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The Role of Technical Infrastructure in the Quality of Relationship Between Tourism and Economic Growth in Iran

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Abstract: According to predictions made for the tourism situation in Iran in year 2020 is not promising. These forecasts make the main motivation to analyze factors that affect tourism and also have effect on the quality of its relationship with economic growth. One of the most important of these factors is the technical infrastructure which is considered in this study, in relation to tourism and economic growth. Due to problems related to availability of information and also because of the possibility of having a better comparison and interpretation of results, data from the tourism, economic growth and three important technical infrastructures (transport, communication and electricity) in 10 countries are applied during 1995-2005. The first five countries in world tourism ranking are nested in one group and four countries with similar rank with Iran in another group. The Granger causality between these variables in both groups of countries was studied. The results show that unlike the first countries in world tourism, in countries like Iran, not only there is not direct link between tourism and economic growth, but also the technical infrastructure not do any significant effects in the quality of the relationship between the two.

JEL Classification: L83, H54, F43,
Key words: Tourism · Technical Infrastructural · Economic Growth · Granger Causality

INTRODUCTION

The role of tourism sector in the economy in recent years has been highlighted more. Increase the share of the tourism industry of global GDP and an increase in average global growth rate of GDP of the tourism (Travel & Tourism Economy GDP), are some evidences of the above claim. According to statistics reported by WTTC (World Travel & Tourism Council), the share of the tourism sector of the total World GDP in year 2009 was equal to 9.4%. Also, according to the growth rates prediction for tourism during the years 2010 to 2020, it expects that this share in 2020 will increase to 9.6% (Table 1).

It is usually expected that among countries, the countries that are more varied climate and have long history, tourists make more demand for them. Iran is one of these countries. Iran is a country in the Middle East region and has a variety of environmental and climate and contains the long history of several thousand years. WTTC statistics show that in year 2009, about 8.2 percent of GDP in Iranian economy comes from tourism related activities. However, predictions about the share of tourism from Iranian economy GDP and also about the tourism growth rate in GDP, is not promising. Look at the statistics related to Iran in Table (1), shows how likely GDP growth of tourism and its contribution to total GDP in the coming years will be reduced.

Considering such statistics could be the main motivation to do research to examine and investigate the root causes for tourism fade in the Iranian economy. Such research can be done (at least) by two methods. The first method pays attention to factors that affect the amount of tourism and also factors that accept its effect. For example, travel agencies' service quality and hotels are examples of these factors. The second method focuses on the study of the variables that impact on the quality of tourism and economic growth relation in any certain level of tourism. Lea [1] , in a study identifies and examines some of these variables. According to Lea, factors which influence the degree of the impact of tourism on economic growth in the host country are as follow:

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Table 1: Tourism forecasts for Iran and the world

	Travel & Tourism Economy GDP			
	World		Iran	
Year	Share %	Real growth (%)	Share %	Real growth (%)
2010	9.1	0.5	8.3	3.8
2011	9.1	3.2	8.3	4.1
2012	9.1	5.1	8.2	3.9
2013	9.2	5.2	8.2	4.1
2014	9.3	4.8	8.2	4.2
2015	9.4	4.4	8.1	3.7
2016	9.4	4.2	8.1	3.8
2017	9.5	4	8	3.5
2018	9.5	4	8	3.3
2019	9.5	4	7.9	3.5
2020	9.6	4.1	7.9	3.7

