ASSESSMENT OF THE IMPACT OF TOURISM SECTOR ON THE ECONOMY OF AZERBAIJAN, KAZAKHSTAN AND IRAN USING INPUT-OUTPUT MODELS

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ABSTRACT

Tourism sector accounts for roughly 30 percent of global trade in services. It is known that Azerbaijan, Kazakhstan, and Iran are oil rich countries. In recent years because of the oil price went down, it compelled these countries to develop the non-oil-gas sector. The tourism sector has assumed great importance among the non-oil-gas sectors. The tourism sector is of great importance by the standpoint of accelerating the social-economic and cultural development, increasing the employment level by producing the products in the branches of the service sector, providing with foreign direct investment and currency inflows. Because tourism is included in the composition of some economic activity types, especially service fields it affords the specific difficulties to evaluate its direct and indirect effects on the country`s economy like the separate sector. We consider that Input-Output tables reflecting the inter-industrial relations and the models being worked out on these tables are very useful for conducting these types of analyses. In this study, the investments assigned to the tourism and its direct and indirect impacts to the other fields and outputs and employment level of these fields have been evaluated by means of models established on basis of Input-Output tables. Analysis of the results of simulations made with models gives the opportunity to define the efficiency of investments assigned to the tourism sector with respect to the other industries on each of the three countries separately. Afterward, the comparative analysis of the results of the models has been carried out.

Keywords: *Employment, Input-output model, investments, multiplier, tourism*

1. INTRODUCTION

One of the most significant economic sectors in the world is tourism sector. In 2017, tourism revenues in the world have been 1 trillion 317 billion 169 million US dollars. According to the UN World Tourism Organization, the number of people traveling around the world in 2017 has reached 722 million. This ratio has been the highest growth rate since 2010 in the last seven years (UNEWTO, 2018). According to the World Tourism and Travel Council, the share of the tourism sector in global GDP is 10,4%. The number of employees in this sector is 313 million and constitutes 9.9% of the total employment in the world (WTTC, 2018). The fall in oil prices in the wold market has forced some oil countries to focus on the non-oil industries, particularly on the tourism sector. Azerbaijan, Kazakhstan, and Iran, in comparison with many countries, have significantly rich sources of historical, cultural and natural beauties.

At the same time, culinary culture and hospitality attract the attention of those involved in international tourism activities. Based on the results of the input-output simulation models of Azerbaijan, Kazakhstan and Iran, the following studies were carried out:

- The multiplicative effects of the change (1 million US dollars invested in the tourism sector for these countries) in the final product on the total output and on the level of employment (creation of new jobs) have been identified, their comparative analysis has been made and their advantages have been found;
- Effects of changes in the value-added norm (in the tourism sector) on the impact of economic activity reciprocally on price and inflation levels have been investigated;
- The multiplier effect of the 1% change in the final product in the tourism industry on the final product and total output of the economic activity has been identified and comparative analysis and its advantages have been conducted.

In order to solve the issues raised, Leonitef's input-output analysis method and optimization method with linear programming have been used.

2. INPUT-OUTPUT METHOD

In the Western literature, intersectoral balance tables, called input-output tables, are widely used in the modeling of inter-sectoral interactions. The table of intersectoral balance has been compiled in the USSR for the first time in the world. The input-output tables are the result of the development of the balance method of analysis and planning. The mathematical model of intersectoral balance was developed by Wassily Leontief (Hasanli,2011, p-8). The national economy of each country in the world has a complex system operating on the background of inter-sectoral relationships. The method of analyzing intersectoral relationships helps in solving the problem of combining micro and macroeconomic models in the study of economic processes. Input-output models developed on the basis of input-output tables are of great importance in the analysis and forecasting of inter-sectoral relations of the national economy. Most of the statistics collected in this table are data on intermediate product flows. Note that the input-output tables are considered a mirror of the economy. Input-output models are one of the methods used to study the reciprocal relationships between industrial sectors of the economy at the international, national or regional level. . Input-output analysis is a method used to calculate the required output level of industries in an economy in order to fully meet the demand for the products produced. That is, the output of an industry can be an input of one or more industries or even itself. In short, the output of an industry depends on the required input of other industries and the necessary inputs of an industry partially affect the output levels of other industries. (Erdogan, 2004, p-327). The United Nations (UN) regularly develops the methodology for the creation of “Input-output” tables suitable for today's market and proposes that the amendments to be made in the Member States should also be taken into account. (Руководства по составлению таблич затрат-выпускаи их анализу, 2000, p. 304). The end of the past century after the 90s years "input-output" tables to be created on the basis of the rules of our country's social-economic system more comprehensive "Social Accounting matrices" (SAM) has been prepared. SAM is part of the System of National Accounts (SNA) and is created by state statistical institutions in a number of countries. The General Equilibrium Model (GEM), established on the basis of SAM, has an excellent structure. At present, GEM models are used in more than 100 countries around the world to analyze and anticipate the country's socio-economic indicators (including the estimate of different tax revenues of the state budget). The creation and implementation of GEM is based on Leontief’s "Input-Output" model. A number of studies have been conducted in Azerbaijan based on the "Input-output" tables. After the declaration of the independence of the Republic of Azerbaijan, the first studies on the economy of Azerbaijan were carried out by Yadulla Hasanli (Hasanli,2011), Imanov and

