THE LEVEL OF INTEGRATION OF CROATIAN PRODUCERS IN TOURISM CLUSTER

Davor Mikulić
Damira Keček
Katerina Fotova Čiković

https://doi.org//10.20867/tosee.07.18

Abstract
Purpose – The aim of this paper is to analyze the level of integration of Croatian producers in tourism cluster. Study assessed the level of interconnection between cluster actors and investigate the connection of sectors which are directly included in the provision of goods and services to tourists and other economic units in Croatia.
Methodology – In this research Structural Decomposition Analysis based on the Input-Output model is used. Structural Decomposition Analysis provides more in-depth insights into the level of integration of Croatian tourism cluster. The total economic effects assessed in two different periods are decomposed to the changes in the level and the structure of tourist's expenditures and the effects of the changes in technological coefficients.
Findings – Empirical results confirm hypothesis on the increasing importance of the tourism sector for the Croatian economy. Higher share of imported goods is found for certain inputs used by tourism sector in recent years which negatively affect the multiplication of positive economic effects to other domestic producers. Trends in the integration and factors behind those trends are identified.
Contribution – Besides scientific community the results of the study could be of interest for policy makers and Croatian tourism associations because study estimate the effects of better coordination and integration among tourist companies and other domestic producers.
Keywords: tourism cluster, Structural Decomposition Analysis, Input-Output table, integration.

INTRODUCTION

Tourism is an important catalyst of growth in many developing countries (Tang, Tiwari and Shahbaz 2016). In 2019, it contributed "10% of the world's GDP" (Xiong, Li, and Yang 2022), "7% of the global trade, and 1 in 10 jobs" in 2017 (Barišić and Cvetkoska 2020) and thus, represents a "significant contribution to world economic development, population employment, and cultural exchange". Tourism has been continuously growing and developing as an economic sector in the last 20 years and has imposed as "strategically important for the developing countries' economies" (Prorok, Šerić and Peronja 2019), due to its recognition as "one of the major components in the economy", and its impact on job creation, enhancement of the social level, decline in overall poverty and greater opportunities for entrepreneurs to prove their skills worldwide (Bazaza 2020).

The tourism industry greatly contributes to the development and growth of the global economy and "is considered to be strongly associated with a large amount of water and energy consumption" (Lee, Wang, and Zuo 2021). Moreover, the increased resources

consumption and environment pollution has unfortunately followed the rapid growth of tourism (Xiong, Li, and Yang 2022). Given this and the importance and key role of tourism as an economic sector as well as a GDP contributor, it is undeniable that its further development will be a top priority for governments. In this sense, tourism clusters have been recognized as „one of the most promising formats of strategic partnership that predetermines the theoretical field of modern scientific research" (Boiko et al. 2017). Moreover, tourism industrial clusters have gained much attention from both academia and the industry due to their "their relatively significant agglomeration effects and ability to raise regional tourism competitiveness" (Chu 2014). Kachniewska (2013) claims that "the EU perceives cluster arrangements as the preferred form of introducing innovations in different economic fields, including tourism".

In this paper, Structural Decomposition Analysis (SDA) is employed to provide new insights regarding the level of integration of Croatian tourism cluster in the Croatian economy. The main objective of this paper is to estimate total effects of foreign tourists' expenditures to Croatian gross value added (GVA) and employment for the period 2010-2018 and to decompose changes in GVA and employment with regard to GVA and employment coefficient change, technology change and final demand change. The economic effects of the potential stronger integration of domestic sectors into the added value chain of the tourism industry were also analyzed. The contribution of this paper is reflected in its novelty and the fact that, to the best of authors' knowledge, there is not a published study employing SDA regarding the estimation of total effects of foreign tourists' expenditures on Croatian economy.

The remainder of this paper is structured as follows. The introduction is followed by an overview of the scholarly literature in this research area. Second section revolves around the used methodology and the third reveals data sources. Section 4 presents empirical results and section 5 opens up a discussion and provides conclusions.

