it reached about ($\overline{R^2} = 99.59\%$) and the rest is due to other factors not included in the estimated model.

**Table No. (02) Student statistical results**

| Correlation | **IND_SU** | **SER_ SU** | **EXP_ SU** | **IMP_ SU** |
|---|---|---|---|---|
| **SER_ SU** | -0.9950 | — | | |
| **EXP_ SU** | 0.8968 | -0.8606 | — | |
| **IMP_ SU** | 0.8167 | -0.7655 | 0.9704 | — |
| **PC_ SU** | 0.8088 | -0.7562 | 0.9731 | 0.9945 |

Source: Dependence on software EVIEWS

We did not find any linear correlations between the independent variables, so the model does not suffer from the multiple linear correlation problems.

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**Table No. (03): Estimating the impact of economic indicators on the Saudi GDP**

| Equations / Parameters | Linear Equation (1) | Log-Log Equation (2) | Log Y-Equation (3) | Semi Log Equation (4) |
|---|---|---|---|---|
| Constant | -2180999 | 7.6735 | -14.080 | -1610899 |
| T | (-2.75 ) 5% | (1.97) 10% | ( -2.89 ) 5% | (-0.39) |
| Ind % | 19615.48 | -1.7041 | 0.264 | -447766.2 |
| T | (2.49 ) 5% | (-2.60) 5% | ( 5.48) 1% | (-0.64) |
| Ser% | 26600.96 | -0.2950 | 0.277 | -326375.2 |
| T | (2.84) 5% | ( -0.75) | ( 4.82) 1% | (-0.78) |
| Exp | 1.39155 | 0.8690 | $1.82*10^{-6}$ | 73827.31 |
| T | (7.89) 1% | (9.62) 1% | ( 1.67 ) 25% | ( 0.76 ) |
| Imp | -0.8646 | -0.2227 | $-5.16*10^{-6}$ | -201156.5 |
| T | (-2.17) 5% | (-2.09) 10% | (-2.11) 5% | (-1.77) 10% |
| Pc | 14.997 | 0.5404 | $6.79*10^{-5}$ | 674947.2 |
| T | ( 2.509 ) 5% | ( 2.42 ) 5% | ( 1.84 ) 10% | ( 2.84 ) 5% |
| $R^2$ | 99.69% | 99.77% | 98.85% | 97.43% |
| $\overline{R^2}$ | 99.59% | 99.71% | 98.52% | 96.67% |
| R | 99.84% | 99.88% | 99.42% | 98.70% |
| F(5,17) | 1093.81 1% | 1529.41 1% | 294.30 1% | 129.08 1% |
| D.W | 1.166 (inconclusive) | 1.202 (inconclusive) | 0.347 (in) | 1.080 (inconclusive) |

**t – table $_{0.01}$ = 2.567 , t – table $_{0.05}$ = 1.740**
**t – table $_{0.10}$ = 1.333 , t – table $_{0.25}$ = 0.689**
**F – table ( 5 – 17 )$_{0.05}$ = 2.827 , f – table ( 5– 17 )$_{0.01}$ = 4.336**

**D – W$_{0.05}$ ( $d_L$ = 0.896 , $d_u$ = 1.785 )**

*The percentages associated with the side numbers are the significance ratios.

To test the two problems of autocorrelation of random errors and inconsistency, we use the tests summarized in the following table:

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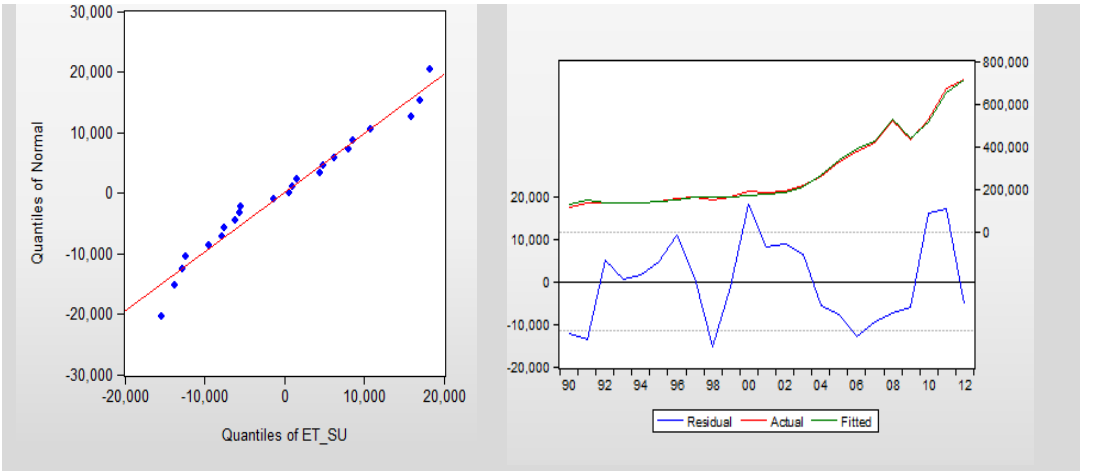
**Table No. (04): Summary of some tests for the estimated model of Saudi output**

| Test | Estimted value | Probability |
|---|---|---|
| Normality (Jarque-Bera) | 1.198 | 0.5492 |
| Seriel Correlation LM Test (Breusch-Gogfrey) | LM= 7.714 (p=2) | 0.2935 |
| | LM= 7.805 (p=3) | 0.2695 |
| HeteroskedasticityTest : (Breusch-Pagan-Godfrey) | F-statistic=1.808 | Prob.F(5,17)= 0.1648 |
| | LM= 7.986 | 0.1570 |