others (2006), Hasanli and Suleymanov (2007) with the help of the "Input-Output" tables (2006). However, these studies were carried out only on data for 2006 on 25 economic activities. With the input and output model the number of jobs increased in Azerbaijan has been examined by Abbasov and others (2007). In another study, comparative analyzes were made with the "Equilibrium Prices" model approach based on sectoral balance tables for the production and distribution of goods and services in the Azerbaijani economy in 2001 and 2006 (2010). Hasanli and Salihova (2017) examined the tourism sector's relationship with other sectors of the economy. Similar studies have also been made for the Republic of Kazakhstan. Thus, Hasanli and others have made a comparative analysis with the input-output model of the economies of Azerbaijan and Kazakhstan (2011). Then Bayzakov and others analyzed the input-output table for the years 2000-2011 (2014). Özdil and Turdaliyeva made a comparative analysis of the economies of Turkey and Kazakhstan with the input-output analysis approach and defined the sectors where the two countries could contribute to economic cooperation and trade in the benefit of the two countries if converted into cost advantages for both Turkey and Kazakhstan (2014). Many studies have been done with the input-output analysis approach for different sectors of the Turkish economy. Çakır and Bostan (2000), Dilber (2007), Sarıışık and others (2011), they investigated the effects of tourism on the Turkish economy. Hasanli and Salihova (2018) conducted a comparative analysis of the tourism sector of Azerbaijan, Kazakhstan and Turkey by using the input-output model. A similar study was conducted by Y. Hasanli and N. Moghsoudi (2011)(Moghsoudi N.,2011) for Iran.

3. THEORY AND METHODOLOGY

To achieve this goal, the Leontief input-output model (Leontief, 1979) and methodology recommended by the UN (2000) were taken as the basis. The input-output model makes it possible to determine the overall impact of various economic indicators (e.g. the final product) on other indicators (e.g. volume of commodity production, value added, level of employment, etc.). The Sectorial Input-Output table is composed of three parts:

- I part shows the mutual interconnections of sectors (rows indicates the intermediate goods, and the columns shows quantities of goods and services received from other industry sectors to perform their own production about to be intermediate consumption expenditures) (Calculation of GDP by production method);
- II part shows the components of the final product (consumption, investment, public expenditures, exports, imports) (Calculation of GDP by expenditure method);
- III part reflects the components of Value Added (wages, profit, depreciation, interest etc.), in other words, the calculation of GDP by income (Hasanli, 2011, p-17)

The input-output model of W. Leontief (Leontief, 1979) is as follows:

$$X = \mathrm{A}X + Y \qquad \text{or} \qquad X = (\mathrm{E} - \mathrm{A})^{-1}Y \quad (1)$$

Here, E- unit matrix, A- direct cost matrix. X- the total output of goods, Y – volume of final products. Inverse matrix $(\mathrm{E} - \mathrm{A})^{-1}$ - is a total cost matrix. If we denote $(\mathrm{E} - \mathrm{A})^{-1} = B$, we'll get $X = \mathrm{B}Y$. B- is a total cost matrix, also it is called Leontief matrix.