1. RECENT AND RELEVANT STUDIES

The subject of economic integration and tourism has been largely investigated by scholars throughout the world. Most of these studies have been applying the input-output (IO) methodology. However, SDA has been slightly neglected by scholars and researchers in tourism. Namely, when surveying the Scopus and Web of Science database with the keywords "STRUCTURAL DECOMPOSITION ANALYSIS" and "TOURISM", most of the available studies refer to China, Taiwan and India.

Xiong, Li, and Yang (2022) developed an environmentally extended IO model for the tourism industry, by separating IO table of mega-city in five groups related to tourism, water, energy, food supply, tourism direct groups and others. Furthermore, they implemented the Leontief inverse matrix. Interestingly, their findings reveal that the food product sector spends the most water while tourism the most energy. In their study, they propose a collaborative governance approach and draw a few policy and practical implications. He et al. (2022) propose a new analytical foundation to explore relationship between direct and indirect effects on China's employment of different sectors related to tourism. Doing so, they apply IO and SDA (IO-SDA) to quantify the employment effects

of sectors related to tourism and their drive mechanisms. They found a decreasing trend of analyzed effects, indicating a declining trend of jobs that direct or indirect create a unit of tourism output. Moreover, the results from the decomposition analysis reveal that the increase in tourism employment is driven by the final demand as a main contributor.

Shu et al. (2022) have also combined IO analysis and SDA methodologies to introduce an analytical basis that examines how final demand impacts the wage changes in tourism-related sectors through industrial linkage mechanisms. Their research focuses on tourism-characteristic sectors in China from 2002 to 2017. The findings reveal that the increase in consumption and the decrease in the share of returns to labor contribute excessively to premiums and discounts on wages. Lee, Wang and Zuo (2021) focus on "the tourism water footprint (TWF) and the tourism energy footprint (TEF)" and examine the water-energy-food (W-E-F) nexus of a total of 138 tourism sectors in China in the period 2012–2017. In their study, they employ the IO analysis and the structure decomposition analysis. Namely, they applied SDA to analyze how direct water or energy use coefficient, economic production structure, tourism expenditure composition and total tourism expenditure influence the modification of TWF and TEF in the period from 2012 to 2017 in China. Their findings reveal that growth of total water and energy consumption is mainly driven by the growth of total tourism consumption.

Zha et al. (2021) explore the tourism carbon emissions in China employing a combination of the environmental IO model and SDA. Namely, they introduced a novel framework for investigating the main determinants affecting carbon change in carbon emissions in tourism. Their findings reveal rather interesting facts, i.e. that most carbon emissions that are linked to China's tourism industry result from indirect carbon emissions from intermediate production processes. Han and Li (2021) tackle the sustainable development of tourism and emphasize the importance of low-carbon and green economy to the future tourism development strategy. Therefore, they introduced the concept of "tourism consumption separation rate" and apply the Kaya traditional accounting method, SDA method and cointegration relationship test method to test the tourism carbon emissions and influencing factors. Their findings reveal that there is an „upward trend" in China's tourism carbon emissions each consecutive observed year from 2010 to 2019.

Sun and Hsu (2019) have applied SDA methodology to explore the impact of Taiwan's tourism about demand factors of total consumption and water purchase patterns. Luo et al. (2020) examine the key impact forces of carbon emissions in China's tourism industry with the application of index and SDA. Findings reveal that direct and total tourism carbon emissions makes 0.7% and 2.7% of total carbon emissions in China. Moreover, they found domestic tourists to be "the positive drivers of tourism emissions", whereas energy intensity as the key negative driver in tourism carbon emissions. Tang, Tiwari and Shahbaz (2016) investigated the dynamic causal and inter-relationships between tourism, economic growth and energy consumption in India. They applied cointegration and generalized variance decomposition methods. Their findings reveal that tourism and economic growth have a significant long-term effect on energy consumption. Also, there is a strong interrelationship between tourism and economic growth in India.

