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The Impact of Domestic Investment on Economic Growth: New Evidence from Malaysia

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ABSTRACT:

This paper investigates the relationship between domestic investment and economic growth in Malaysia. In order to achieve this purpose, annual data for the periods between 1960 and 2015 was tested by using Correlation analysis, Johansen co-integration analysis of Vector Error Correction Model and the Granger-Causality tests. According to the result of the analysis, it was determined that there is a positive effect of domestic investment, exports and labors on economic growth in the long run term, however, there is no relationship between domestic investment and economic growth in the short run term. These results provide an evidence that domestic investment, exports and labors are seen as a source of economic growth in Malaysia

JEL Classification: C13, E22.

KEY WORDS: Domestic Investment, Economic Growth, Correlation, Cointegration, VECM and Causality, Malaysia.

I. INTRODUCTION

Domestic investment is one of the most important economic processes that countries attach great importance to as one of the most important components of the economic growth of the country and the main engine of the economic cycle. Also, domestic investment has a relationship with various economic variables, which made countries seek to guide the

investment decision and create the appropriate climate for economic development and maximizing wealth, thus making researchers in the economy pay great attention to study investment in terms of economic, financial and accounting. Respect of domestic investment at the level of the national economy, capital spending on new projects in the sectors of public utilities and infrastructure such as incision main and branch roads projects and extensions of water and sewerage connections and create urban plans and construction projects, housing and extensions of electricity and power generation, as well as social development in the areas of education, health and communication projects, projects as well to projects that relate to economic activity for the production of goods and services in the production and service sectors such as industry, agriculture, housing, health, education and tourism. Obtainable literature, including recent extensions of the neo-classical growth model as well as the theories of endogenous growth has emphasized the role of domestic investment in economic growth. Among these studies we can cite Kormendi and Meguire (1985); Romer (1986); Lucas (1988); Grier and Tullock (1989); Barro (1991); Levine and Renelt (1991); Rebelo (1991); Mankiw, Romer, and Weil (1992); Fischer (1993) and Barro and Sala-i-Martin (1999). The Malaysian experience is one of development experiences worthy of attention and study of the great achievements that could have benefited the developing countries in general and the Arab countries in particular in order to rise from underdevelopment, stagnation and subordination. Malaysia is a highly developed Islamic country that, over the past four decades, has made tremendous strides in human and economic development. It has become the first industrial country in the Islamic world. It is also the first in the field of exports and imports in Southeast Asia. National economy, industry, agriculture, minerals, oil and tourism, and made progress in tackling poverty, unemployment, corruption and reducing indebtedness to large levels. Malaysia has benefited from greater economic openness to the outside through its integration into the economies of globalization while maintaining the pillars of the development of its national economy, and we see the progress made clear by transforming it from a country that relies mainly on agriculture to a country of origin for industrial and technical goods, especially in the electrical and electronic industries (2001), which monitored the most important technology exporting countries in the world. Malaysia ranked ninth, ahead of both Italy and Sweden, and it was a very successful experience in the face of the economic crisis (1997), which faced the countries of Southeast Asia as a whole the best evidence of the successful program carried out through their commitment to implement a national plan of action imposed by tight limits on monetary policy and gave the Central Bank wide powers to implement a contingency plan to face the

flight of capital and bring foreign exchange to And Malaysia was able to break its financial crisis in just two years. In particular, this work tries to empirically find an answer for the question of whether there is a nexus between domestic investment and economic growth in Malaysia, to achieve this objective the paper is structured as follows. In section 2, we present the review literature concerning the nexus between domestic investment and economic growth. Secondly, we discuss the Methodology Model Specification and data used in this study in Section 3. Thirdly, Section 4 presents the empirical results as well as the analysis of the findings. Finally, Section 5 is dedicated to our conclusion.