The following equation is used to determine the effect of any i-sector of the economy on the total output amount in the final product itself ($\Delta Y = (0, \dots 0, \Delta \mathrm{y_i}, 0, \dots, 0)$) and in other sectors ($\Delta X = \Delta \mathrm{x_i}, \dots \Delta \mathrm{x_{i-1}}, \Delta \mathrm{x_i}, \Delta \mathrm{x_{i+1}}, \dots, \Delta \mathrm{x_n}$):

$$\Delta X = \mathrm{B}\Delta Y \quad (2)$$

The following equation is used to determine the impact of the change in the value-added of any i-sector of the economy on the price level in itself ($\Delta Y = (0, \dots 0, \Delta v_i, 0, \dots, 0)$) and in other sectors ($\Delta P = \Delta p_i, \dots \Delta p_{i-1}, \Delta p_i, \Delta p_{i+1}, \dots, \Delta p_n$):

$$\Delta P = B^T \Delta v \qquad (3)$$

Here, the ΔP shows -price level, $the\ \Delta v - value - added\ ratio$, B is the transpose of the total expense matrix.

The effectiveness of the total output amount on the employment can be determined by the following equation:

$$\Delta L = t\Delta X \quad \text{or} \quad \Delta L = tB\Delta Y \qquad (4)$$

Here, ΔY- indicates upcoming changes in employment (ΔL) as a result of the change in final product, t- is the direct labor density coefficient, in other words, the labor force needed to output a unit in each sector (person-hour, person-day, person-year).

4. EMIRICAL ESTIMATION IN THE CASE OF AZERBAIJAN, KAZAKHSTAN AND IRAN

In this study, according to the report published by the statistical institutions the "input-output" simulations models for the 15 sectors of Azerbaijan economy (ARDSK, 2006) (ARDSK, 2006), 29 sectors of Kazakhstan economy (ASRK, 2007) and 91 sectors of Iran economy based on the "input-output" tables were carried out.

Table 1: The results of the simulation model of Azerbaijan, Kazakhstan and Iran "input-output" (effect of $ 1 million increase of final product in tourism sector on output amount and employment, 1 $ = 1.7 AZN, 1$=368.3 KZT and 1$=42105 İRR).

Countries/Sectors	Effect on output quantity		Effect on employment Person/year	
	Directly	Multiplicator	Directly	Total
	Tourism industry	Across the country	Tourism industry	Across the country
Azerbaijan	1,3	1,81	309	391
Kazakhstan	1,4	1,98	143	248
Iran	1.13	1.60	1959	2239

As can be seen from Table 1, the effect of the increase of the $ 1 million of the final product (Y) in the tourism sector in each of the three countries varies according to the country. The reason for the increase in the final product more multiplier effect (1,98) in the tourism sector in Kazakhstan that this effect is in Azerbaijan (1,81) and in Iran (1.60) in comparison with Kazakhstan, the indirect relationship with other sectors of the economy of the tourism sector can be interpreted as being weak. As a result of the same amount investment in the tourism sector in all three countries, the consequences have found that direct tourism sector will create the 391 workplaces (person-years) in Azerbaijan, in Iran and Kazakhstan respectively 248 and 2239 workplaces. Appropriate values obtained for Iran are higher than in comparison with Azerbaijan and Kazakhstan, and this stems from being low labor productivity and costs in Iran (by US dollar) compared to these two countries.

As mentioned above the number of business places to be more with the account of interest in Kazakhstan is due to the tourism sector and its products are used more than in Iran and Azerbaijan in other sectors of the economy.

Table 2: The results of the "Equilibrium Prices" simulation model of Azerbaijan, Kazakhstan and Iran (The effect of 1% increase in the value added of tourism sector on the price level of other sectors of the economy).

Countries/Sectors	Effect on price level,%	
	In tourism industry directly	Across the country
Azerbaijan	1,293	0,063
Kazakhstan	1,404	0,134
Iran	0,113	0,001

As can be seen from Table 2, the 1% increase in the value added in the tourism sector in Kazakhstan affects more the price level (inflation). Considering that Azerbaijan, Kazakhstan and Iran are petroleum countries, if the value added and or price level in the petroleum sector change, let's look at the simulation results in order to determine the effect of price changes on the price level (inflation) in the country through the "Equilibrium Prices" model.