**Source:** prepared by the researcher based on the results of the assessment using the statistical program

It is evident from the standard results of Table No. (04) That the estimated model is devoid of the problems of self-correlation and heterogeneity, which is shown in Figure No. (01) related to the behaviour of random variables, and therefore the model is free from standard problems and correctly represents economic relations (Saleh A , 1984, P43).

**Figure No. (01): the behaviour of random variables in the estimated model of the Saudi output**




**Source:** Prepared by the researcher based on the results of the assessment using the statistical program

### 3.3. Interpretation of the model:

The estimation of the Saudi model in linear form gave results consistent with theoretical assumptions. The industrial sector and the services sector were among the sectors that are characterized by their positive effects, while imports had a negative impact on output, which corresponds to the economic and technical logic (Almoguera, Herrera, A, 2011,P160).The per capita income of Saudi Arabia showed its positive because the trends of Saudi per capita income tended towards saving and then investment spending, which contributed to a significant increase in the Saudi GDP. The value of Saudi exports also indicated that an increase their value contributes to an increase in Saudi production by a value greater than the value of this increase.(Abedelazez, 2012, P135).

### 3.4. Estimating Algeria's Models:

The estimation of the Algerian GDP model confronted the problem of linear diversity between the independent variables. As each of the two variables caused the proportion of the industrial sector and the value of imports linearly with the rest of the variables, which necessitated their exclusion from the estimated models, and the researcher chose the exponential model with the double logarithmic transformation as the best estimated model for being compatible with theoretical assumptions in addition to the explanatory ability of the model and its economic advantages (First Ministry Portal,2016).

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**Table No. (05): Estimating the impact of economic indicators on the Algerian GDP**

| Equations / Parameters | Linear Equation (1) | Log-Log Equation (2) | Log Y- Equation (3) | Semi Log Equation (4) |
|---|---|---|---|---|
| Constant | -97839.68 | 0.1229 | 10.23 | -1147304 |
| T | (-6.55 ) $^{1\%}$ | (0.193) | ( 7.35) $^{1\%}$ | (-9.00)$^{1\%}$ |
| Agr % | 2058.461 | 0.1711 | 0.0257 | -14947.73 |
| T | (1.78 ) $^{10\%}$ | ( 1.20 ) $^{25\%}$ | ( 1.141) | (-0.524) |
| Ser% | 2155.053 | 0.5270 | -0.0053 | 127174.1 |
| T | (4.84) $^{1\%}$ | (2.86) $^{5\%}$ | ( -0.611) | (3.45) $^{1\%}$ |
| Exp | 1.8353 | 0.524 | $1.45*10^{-5}$ | 45391.32 |
| T | (10.95)$^{1\%}$ | (9.70) $^{1\%}$ | ( 4.43 ) $^{1\%}$ | ( 4.18 ) $^{1\%}$ |
| Pc | 9.632 | 0.451 | $0.188*10^{-3}$ | 45189.06 |
| T | ( 2.95 )$^{1\%}$ | ( 5.43 ) $^{1\%}$ | ( 2.95 )$^{1\%}$ | ( 2.70 )$^{1\%}$ |
| $R^2$ | 99.51% | 99.25% | 98.24% | 96.85% |
| $\overline{R^2}$ | 99.41% | 99.08% | 97.85% | 96.16% |
| R | 99.75% | 99.62% | 99.11% | 98.41% |
| F(4,18) | 931.75 $^{1\%}$ | 596.15$^{1\%}$ | 251.43 $^{1\%}$ | 138.75 $^{1\%}$ |
| D.W | 1.514 (inconclusive) | 1.751 (out) | 1.346 (inconclusive) | 1.450 (inconclusive) |

**t – table $_{0.01}$ = 2.552 , t – table $_{0.05}$ = 1.734**
**t – table $_{0.10}$ = 1.330 , t – table $_{0.25}$ = 0.688**
**F – table ( 4 – 18 )$_{0.05}$ = 2.931 , f – table ( 4– 18 )$_{0.01}$ = 4.579**

**D – W$_{0.05}$ ( $d_L$ = 1.078 , $d_u$ = 1.660 )**

* The percentages associated with the side numbers are the significant percentages

### 3.5.Model test:

The value of the Fisher statistic (F = 596.15) in Table No. (04) indicates the significance of the estimated model at a level of significance (1%), which indicates the importance of the independent variables used in explaining the variance in the gross domestic product and this is confirmed by the determination coefficient, which reached about ( 99.25%).