II. REVIEW LITERATURE

Several empirical studies which investigated the relationship between domestic investment and economic growth found that, fixed capital formation determine the rate of future economic growth. These studies include:

Table 1: Studies related to the relationship between domestic investment and economic growth

NO	Authors	Countries	Periods	Econometric techniques	Keys Findings
1	COMBEY and al (2016)	UEMOA	1995-2014	Cointegration analysis	GDP→ Domestic investment
2	Debi Prasad Bal and al (2016)	India	1970-2012	VECM	Domestic investment→ GDP
3	Montassar Kahia and al (2016)	MENA	1980–2012	Cointegration analysis	Domestic investment→ GDP
4	Rami Hodrab and al(2016)	MENA	1995-2013	Granger causality tests	Domestic investment→ GDP
5	P Pegkas and al (2016)	Greece	1970-2012	Cointegration analysis VAR Granger causality tests	Domestic investment→ GDP
6	Hatem H. A. A and al (2016)	Arabia Saudi	1980-2014	Cointegration analysis ARDL	Domestic investment→ GDP
7	Mahmoud M.S and al(2016)	MENA	1977-2013	Tobit OLS	Domestic investment→ GDP
8	Manamba EPAPHRA and al(2016)	Tanzania	1970-2014	Cointegration analysis Granger causality tests	Domestic investment→ GDP
9	Masoud Albiman Md and al(2016)	Malaysia	1967-2010	Cointegration analysis Granger causality tests	GDP→ Domestic investment
10	Matiur Rahman and al(2016)	Bangladesh	1972-2012	Cointegration analysis VECM	Domestic investment→ GDP
11	Nurudeen Abu and al (2016)	Sub-Saharan Africa	1981 -2011	VAR Granger causality tests	Domestic investment↔ GDP
12	Bakari Sayef (2016)	Egypt:	1965-2015	Cointegration analysis	Domestic investment→ GDP

				Granger causality tests	
13	Bakari Sayef (2016)	Japan	1970-2015	Correlation Analysis OLS	Domestic investment→ GDP
14	Omosebi Ayeomoni and al(2016)	Nigeria	1986-2014	ARDL	Domestic investment→ GDP
15	Bakari Sayef (2017)	Canada	1990-2015	Cointegration analysis Granger causality tests	Domestic investment→ GDP
16	Najid Ahmad and al(2017)	Iran	1971 -2011	Cointegration analysis Granger causality tests	Domestic investment→ GDP

III. Data, methodology and model specification

1. The Data:

The analysis used in this study cover annual time series of 1960 to 2015 or 56 observations which should be sufficient to capture the short run and long run correlation between Export, Labor, Fixed Formation Capital and economic growth in the model. All data set are taken from World Development Indicators 2016.

2. Methodology

Since our study uses variables whose data are in the form of a time series, it is necessary to ascertain their stationary, hence the need to carry out tests of stationary to determine the degree of integration of Variables, among the various tests of verification of stationary that exist. Our study retains the unit root tests ADF and PP. If the variables are all integrated in level, we apply an estimate based on a linear regression. On the other hand, if the variables are all integrated into the first difference, our estimates are based on an estimate of the VAR model. When the variables are integrated in the first difference we will examine and determine the cointegration between the variables, if the cointegration test indicates the absence of cointegration relation, we will use the model VAR. If the cointegration test indicates the presence of a cointegration relation between the different variables studied, the model VECM will be used.

3. Model specification:

Early empirical formulations tried to capture the causal link between domestic investment and GDP growth by incorporating exports into the aggregate production function [Awokuse, T.O. (2007); Masoud Albiman Md and Suleiman NN, (2016)]. The augmented production function including domestic investment, exports and Labor is expressed as:

$$GDP_t = f(exports, Labor, Domestic Investment) \quad (1)$$

The function can also be represented in a log-linear econometric format thus:

$$\log(GDP)_t = \beta_0 + \beta_1 \log(exports)_t + \beta_2 \log(Labor)_t + \beta_3 \log(Domestic Investment)_t + \varepsilon_t \quad (2)$$

Where:

- β_0 : The constant term.
- β_1 : coefficient of variable (Exports)
- β_2 : coefficient of variables (Labor)
- β_3 : coefficient of variable (Domestic Investment)
- t : The time trend.
- ε : The random error term assumed to be normally, identically and independently distributed.

IV. Results and discussion

1) Correlation Test

To establish how forceful the nexus is between two variables, we can use the Pearson correlation coefficient value.

- If the coefficient value is in the negative range, then that indicates the relationship between the variables is negatively correlated, or as one value increases, the other decreases.
- If the coefficient value is in the positive range, then that indicates the relationship between the variables is positively correlated, or both values increase or decrease together.