Table 3: The results of the "Equilibrium Prices" simulation model of Azerbaijan, Kazakhstan and Iran.

Countries/Sectors	Effect on price level,%	
	Direct to oil industry	Across the country
Azerbaijan	1,0064	0,4100
Kazakhstan	1,170	0,272
Iran	1,0003	0,155

As can be seen from Table 3, the increase in the value added rate in the oil sector causes the price level (inflation) in Azerbaijan to be more affected than in Kazakhstan and in Iran. This result can be interpreted as the dependence of the Azerbaijan economy on the oil sector. In addition, the increase in the value added in the oil sector is due to the fact that the price increase in its sector is less than in Kazakhstan, because oil prices in Azerbaijan are under state control.

Table 4: The results of the "input-output" simulation of Azerbaijan, Kazakhstan and Iran (Effect of 1% increase in final product (Y) on output quantity in tourism sector).

	Multiplicator		The effect of total output amount,%		Effect on the total final product quantity,%
Countries/ Sectors	In tourism industry	Across the country	In direct tourism industry	Across the country	
Azerbaijan	1.261	1,963	0.332	0.006	0.005
Kazakhstan	0.259	1,084	0.539	0.021	0.020
Iran	1.164	1.624	0.079	1.035	0.009

According to the simulation results obtained from Table 4, the high rate of multiplier ratios of Kazakhstan both on the country and on the sector shows that the interactions of the tourism sector with other sectors of the economy are stronger than other countries and have a sustainable economy. This result is also proof that Kazakhstan is less dependent on oil than in Azerbaijan and Iran.

5. SUMMARY

It is seen that the tourism sector started to increase its activity within the national economies starting from 2000 in the world. The impact of the tourism sector on the country's economies is increasing in parallel with the acceleration of globalization and people's view of tourism as an indispensable part of welfare and living standards. An increase in the final demand of the tourism sector leads to an increase in the production of both the sector and other related sectors. As a result of the analysis from the simulation models, The reason for the increase in the final product more multiplier effect in the tourism sector in Kazakhstan, in other countries in comparison with Kazakhstan, the indirect relationship with other sectors of the economy of the tourism sector can be interpreted as being weak. As a result of the same amount growth (1 mln US dollars) of the final product, the consequences have found that direct tourism sector will create more workplaces in Iran. This is due to the low labor productivity and costs in Iran compared to the other two countries. The number of business places to be more with the account of interest in Kazakhstan is due to the tourism sector and its products are used more in other sectors of the economy. The increase in the value added rate in tourism sector by 1% affects the level of price (inflation) in Kazakhstan both in the sector and in the country. Since the Azerbaijani economy is more dependent on petroleum, the increase in the value added rate in the oil sector causes the price level in Azerbaijan to be more affected than Kazakhstan and Iran. The increase in the value added in the oil sector is due to the fact that the price increase in its sector is less than in Kazakhstan, because oil prices in Azerbaijan and Iran are under state control. Considering the results, investment in the tourism sector in all three countries has a positive impact on the country's economy and other sectors of the economy. Thus, as the amount of capital to be included in the tourism sector increases, tourism revenues will increase. Intensive promotion and investment activities should be carried out in order to get a share from these increased revenues. In order to maintain these activities in a healthy and effective manner, economic sectors participating in tourism activities should be supported and correct economic policies should be followed.

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APPENDIX

Appendix 1: Results of the "input-output" simulation models of Azerbaijan

Sectors	Code	Change of the final product, Thousand AZN	Multiplier	Change in the number of employees, person-years	Change of final product,%	Change of total output,%	Change of total employment,%
Agriculture, hunting and forestry products	1		0.0	24.2		0.0006	0.0002
Fishing Products	2		0.0	0.0		0.0002	0.0001
Mining industry	3		0.1	0.4		0.0006	0.0001
Processing industry	4		0.2	11.8		0.0002	0.0006
Electricity, gas and water	5		0.0	2.8		0.0006	0.0007
Construction works	6		0.1	12.2		0.0002	0.0006
Trade services	7		0.0	11.1		0.0006	0.0002
Tourism	8,9,11	1700	1.3	309	1.0	0.00008	0.0001
Financial intermediation, insurance and pension services	10		0.0	0.5		0.0004	0.0004
Education services	12		0.0	1.1		0.0000	0.0001
Healthcare and social services	13		0.0	0.3		0.0000	0.0001
Public adminstration and defence, compulsory social insurance services	14		0.0	13.7		0.0005	0.0006
Communal and other services	15		0.0	3.3		0.0003	0.0003
TOTAL		1700	1.8	391	0.001	0.0011	0.0010