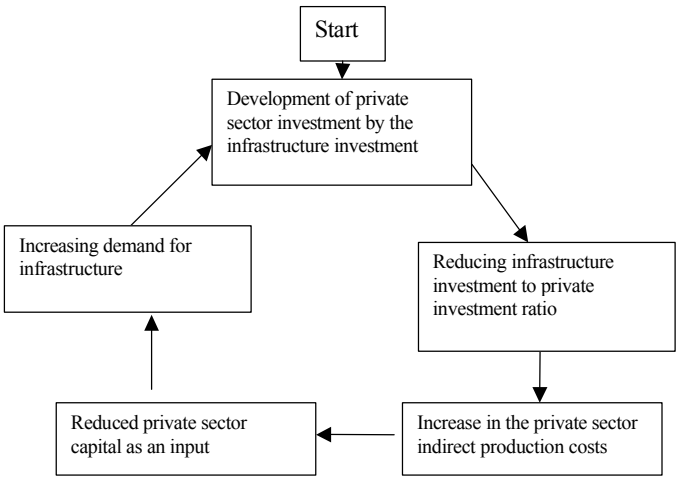
Source: WTTC

- Nature of tourism facilities in the host country and its attractions
- Employment rate of foreigners in the tourism industry
- Seasonality of tourism degrees
- Rotation rate of tourists' spending in the host country
- Percentage of the foreign ownership in related tourism industries
- Size of the national economy in the host country
- Government participation in the provision of tourism infrastructure and incentives to
- Level of host country development
- Amount and intensity of foreign tourist expenditure in the host country

Note that there are factors that simultaneously affect on the degree of impact on tourism and the tourism GDP per unit of GDP of the overall economy. One of the most important of these factors is the technical infrastructure. Since at the same time it is not possible to review all factors affecting and in receipt of tourism, so this article intends to focus on the role of technical infrastructure affecting tourism and economic growth.

Infrastructures have been defined as social overhead capital by many economists. The social overhead capital consists of facilities and essential things for progress and development of economic activities. Therefore, the effect of infrastructure investment on productivity and ability of human capital and also make opportunity to work full potential of economy lead to improve the people quality of life.

Hirshman [2] states that the infrastructure acts as a priming to expand private sector investment and in contrast, it becomes relatively lacking along with the expansion of private capital and productive activities. Process of strengthening infrastructure in this perspective can be summarized in the below chart:



So, it is clear that a technical infrastructure has extensive and multi-stage impacts. Yoshino & Nakahigashi [3] divide infrastructure's economic impacts into two types. Type I is so that infrastructure itself creates demand for products of other parts and type II is so that an infrastructure has some effects as stock in economy which cause decrease in the costs of the private sector production and increase in its productivity.

Keeping these enlarge effects of technical infrastructure on economic activity in mind, cause more need to investigate the relationship between tourism and economic growth. Therefore, this study hypothesis is that if the technical infrastructure improves, then tourism will affect on economic growth. Granger causality test will be use to examine the hypothesis.

In the next section, literature review on the relationship between tourism, economic growth and technical infrastructure will be done. In Part III, data and methods are introduced. Part IV experimental results are subject and finally, discussion with a summary and conclusion in section V, will take over.

Literature Review: There are numerous studies that assessing the causal relationship between economic growth and tourism. Some of more important of these studies are: Kim *et al.* [4] examine the relationship between economic growth and tourism in Taiwan economy. They found a long-run bi-directional causality in two mentioned variable. Sequeira and Campos [5] using panel data on some countries, found that the tourism-specialized countries, averagely, have more economic growth rate than others. Eugenio-martin *et al.* [6] , also, applied panel data of Latin America countries to investigate the economic growth and tourism relationship. They show that tourism can led to economic growth in such countries. Dritsakis [7] applied Granger causality approach to examine the causal relationship between economic growth and incomes raised from tourism. This study done for Greece economy and reach to bi-directional causality between them. Balaguer and Cantarella[8] study the role of tourism in Spain's economic growth. It shows that there is a unidirectional causality run from tourism to economic growth.

On the other hand, there have been done some studies about infrastructures and economic growth, too. Since making the infrastructures require to enormous costs and usually formed in long-run, it is expected that they provide by public sector. So, it consider to role of governments in making infrastructures, in the most studies on mentioned subjects.

Byongki kim [9] study the relation between economic development and infrastructural development in South Korea and Japan. They debate some successful lessons from these two countries. Also, they found that transportation and communication have powerful effect on economic growth, than other infrastructures. Gupta *et al* [10], in a study focusing on 39 low-income countries, found that the composition of public expenditure matters significantly effect on economic growth. Then, "countries where a large fraction of government spending consists of wages and transfers tend to have slower growth, whereas countries where higher shares of spending are allocated to [Social Overhead]capital and non-wage goods and services tend to have faster growth" [11].