Table 2: Correlation TEST

	GDP	Domestic Investment	Exports	Labor
GDP	1	0.9751	0.9842	0.9016
Domestic Investment	0.9751	1	0.9511	0.8945
Exports	0.9842	0.9511	1	0.9322
Labor	0.9016	0.8945	0.9322	1

The results of the correlation test give us that all the variables studied are positively correlated, that is meant an increase in domestic investment, exports and population directly lead to an increase in the gross domestic product and the reverse when Is a decrease.

2) Test for unit roots: ADF and PP

Consistent with the appearance of the curves [Log (PIB), Log (Domestic Investment), Log (Population), Log (Exports)], we observe according to their general directions at the same time and the same movement, which place their stationary in level. For this reason, we are obliged to test the stationary of the variables used in our model, in order to check whether or not the stature of a unit root is the same, using the augmented Dickey Fuller test (ADF) and the Phillipps-Perrons (PP).

Table 3: Test for unit roots: ADF and PP

ADF		PP			
Null Hypothesis: D(LOG(GDP)) has a unit root					
Augmented Dickey-Fuller test statistic	t-Statistic	Probability	Phillips-Perron test statistic	Adj. t-Stat	Probability
	-5.646201	0.0000		-5.678259	0.0000
Test critical values:	1% level	-3.557472	Test critical values:	1% level	-3.557472
	5% level	-2.916566		5% level	-2.916566
	10% level	-2.596116		10% level	-2.596116
Null Hypothesis: D(LOG(EXPORTS)) has a unit root					
Augmented Dickey-Fuller test statistic	t-Statistic	Probability	Phillips-Perron test statistic	Adj. t-Stat	Probability
	-6.256669	0.0000		-6.191611	0.0000
Test critical values:	1% level	-3.557472	Test critical values:	1% level	-3.557472
	5% level	-2.916566		5% level	-2.916566

	<i>10% level</i>	-2.596116		<i>10% level</i>	-2.596116
Null Hypothesis: D(LOG(DOMESTIC INVESTMENT)) has a unit root					
Augmented Dickey-Fuller test	t-Statistic	Probability	Phillips-Perron test statistic	Adj. t-Stat	Probability
statistic		-6.035487		-6.005748	0.0000
Test critical values:	<i>1% level</i>	-3.557472	Test critical values:	<i>1% level</i>	-3.557472
	<i>5% level</i>	-2.916566		<i>5% level</i>	-2.916566
	<i>10% level</i>	-2.596116		<i>10% level</i>	-2.596116
Null Hypothesis: LOG(LABOR) has a unit root					
Augmented Dickey-Fuller test	t-Statistic	Probability	Phillips-Perron test statistic	Adj. t-Stat	Probability
statistic		-2.729804		-4.061336	0.0023
Test critical values:	<i>1% level</i>	-3.581152	Test critical values:	<i>1% level</i>	-3.555023
	<i>5% level</i>	-2.926622		<i>5% level</i>	-2.915522
	<i>10% level</i>	-2.601424		<i>10% level</i>	-2.595565

From Table 2, it can be seen that for all variables the statistics of the ADF test and the PP test are lower than the criterion statistics of the different thresholds than after a prior differentiation, so they are integrated with orders (1), then we can conclude that there may be a cointegration relation.

3) Cointegration Analysis

To check the cointegration between the variables studied, it is necessary to pass through two stages. First of all, it is necessary to specify the number of optimal delay which must be suitable for our model. Then we will use the Johanson Test to specify the number of cointegration relationships between variables.

a) VAR Lag Order Selection Criteria

The choice of the number of the delay has a very important role in the design of a VAR model. Most VAR models are estimated to involve symmetric lags, he same lag length is exercised for all variables in all equations of the model. This lag length is frequently picked using an explicit statistical criterion such as the HQ, FPE, AIC or SIC.