Appendix 2: Results of the "input-output" simulation models of Kazakhstan

Sectors	Code	Change of final product, thousand tenge	Employment, person-year	Change of added value,%	Price change, %	Change of final product,%	Change of total output level,%
Agriculture, hunting and forestry	1		37		0.065		0.004
Fishing	2		0		0.001		0.005
Coal and lignite, extraction of peat	3		0		0.004		0.015
Row oil and natural gas extraction	4		0		0.055		0.009
Metal ore mining	5		1		0.016		0.021
Other mining and quarrying industries	6		0		0.004		0.031
Processing of agricultural products	7		2		0.065		0.005
Textiles industry	8		1		0.004		0.035
leather, leather products and footwear manufacturing	9		0		0.000		0.005
Wood and wood products production	10		0		0.013		0.127
Paper and paperboard production, printing	11		0		0.011		0.030
Coke, refined petroleum products and nuclear fuel production	12		0		0.037		0.049
Chemical industry	13		1		0.013		0.043
Rubber and plastics production	14		1		0.023		0.072
Production of other non-metal mineral products	15		2		0.030		0.068
Metallurgy and metal processing	16		2		0.083		0.023
Machinery and equipment repair, spare parts manufacturing	17		1		0.026		0.021
Other manufacturing industries	18		0		0.002		0.013
Production and distribution of electricity, gas and water	19		3		0.029		0.037
Construction	20		1		0.008		0.002
Trade and repair of household goods	21		47		0.034		0.126
Tourism	22,23,26	368300	143	1.0	1.404	1.0	0.002
Post and telecommunications	24		2		0.029		0.045
Financial industry	25		2		0.028		0.011
Education	27		0		0.000		0.000
Healthcare and social services	28		0		0.000		0.000
Other utlity and social services	29		1		0.002		0.004
Total		368300	248	0,70	0.134	0.042	0.048