Albala & Mantzakis[12] found that public infrastructures had a positive effect on private investment and economic growth. Loayza et.al [13] shows that public infrastructures (measured by number of telephone lines per capita) have a positive and significant effect on growth in Latin America countries. Calderon & Serven [14] using a big sample of countries result that economic growth effect on stock of infrastructural properties, positively. Yoshida [3] presented the correlations between economic growth and the infrastructures (such as electricity and transportation) in Japan. He derives some important lessons for developing countries: the growth rate of demand in infrastructures was much higher than that of per capita Gross National Production (GNP) in the early stage of development and public investment in infrastructure was big. Canning [15] provided an annual database of physical infrastructure stocks (number of telephones, number of telephone main lines, electricity generating capacity, total roads, paved roads and railway lines) for 152 countries. Also, the article result that telephone and paved road have most effects on economic growth. Easterly & Rebelo [16] found that investment in infrastructures (especially, in transportation and communication) has a positive effect on economic growth. They calculate the elasticity of production to level of infrastructure equal to 0.16.

As is said before, we are going to study the relationship between economic growth and tourism, subject to a consideration on role of infrastructures. So, it will be explained the data and methodology required to do such study in next section.

Data and Methodology: To investigate the relationship between economic growth, tourism and technical infrastructure, we focus on the three most important types

Table 2: Country groups

Group A	Country	France	Spain	United State	Italy	China
	Order	1	2	3	4	5
Group B	Country	Lithuania	Jamaica	Iran	Estonia	Malta
	Order	65	66	68	69	70

of technical infrastructure. This infrastructure includes: transport, communications and electricity. Thus, the data used in this study include: the number of international tourism arrivals, which is indicated by TOU, GDP per capita, (PPP constant 2005 international $) by GDP, the number of flights recorded (Air transport, registered carrier departures worldwide) by AIRT, the number of telephone mainlines by TELE and electricity production (kWh) by ELEC.

However, there are two problems for data in Iran on this regard. First, we should ignore data coincide with periods of revolution and war in Iran (the years 1978 to 1988) and use the dummy variable for this period. Second that even by using dummy variable, authentication information of these courses is not available. Therefore, we decide to study relation between economic growth, tourism and technical infrastructure in the group countries. To organize these groups, the World Bank statistics for the number of tourists entered the country for 195 countries around the world were evaluated. Accordance with these statistics, tourists who were arrived to Iran was 1168900 people (average for years 1995 to 2005) and Iran ranked 68 among 195 countries. Iran along with four countries nearby in ranking, make one country group for the present study. To create the possibility of comparison and better interpretation of results, other groups is studied. This group includes countries with first grade to fifth tourism World Bank ranking (Table 2).

Therefore, the information for considered five variables in 10 countries during 1995 and 2005 were collected from World Bank sources. Natural logarithm of all variables in this survey will be used to econometric estimation. Finally, three type Granger causality tests will be performed for each of two country groups A and B. This test includes Granger causality test between economic growth and tourism; between economic growth and technical infrastructures and ultimately between tourism and technical infrastructures. Granger causality test (Granger [17]) based on a Vector Auto-Regressive (VAR) model in which the relationship between the present values of variable and past values of other variables. For example to test Granger causality for two variables like Y and E the equations can be expressed as:

$$\Delta Y = \alpha_0 + \Sigma\, \beta_{0i}\, \Delta Y_{t-i} + \Sigma\, \gamma_{0j}\, \Delta E_{t-j} + \epsilon \qquad (1)$$

$$\Delta E = \alpha_1 + \Sigma\, \beta_{1i}\, \Delta E_{t-i} + \Sigma\, \gamma_{1j}\, \Delta Y_{t-j} + \mu \qquad (2)$$

In here, Δ is first order difference operator and α, β and γ the parameters of the model, ϵ and μ indicate the error terms that are supposed to be white noise. From such VAR model, Granger causality test (according to researcher hypothesis) has null hypothesis that E does not cause Y, as follow:

$$H_0:\ \gamma_{0j} = 0 \quad j = 1,\ldots, P \qquad (3)$$

P is the number of optimal lag in VAR model. If at lest one of γ_{0j} dose not equal to zero, H_0 hypothesis is rejected and that means to E granger cause Y.