Table 4: VAR Lag Order Selection Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	24.24225	NA	5.23e-06	-0.809690	-0.656728	-0.751441
1	377.6496	636.1332	7.22e-12	-14.30598	-13.54117	-14.01474
2	474.7192	159.1941	2.86e-13	-17.54877	-16.17211	-17.02453
3	523.7014	72.49369	7.89e-14	-18.86806	-16.87955	-18.11082
4	572.7856	64.79122*	2.24e-14*	-20.19143	-17.59107*	-19.20120*
5	585.8832	15.19318	2.80e-14	-20.07533	-16.86313	-18.85210
6	605.0990	19.21582	2.93e-14	-20.20396*	-16.37992	-18.74774

The results of Table 3 show us that the number of lags has been equal to 4 since the criteria FPE, AIC, SC and HQ select that the number of lags is equal to 4.

b) Johanson Test

This method is profitable because it makes it possible to give the number of co-integration relationships that remain between our long-term variables. The sequence of the Johanson test involves discovering the number of cointegration relations. For this purpose, the maximum likelihood method is used and the results are explained in Table 4.

Table 5: Johanson Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value 0.05	Prob.**
None *	0.417784	66.18721	47.85613	0.0004
At most 1 *	0.344476	38.60061	29.79707	0.0038
At most 2 *	0.237906	17.06230	15.49471	0.0288
At most 3	0.060935	3.206374	3.841466	0.0733

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

*** denotes rejection of the hypothesis at the 0.05 level**

****MacKinnon-Haug-Michelis (1999) p-values**

To specify the number of cointegration relations, we must examine the following hypothesis:

- If the statistic of the trace is greater than the value criticized then one rejects H0 therefore there exists at least one cointegration relation.
- If the trace statistic is less than the critiqued value, then H0 is accepted so there is no cointegration relationship.

There are three cointegration relationships, so the error-correction model can be retained.

4) The Results of Estimation

a) Long run equation

The results of the estimation by the maximum likelihood method denote the following cointegration relation. The long-term equilibrium relation is presented as follows:

$$\begin{aligned} \text{Log}(GDP) = & 0.2108 \text{Log}(\text{Domestic Investment}) + 0.3291 \text{Log}(\text{Exports}) + 1.4152 \text{Log}(\text{Labor}) \\ & (0.08495) \qquad \qquad \qquad (0.12126) \qquad \qquad \qquad (0.44151) \end{aligned}$$

Note: The values in parentheses represent the Student test.

The equation of the long-run relationship shows that all the independent variables {Log (Domestic Investment), Log (Exports) and Log (Labor)} have a positive effect on the dependent variable {Log (PIB)}. To justify the robustness of these last results and to prove and affirm that this long-term relationship is fair or not, we must test the significance of these variables. For this reason, we will apply the Vector Error Correction Model (VECM).

b) Estimation of Vector Error Correction Model (VECM)

After estimating the long-run equilibrium relationship, we estimate the equation in the following form as an error correction model. The results of the estimate give the following relation:

$$\begin{aligned}
D(\mathbf{LOG}(\mathbf{GDP})) = & \mathbf{C}(1) * (\mathbf{LOG}(\mathbf{GDP}(-1)) - 0.329186182268 * \mathbf{LOG}(\mathbf{Exports}(-1)) \\
& - 0.210814324694 * \mathbf{LOG}(\mathbf{Domestic Investment}(-1)) - 1.41527248993 \\
& * \mathbf{LOG}(\mathbf{Population}(-1)) + 11.9632700073) + \mathbf{C}(2) * D(\mathbf{LOG}(\mathbf{GDP}(-1))) + \mathbf{C}(3) \\
& * D(\mathbf{LOG}(\mathbf{GDP}(-2))) + \mathbf{C}(4) * D(\mathbf{LOG}(\mathbf{GDP}(-3))) + \mathbf{C}(5) * D(\mathbf{LOG}(\mathbf{GDP}(-4))) \\
& + \mathbf{C}(6) * D(\mathbf{LOG}(\mathbf{Exports}(-1))) + \mathbf{C}(7) * D(\mathbf{LOG}(\mathbf{Exports}(-2))) + \mathbf{C}(8) \\
& * D(\mathbf{LOG}(\mathbf{Exports}(-3))) + \mathbf{C}(9) * D(\mathbf{LOG}(\mathbf{Exports}(-4))) + \mathbf{C}(10) \\
& * D(\mathbf{LOG}(\mathbf{Domestic Investment}(-1))) + \mathbf{C}(11) \\
& * D(\mathbf{LOG}(\mathbf{Domestic Investment}(-2))) + \mathbf{C}(12) \\
& * D(\mathbf{LOG}(\mathbf{Domestic Investment}(-3))) + \mathbf{C}(13) \\
& * D(\mathbf{LOG}(\mathbf{Domestic Investment}(-4))) + \mathbf{C}(14) * D(\mathbf{LOG}(\mathbf{Population}(-1))) + \mathbf{C}(15) \\
& * D(\mathbf{LOG}(\mathbf{Population}(-2))) + \mathbf{C}(16) * D(\mathbf{LOG}(\mathbf{Population}(-3))) + \mathbf{C}(17) \\
& * D(\mathbf{LOG}(\mathbf{Population}(-4))) + \mathbf{C}(18)
\end{aligned}$$