2. RESEARCH METHODOLOGY

IO analysis is effective analytical tool that examine economic relationships among economic sectors of the national economy (Miller and Blair 2009; ten Raa 2005; Mikulić 2018). It is mainly used to estimate total effects of a sector of interest on the overall economy. This macroeconomic analysis is based on the IO table by which the flows of goods and services among productive sectors are, in matrix form, described by the following equation:

$$X = AX + Y \tag{1}$$

Column vector $X = \begin{bmatrix} X_1 \\ \vdots \\ X_n \end{bmatrix}$ is output vector, column vector $Y = \begin{bmatrix} Y_1 \\ \vdots \\ Y_n \end{bmatrix}$ is final demand vector and $A = \begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix}$ is $n \times n$ matrix of technical coefficients defined as a ratio of a product from sector i required by sector j to produce one unit of its product ($i, j = 1, \dots, n$, where n is a number of productive sectors). The solution of the matrix equation (1) is vector:

$$X = (I - A)^{-1}Y \tag{2}$$

where I is an $n \times n$ identity matrix. In more detailed one can find in Miller and Blair (2009) and Peterson and Olinick (1982). Matrix $L = (I - A)^{-1}$ is Leontief inverse matrix and allows direct and indirect effects of each productive sector on the overall economy estimation. Induced effects are estimated by the application of extended matrix A' which includes an additional row presenting the wage coefficients by sectors and an additional column presenting the structure of personal consumption.

The availability of IO data for several time periods makes it possible to decompose the total amount of an economic indicator change into the contributions of its various components. For example, the total change in output between two time periods could be decompose into a part related to changes in technology and final demand. SDA refers to a decomposition analysis based on IO analysis (Miller and Blair 2009; Oxford Institute for Energy Studies 2015). According to the Rose and Casler (1996), SDA is defined as economic change analysis by means of a comparative static changes in key parameters in an IO table. It represents a very useful technique and tool to quantify contributions of various driving forces to the targeted change over time (Lee, Wang, and Zuo 2021). It is also used to analyze the energy intensity, structure, economic scale, and industrial structure changes of national and cross-city structures (Han and Li 2021). The main points of SDA are presented below.

Assuming IO data are available for two time periods ($t = 0$ and $t = 1$), output vector in the year t can be written as:

$$X^t = L^t Y^t \tag{3}$$

where $L^t = (I - A^t)^{-1}$ presents Leontief inverse matrix in the year t and Y^t final demand vector in the year t. Difference in output vectors for those two years, i.e. change in outputs over the period equals to:

$$\Delta X = X^1 - X^0 = L^1 Y^1 - L^0 Y^0 \tag{4}$$

The idea of SDA is decomposition of total change in outputs into changes in the different components which in the formula (4) would mean separation into changes in technical coefficients, i.e. changes in matrix L ($\Delta L = L^1 - L^0$) and changes in final demand, i.e. changes in vector Y ($\Delta Y = Y^1 - Y^0$). Different expansions and rearrangements of terms can be made in the above formula by taking different years for L and Y (Rørmose 2010). Dietzenbacher and Los (1998) analysed a broad variety of possible decompositions and concluded that using the average of the results obtained by using only year 1 values for L and only year 0 values for Y and using only year 0 values for L and only year 1 values for Y is an acceptable approach. Decomposition of ΔX then equals to:

$$\Delta X = \frac{\Delta L(Y^0 + Y^1)}{2} + \frac{(L^0 + L^1)\Delta Y}{2} \tag{5}$$

The first term in the formula (5) refers to technology change effect and the second term to final demand change effect.