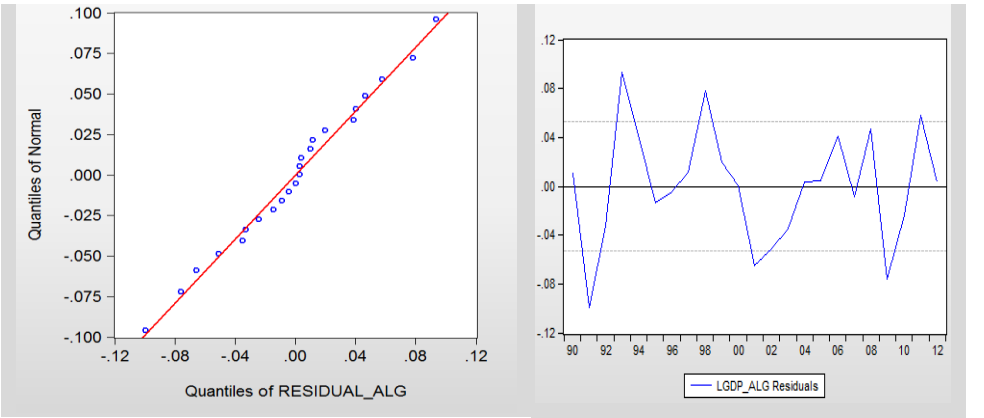
We note from the same table that the value of DW = 1.751 falls within the domain $[d_u = 1.66,2]$ which is the field of self-correlation of random errors, and in order to test the problem of the variability of the uniformity of the variance of errors we use the **Breusch-Pagan-Godfrey** test shown in the following table:

**Table No. (06): a summary of some tests for the estimated model of the Algerian output**

| Test | Estimted value | Probability |
|---|---|---|
| Normality (Jarque-Bera) | 0.0983 | 0.952 |
| Seriel Correlation LM Test (Breusch-Gogfrey) | LM= 3.06 (p=2) | 0.2165 |
| | LM=3.57 (p=3) | 0.3106 |
| HeteroskedasticityTest : (Breusch-Pagan-Godfrey) | F-statistic=0.8816 | Prob.F(4,18)=0.4945 |

**Source:** prepared by the researcher based on the results of the assessment using the statistical program

**Figure No. (02): the behavior of random variables in the estimated model of Algerian output**




**Source:** Prepared by the researcher based on the results of the assessment using the statistical program

The results of the standard tests recorded in Table (06) show that there is no self-correlation of the random residues for (p> 1), and there is also no problem of inconsistency of the uniformity of the variance of errors based on the probability value (Prob.F (4,18) = 0.4945) , Which is also evident from Figure (02), which illustrates the behavior of random residues in this model.( Algeria's Economic Outlook , 2020,P43).

In order to test the problem of linear multiplicity, we use the Klein test, where the multiple correlation coefficient reached (R = 0.9962) and the largest value for the simple correlation coefficients was (R = 0.9053) Therefore, the multiple correlation coefficient is greater than the highest value in this matrix, which indicates the absence of correlation Linear between independent variables.

**Table No. (07) Student statistical results**

| Correlation | **AGR_ALG** | **SER_ ALG** | **EXP_ ALG** |
|---|---|---|---|
| **SER_ ALG** | 0.538930 | — | |
| **EXP_ ALG** | -0.830429 | -0.317154 | — |
| **PC_ ALG** | -0.672040 | -0.17918 | 0.905353 |

Source: Dependence on software EVIEWS

### 3.6.Interpretation of the model:

From the relationships of the estimated logarithmic model it was found that all the variables of the model are compatible with the theoretical assumptions of feature signals; The two variables showed the percentage of the agricultural sector (Agr%) and the ratio of the services sector (Ser%) to the Algerian GDP, a positive relationship, meaning that their increase by (1%) leads to an increase in output by (0.17% and 0.52%), respectively. From the export variable and the per capita income variable, there is a positive relationship with the output, after which all these variables remain of a weak influence; As the elasticity of the Algerian GDP did not exceed (0.5) for any of these explained variables. (WORLD BANK MIDDLE EAST AND NORTH AFRICA REGIO N,2020, P35).

### 3.7. Estimating Malaysia's Models:

Table No. (08) summarizes the estimation of Malaysian output models according to the formulas mentioned during the description and form of the study model.

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**Table No. (08): Estimating the impact of economic indicators on the Malaysian GDP**

| Equations / Parameters | Linear Equation (1) | Log-Log Equation (2) | Log Y- Equation (3) | Semi Log Equation (4) |
|---|---|---|---|---|
| Constant | 147892.3 | -0.79730 | 4.621 | 486766.5 |
| T | (1.68 ) 25% | (-0.42) | ( 10.81) 1% | (0.36) |
| Ind% | -3160.218 | 0.042909 | 0.0259 | -323784.1 |
| T | (-3.04 ) 1% | ( 0.09 ) | ( 2.96) 1% | (-1.65) 25% |
| Ser% | -689.61 | 0.3941 | 0.0267 | -193417 |
| T | (-0.53) | (0.81) | ( 2.71) 5% | (-0.92) |
| Exp | 0.6903 | 0.4467 | $3.78*10^{-6}$ | 58537.4 |
| T | (5.60) 1% | (3.76) 1% | ( 4.10 ) 1% | ( 1.32 ) 25% |
| Pc | 12.8494 | 0.7231 | $0.103*10^{-3}$ | 109823.6 |
| T | ( 2.96) 1% | ( 4.43 ) 1% | ( 3.13 ) 1% | ( 1.82 ) 10% |
| $R^2$ | 99.39% | 98.37% | 98.08% | 94.50% |
| $\overline{R^2}$ | 99.25% | 97.99% | 97.62% | 93.28% |
| R | 99.69% | 99.18% | 99.03% | 97.21% |
| F(4,18) | 733.57 1% | 257.93 1% | 217.52 1% | 77.45 1% |
| D.W | 0.984 (in) | 1.529 (inconclusive) | 1.360 (inconclusive) | 0.570 (in) |