The following table shows the results of estimating the equation. If the coefficient of the variable C (1) is negative and possesses a significant probability. This means that all variables in the long-term relationship are significant in explaining the dependent variables.

Table 6: Least Squares (Gauss-Newton / Marquardt steps)

	Coefficient	Std. Error	t-Statistic	Probability.
C(1)	-0.619624	0.350977	-1.765425	0.0867
C(2)	0.712811	0.473517	1.505354	0.1417
C(3)	-0.194493	0.416972	-0.466441	0.6440
C(4)	0.307970	0.414355	0.743251	0.4626
C(5)	-0.004255	0.414752	-0.010258	0.9919
C(6)	-0.291698	0.264995	-1.100768	0.2790
C(7)	-0.000285	0.235391	-0.001212	0.9990
C(8)	-0.166334	0.241522	-0.688693	0.4958
C(9)	0.163341	0.235970	0.692211	0.4936
C(10)	-0.022473	0.177202	-0.126823	0.8998
C(11)	0.035348	0.172930	0.204409	0.8393
C(12)	0.036069	0.162957	0.221340	0.8262
C(13)	-0.070895	0.157182	-0.451039	0.6549
C(14)	213.0419	207.3751	1.027326	0.3117
C(15)	-533.2976	553.3595	-0.963745	0.3422
C(16)	518.7103	551.5620	0.940439	0.3538
C(17)	-205.6644	211.0724	-0.974378	0.3370
C(18)	0.252649	0.211995	1.191772	0.2419

In our case, the correction error term is significant and has a negative coefficient. These prove that in the long run, 1% increase in domestic investment leads to an increase of 0.2108% of GDP.

c) Wald Test

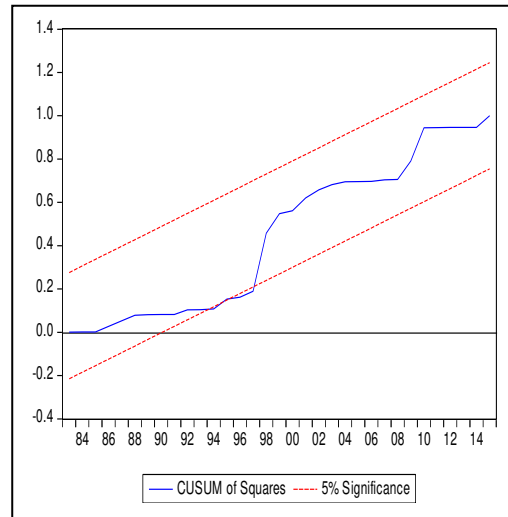
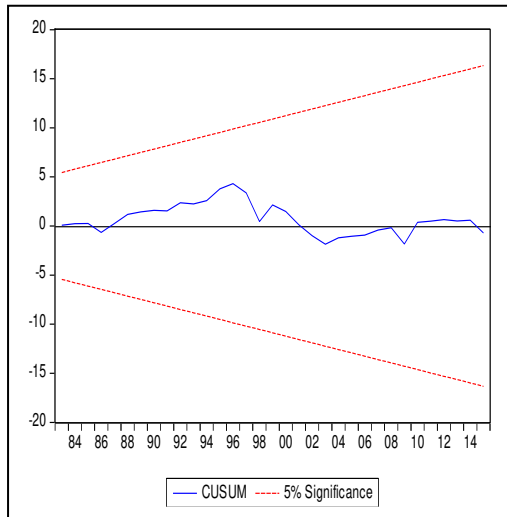
The objective of the WALD test is to determine that if there is a short-term relationship between the variables used.