In addition to output change, the decomposition can also be performed for changes in some variables that depends on output. Let employment coefficient $e_i^t, i = 1, \dots, n$ represents the number of employed person in sector's i output at time t and let $\hat{e}^t = [e_1^t \cdots e_n^t]$ be a row vector of employment coefficients. Then the vector of employment, by sector, associated with output at time t is $\varepsilon^t = \hat{e}^t L^t Y^t$ and the vector of changes in employment is:

$$\Delta\varepsilon = \varepsilon^1 - \varepsilon^0 = \hat{e}^1 L^1 Y^1 - \hat{e}^0 L^0 Y^0 \tag{6}$$

Decomposition into contributions by the three elements is as follows:

$$\Delta\varepsilon = \frac{\Delta\hat{e}(L^0 Y^0 + L^1 Y^1)}{2} + \frac{\hat{e}^0(\Delta L)Y^1 + \hat{e}^1(\Delta L)Y^0}{2} + \frac{(\hat{e}^0 L^0 + \hat{e}^1 L^1)(\Delta Y)}{2} \tag{7}$$

The first term in the formula (7) refers to employment coefficient change, the second term to technology change and the third one to final demand change.

By replacing employment coefficient in above formulas with value added coefficient, representing the value added of sector i in unit of its output, similar formulas for the decomposition into value added coefficient change, technology change and final demand change can be obtained. In more detailed one can find in Miller and Blair (2009).

3. DATA SOURCES

The main data sources in this research are symmetric IO tables for Croatian economy for the year 2010 for the year 2018 downloaded from the https://ec.europa.eu/eurostat/databrowser/view/naio_10_cp1700/default/table?lang=en (Eurostat 2023). GVA and employment data were also downloaded from the http://ec.europa.eu/eurostat/data/database. Flows of goods and services in Croatian IO table are disaggregated to 64 mutually exclusive sectors. However, because of the simplicity and clarity, results in the continuation are presented at the level of aggregate sectors which are defined according to official Classification of economic activities by products (CPA) by Table 1.

Table 1: **Definition of aggregate economic sectors according to CPA classification**

CPA Code	Description of the aggregate sector
A + C10-12	Agri-food
B + D + C_19	Energy
C (except C_19) + E + F	Industry
G + H	Trade and transport
I + N_79	Hospitality
J + K + L + M + N (except N_79) + O + P + Q + R + S + T	Services

Source: Author's systematization.

Total expenditures of foreign tourists are based on balance of payments statistics (item travel) published by Croatian national bank https://www.hnb.hr/en/statistics/statistical-data/rest-of-the-world/balance-of-payments. Distribution of expenditures by product groups and sectors are based on results of TOMAS survey (Marušić et al. 2020). Methodology of distribution of tourists' expenditures to demand for goods and services delivered by individual economic sectors are explained in Mikulić, Keček and Žajdela Hrustek (2017).

4. RESEARCH RESULTS

4.1. Comparative analysis of the integration of hospitality and other domestic economic sectors

An increase in demand for specific good or service generates direct revenues of the economic sector which deliver demanded product, but also indirectly affect all other domestic producers which supply direct producer with required intermediate inputs. The most important inputs required in operation of hotels and restaurants are agricultural and manufactured food products, energy and other manufactured products bought by trade distributors. Stronger integration of domestic producers in value added chain of hospitality services result in higher multiplicative effects increase in demand of tourists. Table 2 presents the international comparison of the structure of the share of total intermediate consumption in output of sector hotels and restaurants for Croatia and group of Mediterranean countries. Although expenditures of tourists cover various types of

goods and services, the main channel of spreading of multiplicative effects include hotels and restaurants as the most important item in the total expenditure of foreign tourists.