**$t - table_{0.01} = 2.552$ , $t - table_{0.05} = 1.734$**
**$t - table_{0.10} = 1.330$ , $t - table_{0.25} = 0.688$**
**$F - table\ (4 - 18)_{0.05} = 2.931$ , $f - table\ (4 - 18)_{0.01} = 4.579$**

**$D - W_{0.05}\ (d_L = 1.078$ , $d_u = 1.660)$**

***The percentages associated with the side numbers are the significant percentages.**

The estimation faced standard problems, the most important of which were linearity and self-correlation of errors. These problems were addressed by deleting the variables causing this and re-estimating in an iterative manner (Iterative Method). After comparing the results, the (second)

linear model with the double logarithmic transformation was chosen as the best estimate among the estimated models for its compatibility with the economic and technical logic (Al-Iriani, 2006).

### 3.8.Model test:

The values of (T) test shown in Table No. (08) show the significance of the parameters of the variables (the value of exports (Exp) and the rate of per capita income (Pc)) at the level of (1%), and the insignificance of the variables of the industrial sector percentage (Agr%) and the service sector percentage ( Ser%) to the result at a level less than (25%), and the value of (F) test proves the significance of the model at (1%) level, which indicates success in choosing the model variables.

The value of the test (DW = 1.529) comes within the area $[d_l = 1.078, d_u = 1.660]$ in which the decision is considered inconclusive for the problem of self-correlation of errors, and to ensure that the model is free of this problem, it was necessary to use the **Seriel Correlation LM Test Breusch-Gogfrey** shown in the following table:

**Table No. (09): Summary of some tests for the estimated model of Malaysian output**

| Test | Estimted value | Probability |
|---|---|---|
| Normality (Jarque-Bera) | 3.907 | 0.1417 |
| Seriel Correlation LM Test (Breusch-Gogfrey) | LM= 0.883 (p=1) | 0.3472 |
| | LM= 1.661 (p=2) | 0.4357 |
| | LM=1.780 (p=3) | 0.6197 |
| HeteroskedasticityTest : (Breusch-Pagan-Godfrey) | F-statistic=1.096 | Prob.F(4,17)=0.3901 |

Source: prepared by the researcher based on the results of the assessment using the statistical program.

The calculated value of **Breusch-Gogfrey test** (LM = 0.883) is smaller than the tabular value ($\chi^2(1)=3.84$)which means acceptance of the hypothesis ($H_0:\rho=0$) that is, there is no self-correlation between errors, and the value of the **Breusch-Pagan test** proves that the hypothesis of homogeneity of error variance is not rejected ( $H_0:\sigma_1^2=\sigma_2^2=.....=\sigma_n^2$) where ( Prob = 0.3901> 0.05), and Figure (03) showing the behavior of random residues in the estimated model. The nullity of the model reinforces the problem of homogeneity variance instability of random errors.

When comparing the value of the total multiple correlation coefficient (R = 0.9918) with the simple correlation coefficients, we find that the latter is the smallest, and therefore according to **Klein**, there is no linear multiplicity problem. Therefore, we conclude that the estimated Malaysian model Therefore, we conclude that the

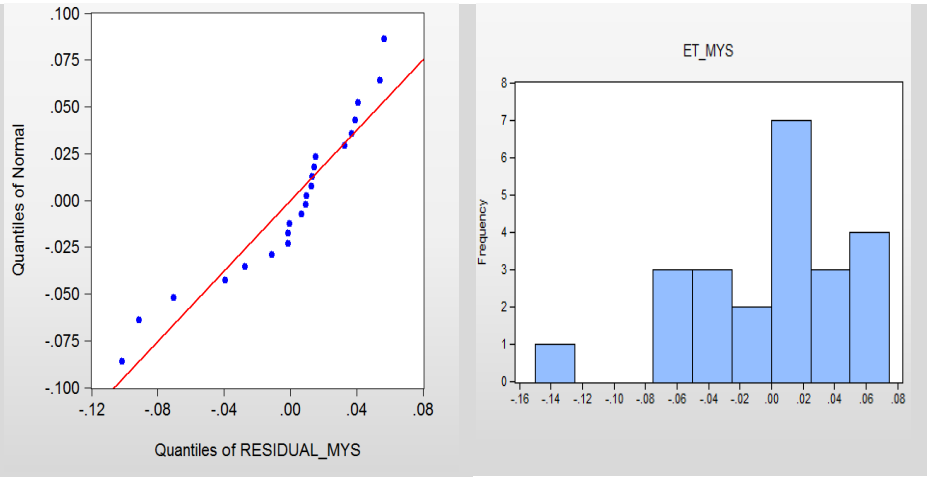
estimated Malaysian model does not suffer from standard problems (Ibrahim.M , 1998, P60).