Experimental Results: As were expressed, to answer the research questions, the role of technical infrastructure in the impact of tourism on economic growth, we will use Granger causality method. Since the Granger causality test is based on a VAR model, so at first it must be to attribute to variables integrate properties. Among the unit root tests for panel data are designed to test by Levin *et al.* [18] is designed to be more famous. Thus, for each of the five variables in the present study, the unit root test by Levin *et al.* [18] test is applied. Tests have been implemented in two modes: unit root test by considering only constant (C) and constant and trend (C + T). The results are summarized for groups A and B countries in the table 3.

Decision making for variables integrate properties being done on this basis that the unit root test, at least one of two modes C or C + T, gives evidence of being integrate. Accordingly, all research variables in both countries are stationery at level. So, it is necessary to determine optimum number of lags in the VAR model that causality test will be based on in the next step. Benchmark criterion AIC and SBC (Akaike Information Criterion & Schwarz Bayesian Criterion) show similar result and all VAR models indicate one lag as the optimum lag.

Finally, the Granger causality test is concluded for each of the relationship between economic growth- infrastructure, economic growth-tourism and

Table 3: Levin, Lin and Chu's unit root test for variables in both countries groups

Variable Name		Countries Group A		Result for Group A	Countries Group B		Result for Group B
GDP	LEVEL	C+T	-3.00425 (0.0013)*	I(0)	C+T	-3.38276 (0.0004)*	I(0)
		C	1.23931 (0.8926)		C	1.27905 (0.8996)	
	FIRST DIFFERENCE	C+T	----------		C+T	----------	
		C	-1.27268 (0.1016)		C	-2.37391 (0.0088)*	
TOU	LEVEL	C+T	-1.73547 (0.0413)*	I(0)	C+T	-7.48277 (0.000)*	I(0)
		C	-3.29443 (0.0005)*		C	-5.06248 (0.000)*	
	FIRST DIFFERENCE	C+T	----------		C+T	----------	
		C	----------		C	----------	
ELEC	LEVEL	C+T	-2.12013 (0.017)*	I(0)	C+T	-3.15582 (0.0008)*	I(0)
		C	0.33881 (0.6326)		C	3.04904 (0.9989)	
	FIRST DIFFERENCE	C+T	----------		C+T	----------	
		C	-3.12023 (0.0009)*		C	-4.25785 (0.000)	
TELE	LEVEL	C+T	-2.23044 (0.0129)*	I(0)	C+T	-1.97523 (0.0241)*	I(0)
		C	-3.17303 (0.0008)*		C	-0.07804 (0.4689)	
	FIRST DIFFERENCE	C+T	----------		C+T	----------	
		C	----------		C	-1.21832 (0.1116)	
AIRT	LEVEL	C+T	-3.25313 (0.0006)*	I(0)	C+T	-7.71458 (0.000)*	I(0)
		C	-1.16861 (0.1213)		C	-7.09808 (0.000)*	
	FIRST DIFFERENCE	C+T	----------		C+T	----------	
		C	-3.19355 (0.0007)*		C	----------	

* Significant at 95% confidence level Source: Research Findings

Table 4: Granger causality test results for countries in group A

	X				
Y	GDP	TOU	ELEC	TELE	AIRT
GDP	----------	3.22859 (0.07879)#	36.0162 (2.7E-7)*	464.631(5.2E-26)*	5.89091 (0.01911)*
TOU	0.50151 (0.48233)#	----------	8.50094 (0.00542)*	38.6051(1.3E-7)*	3.78097 (0.05784)#
ELEC	7.08251 (0.01062)*	0.02446 (0.87638)	----------	----------	----------
TELE	8.6124 (0.00515)*	0.00144 (0.96993)	----------	----------	----------
AIRT	10.3594 (0.00234)*	0.5605 (0.45779)	----------	----------	----------

* Significant at 95% confidence level # Significant at 90% confidence level Source: Research Findings