Wald Test:			
Test Statistic	Value	df	Probability
F-statistic	0.090640	(4, 33)	0.9848
Chi-square	0.362560	4	0.9854
Null Hypothesis: C(6)=C(7)=C(8)=C(9)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(6)	-0.022473	0.177202	
C(7)	0.035348	0.172930	
C(8)	0.036069	0.162957	
C(9)	-0.070895	0.157182	

The results in the table show that the variable Log (domestic investment) has no effect on the variable log (GDP) in the short term.

d) VAR Stability

Finally we will apply to use the test CUSUM and the test CUSUM of SQUARES, this test makes it possible to study the stability of the model estimated over time.



The tests results of the stability VAR (CUSUM Test and CUSUM of Square Test) show that the Modulus of all roots is less than unity and lie within the unit circle. Accordingly we can conclude that our model the estimated VAR is stable or stationary.

V. Conclusion

The aim of this study was to determine the impact of domestic investment on economic growth in Tunisia during the period of 1969 to 2015. The correlation analysis, the cointegration analysis, VECM model and the Granger Causality Tests are used here to look into the relationship between domestic investment and economic growth in the long run term and in the short run term. According the results, we find that there is a positive impact of domestic investment, exports and labor on economic growth in the long run term; however, there is no relationship between domestic investment and economic growth in the short term. This is due to the importance of the geographical location of Malaysia. Where it is located in the heart of the East Asian and is a very distinct area and it is easy to export to the neighboring day and this is a very important feature. The Malaysian government also encourages investors to invest and trade on their land by providing them with the convenience and ease of procedures. In addition, Malaysia is a politically stable country with laws in force. The technological development witnessed by Malaysia has helped the owners of factories and companies to excel in their work by improving the quality of production and marketing and at all other levels. One of the most important factors explaining the effectiveness of domestic investment and export in Malaysia's high economic growth is its excellent infrastructure.

When the government designed the infrastructure, it was not only considered to serve individuals and residents, but also to serve the business community, and is certainly one of the best infrastructures in Asia. The Internet, for example, is connected to digital and optical fiber technology. There are five international airports in the country, all of which are equipped with air freight facilities. Therefore, investors will find it difficult to export their products anywhere in the world by air. The sea, where there are 7 seaports and all operate efficiently. Also, those who decide to invest in Malaysia will never find it difficult to obtain high-quality employment, whatever their quality of business. In a country where skilled workers are available, they are also very serious and committed. There are also doctors, engineers, chemists, researchers and others, so the investor will not have to attract workers from outside the country, which has certainly reduced costs. The credit of this Renaissance is due to the interest of the authorities above all citizens. This interest has led to an exchange of respect to the authorities. The government often involves citizens in the discussion of economic issues through the councils allocated for this. Therefore, the Malaysian citizen always feels that he is the target of the development process and that the Renaissance of his country is based on it first of all. When an economist asked a simple Malaysian factor about the mystery of his country's miracle, he simply replied "We were asked to work for eight hours a day. We worked two extra hours every day to love the country." We do not forget that these extra hours were voluntary. These workers would not have been cut off from their leisure time unless they believed that they would bring good luck to their future and the future of their children. Malaysia's experience in development is specific in its use of the historical situation of the global conflict between the Soviet Union before its fall and the United States of America. Where, America has supported the countries of this region economically to be a tempting model for the countries of the region which have fallen to the former Soviet Union and the socialist bloc. But we must mention here that Malaysia has adapted to this trend of self-reliance and a strong economy. The growth of the tourism sector is due to several reasons, notably the events of September 11, which led to a large increase in security measures, especially in Europe and the United States, which targeted mainly Arabs and Muslims, which led to the search for alternatives to tourists other than European and American. Malaysia has taken advantage of the opportunity and has launched many websites through the Internet, which calls for tourism. In the Arab world, the Arabs have noticed this call. They have found in Malaysia the desired goal of their tourism, with tourists, encouraging traveling there, including tourism licenses, compared to Europe and America, as well as being a developed Islamic country.

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