**Table No. (10) Student statistical results**

| Correlation | IND_MYS | SER_ MYS | EXP_ MYS |
|---|---|---|---|
| **SER_ MYS** | -0.722868 | — | |
| **EXP_ MYS** | -0.025380 | 0.304737 | — |
| **PC_ MYS** | -0.278165 | 0.528571 | 0.930915 |

Source: Dependence on software EVIEWS

**Figure No. (03): the behavior of random variables in the model of the Malaysian output**




Source: Prepared by the researcher based on the results of the assessment using the statistical program.

## 3.9.Interpretation of the model:

The trend of the effect of independent variables on the Malaysian GDP was consistent with theoretical expectations and with correct economic relations. As the variables (the

percentage of the industrial sector's contribution to generating the output (Ind%), the percentage of the service sector's contribution to generating the output (Ser%), the value of exports (Exp), and the per capita income (Pc)) had a positive effect, but they had a weak effect on the output. Despite this, the Malaysian GDP is more influenced by the two variables of the two main sectors (industry - services) due to their importance (Maddala, G., 1999, P640). As the Malaysian industrial sector has become playing an important role in the economic development of Malaysia after its added value doubled at a rate of (9.5%) annually, as a result of the state's encouragement for high-tech and capital-intensive industries, and this is in order to increase the competitiveness of national products and expand its domestic market. The services sector is the largest part of the economy in the country, as it constitutes (45.21%) of the GDP(Investment Climate Report in the Arab Countries,2008,p130).

**4. choosing the most competitive country in a group**

After estimating the output models in the countries of the study sample and choosing the best model, we try to make a comparison between these countries according to each group to choose the most competitive country among them.

Table No. (11) includes the estimates of the models chosen to express the domestic outputs of the group countries (Saudi Arabia - Algeria - Malaysia) as follows:

**Table No. (11): Estimating the selected models for the third group countries (Saudi Arabia - Algeria - Malaysia)**

| Equations / Parameters | SU<br>Linear Equation | ALG<br>Log-Log Equation | MYS<br>Log-Log Equation |
|---|---|---|---|
| Constant<br>T | **-2180999**<br>**(-2.75) 5%** | **0.1229**<br>**(0.193)** | **-0. 7973**<br>**( -0.42) 1%** |
| Agr %<br>T | | **0.1711**<br>**( 1.20 ) 25%** | |
| Ind %<br>T | **19615.48**<br>**(2.49 ) 5%** | | **0.0259**<br>**( 2.96) 1%** |
| Ser%<br>T | **26600.96**<br>**(2.84) 5%** | **0.5270**<br>**(2.86) 5%** | **0.0267**<br>**( 2.71) 5%** |
| Exp<br>T | **1.39155**<br>**(7.89) 1%** | **0.524**<br>**(9.70) 1%** | **$3.78*10^{-6}$**<br>**( 4.10 ) 1%** |
| Imp<br>T | **-0.8646**<br>**(-2.17) 5%** | | |
| Pc<br>T | **14.997**<br>**(2.509) 5%** | **0.451**<br>**( 5.43 ) 1%** | **$0.103*10^{-3}$**<br>**( 3.13 ) 1%** |
| $R^2$ | **99.69%** | **99.25%** | **98.08%** |
| $\overline{R^2}$ | **99.59%** | **99.08%** | **97.62%** |
| R | **99.84%** | **99.62%** | **99.03%** |
| F(5,17) | **1093.81 1%** | **596.15 1%** | **217.52 1%** |
| D.W | **1.166**<br>**(in conclusive)** | **1.751**<br>**(out)** | **1.360**<br>**(inconclusive)** |

**Source: Tables No. (03), (05), (08)**

Depending on the estimation of these models, the gross domestic product was calculated for each of these countries by entering weights for the variables according to the formula of the estimated model, and then comparing countries according to the output to diagnose the most competitive country within the group as follows (Outlook Report on International Economic Growth and Sustainable Development, 2013, P 4).