Table 5: Granger causality test results for countries in group B

	X				
Y	GDP	TOU	ELEC	TELE	AIRT
GDP	----------	1.52174 (0.22349)	0.00026 (0.98712)	0.01756 (0.89515)	0.85437 (0.36004)
TOU	0.10525 (0.74706)	----------	1.39381 (0.2437)	4.68696 (0.0355)*	0.8327 (0.36615)
ELEC	3.89985 (0.05418)#	8.15295 (0.00638)*	----------	----------	----------
TELE	1.28984 (0.26184)	5.10299 (0.02856)*	----------	----------	----------
AIRT	6.13426 (0.01691)*	0.2703 (0.60557)	----------	----------	----------

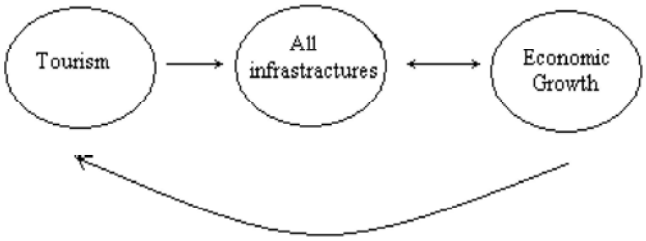
* Significant at 95% confidence level # Significant at 90% confidence level Source: Research Findings

infrastructure-Tourism. The result of this test for countries in group A is summarized in table 4.

In here the null hypothesis is that X is not Granger cause for Y. Eight causality directions have been approved for countries in group A at 95% significant level. Two other causality paths are added if we assume that the significant level is at 90%. Figure (1) sum up these ten causality directions.

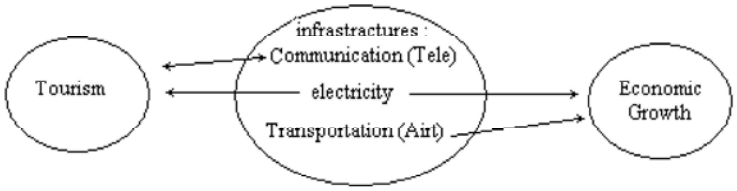
Granger causality test with the same details for countries in the group B were also performed. The results are shown in table 5.

In this group, four causality directions have been approved for countries in group B at 95% significant level. At 90% confidence level, one other causality direction might not be rejected. Figure (2) sum up these ten causality directions.



Source: Research Findings

Fig. 1: The relationships between variables in Group A countries



Source: Research Findings

Fig. 2: The relationships between variables in Group B countries

Summary and Conclusion: Reviewing descriptive statistics and the status of tourism in Iran and the world demonstrate the importance of tourism in the Iranian economy and the global economy. However, according to forecasts made for tourism situation in 2020, it is expected that the GDP share of the tourism of the total GDP is not promising and its growth rate decreases. Such situations create the main motivation to study factors that have the effect on tourism and the quality of its relationship with economic growth. However, the number of these factors is not few but one of the most important of these factors is the technical infrastructure that in this study, in relation to tourism and economic growth has been investigated. So the research question is how technical infrastructure affects on the relationship between tourism and economic growth.

To answer this question, two country groups is formed. The first group includes the first five countries in the World Bank ranking according to the number of entered tourist. The second group, including Iran and the four countries mentioned that ranking, close out with Iran. Finally, using Granger causality test, causality between economic growth, tourism and three major technical infrastructures (electricity, communications and transport) were investigated. The results showed that in countries with good ranking in tourism, although tourism growth directly is influenced by economic growth, but economic growth get effect indirectly by tourism (through the all three technical infrastructures). This shows that how the entry of tourists to these countries causes the infrastructure development and in turn this makes to boost economic growth. Also, in the next phase the economic growth and the infrastructure developments cause to increase tourist entrance.

But in countries like Iran (which has 68th position among 195 countries in the number of World Bank tourists ranking) not only there is no any direct link between tourism and economic growth, but also not indirectly relation through the technical infrastructures.

Therefore, as a result for this study, unlike countries with good ranking in tourism, tourism in countries like Iran has not any meaningful affect on economic growth and the technical infrastructures do not make any affect on the quality of their relationship. However, according to result in data (Figure 3), a recommended policy for Iran and similar countries to increase tourist entrance is improving the quality and quantity of electricity infrastructure simultaneously.

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