Appendix 3: Results of the "input-output" simulation models of Iran

Products	Code	Change of final product,	Employment, person-year	Change of total employment %	Change of the mixed value	Change in price level,%	Final product change,%	Total output change,%
Products of agriculture & horticulture	1		5	0.0004		0.000		0.071
Gardening products	2		0	0.0001		0.000		0.016
Live animals and animal products	3		1	0.0003		0.000		0.046
Honey, cocoons & other products of bees and silk-worms	4		0	0.0001		0.000		0.014
Forestry and logging products	5		4	0.0059		0.000		1.106
Fish and other fishing products	6		0	0.0003		0.000		0.044
Coal and lignite; peat	7		3	0.0054		0.000		1.039
Crude petroleum & natural gas	8		2	0.0007		0.000		0.123
Iron ores and concentrates	9		8	0.0066		0.000		1.277
Copper, ores and concentrates	10		2	0.0042		0.000		0.801
Stone, sand and clay	11		4	0.0050		0.001		1.210
Other minerals	12		1	0.0041		0.000		0.852
Electricity & electricity distribution services	13		4	0.0048		0.004		0.802
water distribution services & Water	14		2	0.0023		0.001		0.370
Natural gas & gas distribution services	15		3	0.0036		0.000		0.587
Animal and vegetable oils and fats	16		0	0.0007		0.001		0.135
Other food products & beverages	17		0	0.0003		0.000		0.059
Tobacco products	18		0	0.0000		0.000		0.004
Yarns & textiles	19		3	0.0007		0.000		0.119
Wearing apparel	20		10	0.0012		0.000		0.214
Footwear & parts thereof & other leather products	21		1	0.0011		0.000		0.198
Products of wood, cork, straw and plaiting materials	22		3	0.0059		0.000		1.208
Related & matter Pulp, paper and paper products; printed articles	23		4	0.0108		0.000		1.695
Coke oven products; refined petroleum products; nuclear fuel	24		8	0.0095		0.000		1.664
Chemical materials & products	25		2	0.0031		0.000		0.588
Rubber & plastics products	26		5	0.0062		0.000		1.126
Glass & glass products	27		1	0.0017		0.000		0.543
Other non-metallic mineral products	28		3	0.0041		0.001		0.960
Furniture	29		0	0.0001		0.001		0.025
thereof products & steel & Basic iron	30		10	0.0044		0.001		0.845
Other metals	31		1	0.0042		0.001		0.792
Metal products	32		5	0.0021		0.001		0.442
General-purpose machinery	33		3	0.0050		0.001		0.904
Special-purpose machinery	34		0	0.0001		0.001		0.020
parts thereof & Domestic appliances	35		0	0.0005		0.001		0.101
Office, accounting & computing machinery	36		1	0.0006		0.000		0.101
Electrical machinery & apparatus	37		2	0.0016		0.000		0.300
Radio, television and communication equipment & apparatus	38		2	0.0085		0.001		1.511
Medical and surgical equipment & orthopaedic appliances	39		0	0.0001		0.000		0.020
Optical and precision instruments ,watches & clocks	40		2	0.0045		0.001		0.829
Motor vehicles, trailers and semi-trailers,bodies, parts and accessories thereof	41		1	0.0010		0.001		0.174
Other transport accessories & equipment & parts thereof	42		10	0.0163		0.001		2.853
Jewellery and other manufactured n.e.c	43		6	0.0025		0.000		0.398
Residential buildings	44		1	0.0001		0.000		0.078
Wholesale & retail trade services	46		11	0.0013		0.000		0.244
Lodging services	47		4	0.0170		0.000		2.981
Food & beverage serving services	48		10	0.0032		0.000		0.566
Tourism (45,49,50,53,54,55,62,88,89,90)		42105	1959	0.1408	1	0.115	1	7.885
Road transport services of freight	51		3	0.0024		0.001		0.499
Transport services via pipeline	52		1	0.0041		0.003		0.715
Postal & telecommunications services	56		3	0.0032		0.000		0.374
Banking services	57		30	0.0034		0.000		0.622
Other finantioal intermediations & auxiliary to financial intermediations	58		7	0.0028		0.000		0.517
Insurance and pension services	59		16	0.0127		0.000		2.199
Renting services involving own residential property	60		0	0.0000		0.000		0.000
Renting or leasing services involving rented or leased residential property	61		0	0.0000		0.003		0.001
basis Real estate services on a fee or contract	63		4	0.0081		0.000		0.624
machinery and Leasing or rental services concerning other household appliances & equipment without operator	64		2	0.0036		0.000		1.443
Research and development services	65		7	0.0087		0.000		0.641
Computer and related services	66		5	0.0103		0.000		1.469
Professional, scientific and technical services except computer , research and development services	67		2	0.0025		0.001		1.932
Agricultural, hunting, forestry, fishing and mining services	68		29	0.0115		0.000		0.435
Maintenance and repair services	69		0	0.0000		0.001		2.029
News agency services	70		1	0.0000		0.000		0.000
Public administration	71		0	0.0000		0.000		0.005
Military and civil defence services	72		0	0.0001		0.000		0.003
Police and fire protection services	73		0	0.0000		0.000		0.015
Compulsory social security services	74		0	0.0000		0.000		0.000
Governmental primary education services	75		0	0.0000		0.002		0.000
Privat primary education services	76		0	0.0000		0.000		0.000
Governmental general,technical and vocational secondary education services	77		0	0.0000		0.002		0.000

Privat general,technical and vocational secondary education services	78		0	0.0000		0.000		0.000
Governmental higher education services	79		0	0.0000		0.000		0.000
Privat higher education services	80		6	0.0023		0.001		0.002
Education and training services	81		0	0.0000		0.000		0.405
Hospital services	82		2	0.0002		0.000		0.001
Medical and dental services	83		0	0.0000		0.000		0.039
Other human health services	84		0	0.0023		0.000		0.000
Veterinary services	85		0	0.0000		0.001		0.397
Social services	86		0	0.0000		0.001		0.000
Religious services	87		4	0.0081		0.000		0.000
Other services	91		1	0.0024		0.001		0.430
Total		42105	2239	0.0095	0.029	0.003	0.039	1.035