### 4.1. Calculation of the Saudi GDP:

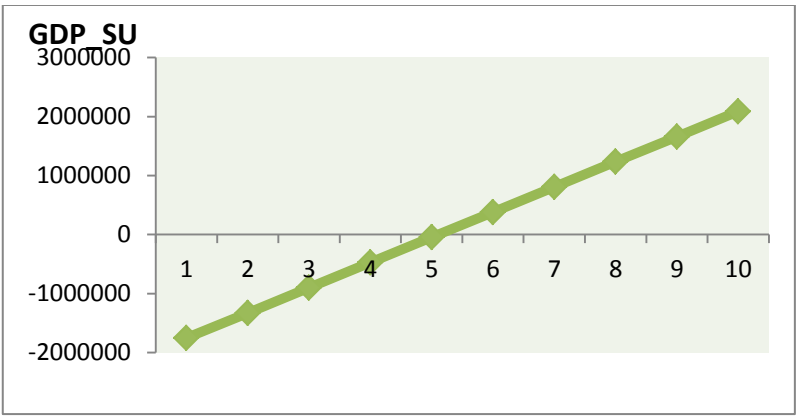
In the same manner used in the first group in estimating the gross domestic product, we estimate the Saudi product from the selected estimated model (the linear model), and summarize the results in the following table:

**Table No. (12): Saudi GDP calculated from the estimated model**

| GDP_SU | Pc | Imp | Exp | Ser% | Ind% | (c) constant | Variables | Numbers |
|---|---|---|---|---|---|---|---|---|
| | 14,99709 | -0,8646 | 1,3915 | 26600,96 | 19615,48 | -2180999 | (bi) | |
| | 8580 | 48117 | 77641 | 42,67 | 51,88 | | (Me) | |
| -1754121,475 | 1560 | 8749 | 14117 | 8 | 9 | | | 01 |
| -1327243,951 | 3120 | 17497 | 28233 | 16 | 19 | | | 02 |
| -900366,4261 | 4680 | 26246 | 42350 | 23 | 28 | | | 03 |
| -473488,9014 | 6240 | 34994 | 56466 | 31 | 38 | | | 04 |
| -46611,37679 | 7800 | 43743 | 70583 | 39 | 47 | | | 05 |
| 380266,1478 | 9360 | 52491 | 84699 | 47 | 57 | | | 06 |
| 807143,6725 | 10920 | 61240 | 98816 | 54 | 66 | | | 07 |
| 1234021,197 | 12480 | 69988 | 112932 | 62 | 75 | | | 08 |
| 1660898,722 | 14040 | 78737 | 127049 | 70 | 85 | | | 09 |
| 2087776,246 | 15600 | 87485 | 141165 | 78 | 94 | | | 10 |

**Source:** prepared by the researcher based on the results of the assessment.

**Figure No. (04): Evolution of the Saudi Gross Domestic Product calculated from the estimated model**




Source: prepared by the researcher based on the data of Table No. (03).

From the above figure, the reality of the Saudi GDP trend is shown when increasing the values of the variables in the estimated model. It rises from the bottom left to the far right by the value of the estimated parameter for each of the weighting values, especially the export values that represent (45.18%) of the GDP and the percentage of the industrial sector in generating the GDP that exceeded the average (54%) during the study period (Outlook Report on International Economic Growth and Sustainable Development, 2013, P 12). As mentioned above, Saudi Arabia is considered superior due to the high average growth rate of its exports compared to the countries of the group and this is due to its possession of a number of industries intended for export, such as chemical and plastic products that reach the Asian and European markets, which enabled it to enter serious competitions with its counterparts in global markets, taking advantage of cheap

energy and material prices(Outlook Report on International Economic Growth and Sustainable Development, 2013, P 22).

### 4.2. Calculation of the Algerian GDP:

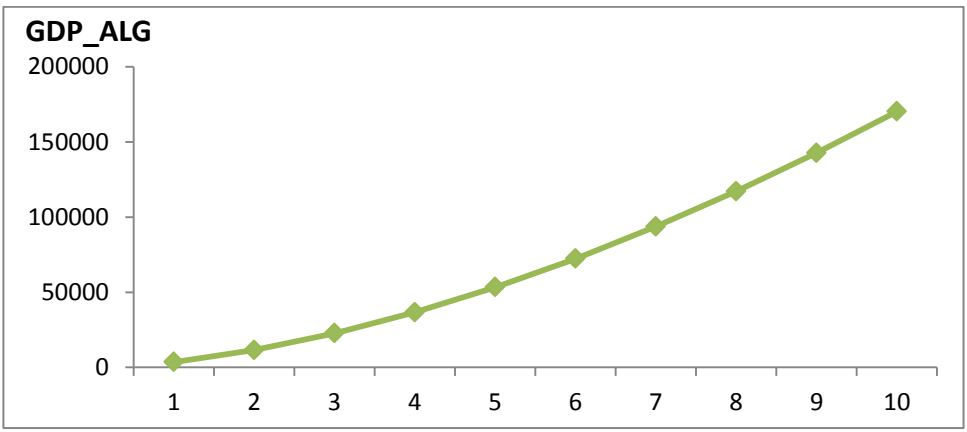
The Algerian GDP was calculated from the estimated model (the double logarithmic model), and its value was organized in the following table:

**Table No. (13): Algerian GDP calculated from the estimated model**

| GDP_CHA | Pc | Exp | Ser% | Agr% | (c) Constant | Variables | Numbers |
|---|---|---|---|---|---|---|---|
| | 0,451914 | 0,524677 | 0,527047 | 0,171158 | 0,122939 | (bi) | |
| | 1890 | 20152 | 38,17 | 9,9 | | (Me) | |
| 3602,000779 | 344 | 3664 | 7 | 1,80 | 1,130815 | | 01 |
| 11500,25936 | 687 | 7328 | 14 | 3,60 | | | 02 |
| 22679,035 | 1031 | 10992 | 21 | 5,40 | | | 03 |
| 36717,36169 | 1375 | 14656 | 28 | 7,20 | | | 04 |
| 53355,10388 | 1718 | 18320 | 35 | 9,00 | | | 05 |
| 72408,30878 | 2062 | 21984 | 42 | 10,80 | | | 06 |
| 93736,90705 | 2405 | 25648 | 49 | 12,60 | | | 07 |
| 117229,0648 | 2749 | 29312 | 56 | 14,40 | | | 08 |
| 142792,4812 | 3093 | 32976 | 62 | 16,20 | | | 09 |
| 170349,0839 | 3436 | 36640 | 69 | 18,00 | | | 10 |

**Source:** prepared by the researcher based on the results of the assessment.

**Figure No. (05): the evolution of the Algerian GDP calculated from the estimated model**




**Source:** prepared by the researcher based on the data of Table No. (13).

It is noted from the data of Table No. (13) that the values of the Algerian GDP were insignificant compared to the values of the outputs of the countries of this group. As the Algerian economy depends mainly on oil revenue (Hassam.F, 2005, P31).

### 4.3. Calculation of the Malaysian GDP:

In the same way adopted in calculating the gross domestic product, the Malaysian output values were obtained from the estimated model (the double logarithmic model), and they were organized in the following table (BNM, 2018,P63):

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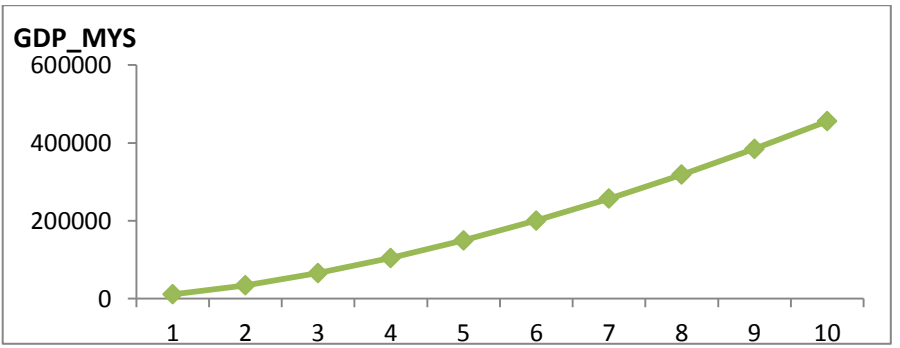
**Table No. (14): Malaysian GDP calculated from the estimated model**

| GDP_CHA | Pc | Exp | Ser% | Ind% | (c) Constant | Variables | Numbers |
|---|---|---|---|---|---|---|---|
| | 0,723126 | 0,446778 | 0,394194 | 0,042909 | -0,797307 | (bi) | |
| | 4130 | 109221 | 44,93 | 43,88 | | (Me) | |
| 11262,78376 | 751 | 19858 | 8 | 8 | 0,450540 | | 01 |
| 34308,6047 | 1502 | 39717 | 16 | 16 | | | 02 |
| 65823,79871 | 2253 | 59575 | 25 | 24 | | | 03 |
| 104510,6061 | 3004 | 79433 | 33 | 32 | | | 04 |
| 149587,5453 | 3755 | 99292 | 41 | 40 | | | 05 |
| 200511,9461 | 4505 | 119150 | 49 | 48 | | | 06 |
| 256876,4033 | 5256 | 139009 | 57 | 56 | | | 07 |
| 318359,3992 | 6007 | 158867 | 65 | 64 | | | 08 |
| 384698,1857 | 6758 | 178725 | 74 | 72 | | | 09 |
| 455672,4226 | 7509 | 198584 | 82 | 80 | | | 10 |

Source: prepared by the researcher based on the results of the assessment.

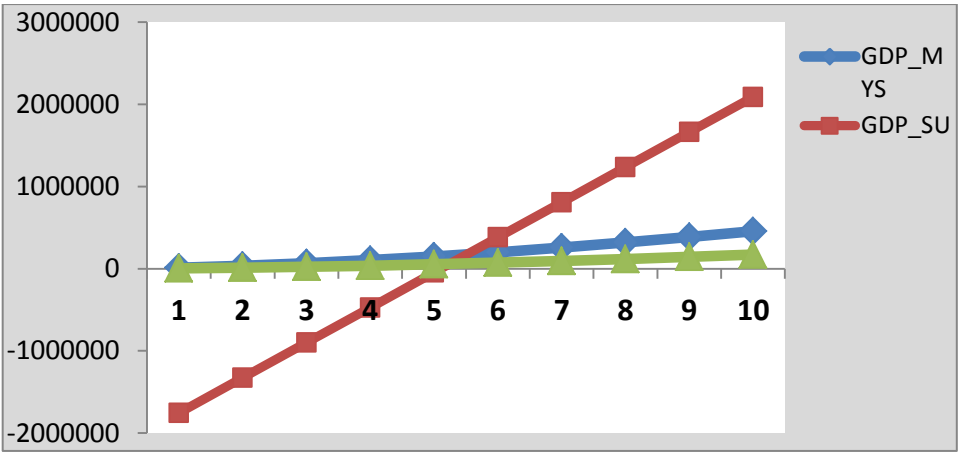
**Figure No. (06): the evolution of the Malaysian GDP calculated from the estimated model**




**Source:** prepared by the researcher based on the data of Table No. (14).

The Malaysian output records successive and increasing increases as a result of monotonic weighting increases in their values, and therefore the curve is not linear and is concave because the estimated model is of an exponential form, and the output depends greatly on the progress of the services sector, which represents the largest part of the economy, which constitutes (45.21%) of the output This sector has grown at a growth rate of more than 10% annually during the period (1990-2012), as a result of industrial progress and information technology, which made the country in need of strong services that facilitate and provide the required services and availability (IDEAS, 2015,P96).

**Figure No. (07): Evolution of the estimated gross domestic products of the group countries.**




Source: Prepared by the researcher.

It is noticed from the last graph of the variation in the movement of the outputs of these countries when using the estimated models for them, and it shows that the Saudi GDP is more capable. Therefore, the competitiveness of the Saudi economy is greater than that of the Malaysian and Algerian economies (World Bank 2014,P90).

## 5. Results:

This study has given great importance to the competitiveness components represented in economic growth that depends mainly on the performance of its sectors as the main determinant for building a competitive capacity that contributes to achieving real sustainable economic development. It has been shown that the state of Saudi Arabia is the most competitive when comparing Algeria and Malaysia, and this result is in agreement (GASTAT,2019, p6). With most of the recent international economic reports and publications that are interested in following the issue of global competitiveness; As these reports confirm that the US economy is at the forefront of the strongest economies in the world, followed by the Chinese economy, which has become second after it witnessed rapid development and a continuous rise in its global ranking thanks to the great achievements resulting from reform and opening up to the outside, but China is still a developing country equivalent to Its per capita GDP is one-fifth of its Japanese equivalent, and it has not even reached half the global average in this regard. As for the Saudi economy, it witnessed a historical development in the mid-seventies of the last century as a result of the doubling of oil production and its revenues, and perhaps the most prominent indicator of this is the doubling of the gross domestic product more than six times in 23 years, and the reports referred to as a developing economy in the early stages of economic development It has many obstacles that must be

overcome to catch up with developed countries, and despite this, the Saudi economy is the most competitive among the countries of its groups. (J. Energy, 1994, P270).

### 5.1. The results

In light of what has been reviewed in this study, the most important results that were reached can be presented as follows:

1- Competitiveness is based on the interconnectedness between levels and different entities, in addition to its focus on a long-term view, and the same applies to development. Thus, the development potential of a country is ability to stimulate the competitiveness of its economy.

2- The success of any country in creating a high position among the countries of the world has become dependent on competition in the local and international markets.

3- The countries of the group (Saudi Arabia - Algeria - Malaysia) share a decrease in the contribution of the agricultural sector in generating the GDP compared to the rest of the main sectors, especially Saudi Arabia, in which the average of this percentage does not exceed the limits of (5%). This is due to several factors, the most important of which is the scarcity of agricultural lands and limited Water resources, the nature of the desert soil and its poverty of organic materials, which necessitates an increase in the use of organic and industrial fertilizers, and thus high production costs,

which made it dependent on meeting the needs of the local demand abroad.

4- Saudi Arabia and Algeria share the relative importance of the industrial sector, as the average percentage of its contribution to the formation of output exceeds 50%. This reflects the extent of the two countries 'dependence on the industrial sector despite what distinguishes it from weak productivity due to the lack of compliance with industrial institutions and the rules of competitiveness in the market, and the high cost Industrial production due to dependence on imported technology.

### 5.2. Recommendations

In light of the theoretical and practical results that have been reached, we present the following recommendations:

1- The necessity of having a strong, effective and realistic vision for leadership that is based on results and not on slogans.

2- Development indicators must be reconciled with competitiveness indicators, so that the development aspect is not absent when analyzing competitiveness.

3- Activating the export sector, which is a catalyst for economic growth as it works to improve the efficiency of resource use and benefit from economies of scale that help in overcoming the narrow local market, by opening new markets

and improving the quality and quality of products in order to enhance the ability of exports to compete in global markets.

4- The necessity of encouraging local investment and attracting foreign direct investment as it is a major source of financing in addition to being an important means of transferring technology, leading to raising the level of productivity and improving the quality of commodity and service products.

Despite the positive results achieved by the Algerian economy in recent years in the indicators of macroeconomic balance, Algeria is still classified among the countries with weak competitiveness, so it has become important to raise the competitiveness of the national economy, through the following:

- Applying a flexible and gradual approach to economic transformation and reformulating policies according to changes in international circumstances.
- Paying attention to enhancing the competitiveness of national products, including goods and services, to enable them to withstand and compete against foreign products in the local and global markets.
- Adopting an effective strategy in dealing with global oil markets because of the importance of oil, as it is the only source for the national economy to obtain the necessary funds to meet the requirements of development.

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