Table 2: **The share of domestic and imported products in the intermediate consumption of hotels and restaurants**

	France	Italy	Greece	Spain	Portugal	Croatia
Total intermediate consumption	48.7	48.2	50.9	41.9	43.5	45.8
'Domestic, in %	83.5	95.2	81.2	92.0	91.6	78.6
'Imported, in %	16.5	4.8	18.8	8.0	8.4	21.4
Agri-food	20.7	16.6	19.5	17.2	16.3	18.3
'Domestic, in %	78.7	98.3	77.9	92.0	73.1	72.9
'Imported, in %	21.3	1.7	22.1	8.0	26.9	27.1
Energy	1.4	2.7	2.0	1.0	3.1	2.9
'Domestic, in %	94.4	72.8	77.9	96.9	98.0	77.3
'Imported, in %	5.6	27.2	22.1	3.1	2.0	22.7
Trade	6.8	2.7	7.9	6.6	8.1	6.1
'Domestic, in %	93.0	96.7	100.0	98.8	100.0	100.0
'Imported, in %	7.0	3.3	0.0	1.2	0.0	0.0

Source: Eurostat (2023)

International comparison showed higher share of intermediate consumption in the output generated by hotels and restaurants in Croatia than recorded in France, Italy and Greece while Spain and Portugal had even lower requirements for intermediate inputs. Besides, relatively low share of total intermediate consumption, the share of imported intermediate products are the highest in Croatia. It indicates the lower level of integration of hospitality industry in Croatia compared to other Mediterranean economies. High import dependence is especially visible for the group of agricultural and manufactured food products where more than one quarter of total inputs used by hotels and restaurants has been imported in Croatia. The strongest integration of hotels and restaurants and domestic agri-food sector is found for Italy and Spain where over 90% of domestic agri-food inputs have been used. Results for 2018, as presented by Table 2 confirm findings from the previous period 2005-2015 presented by Ivandić (2021) which focused on the negative effects of import dependence on the intensity of multiplicative effects of hospitality sector in Croatia.

4.2. The structural factors behind the increase in the importance of tourism in 2010-2018 period

The results of standard IO model presented by Table 3 capture total effects of foreign tourists' expenditures on Croatian GVA and employment. In 2018, expenditures of foreign tourists generated 52.1 billion HRK of GVA and induced 271 thousand jobs in terms of annual full-time equivalents. If expressed in relative terms, it can be concluded that expenditures of foreign tourists generate 16.5% of total Croatian GVA in 2018, which classify tourism in the group of the key economic sectors in Croatian economy.

Table 3: **Total effects of foreign tourists' expenditures to Croatian GVA and employment**

	Effects	2010	2018	Changes in GVA and employment effects
GVA, in million HRK	Direct	15,298	26,210	10,912
	Indirect	7,368	13,018	5,649
	Induced	8,451	12,872	4,422
	Total	31,116	52,100	20,983
Employment, annual FTE jobs	Direct	116,854	133,190	16,336
	Indirect	45,806	68,602	22,796
	Induced	59,441	68,988	9,547
	Total	222,101	270,781	48,680

Source: Authors' calculations.

GVA generated by tourism increased in 2010-2018 period for 21 billion HRK, while labor requirements increased for 49 thousand FTE jobs. The importance of tourism can be even more visible if its effects are compared with total GVA increase in analyzed period. As total Croatian GVA increased from 280 to 317 billion HRK, it can be concluded that almost 60% of the increase in the economic activity in analyzed period is attributable to foreign tourism. On the other hand, total number of jobs in Croatian economy did not record significant change, which indicate that increasing labor requirements of tourism had to be satisfied by attraction of employees from other economic sectors or by import of employees from other countries. The changes in direct GVA and employment effects makes approximately half of the total effects while the rest comprises indirect and induced effects.

Total change in effects for employment and GVA can be distributed in three different structural factors. The first item is intensity effect which capture variation in labor productivity in the case of employment and variation in the shares of GVA in economic sectors. Negative values for the intensity effect refers to the increase in labor productivity where economic sectors require less labor per unit value of output. The second item measure technology effects, i.e. variation in the number of indirect employment or indirect GVA in value added chain. Higher integration of domestic producers into value added chain of tourism result in positive technology effects. As IO model is based on the flows of domestic goods and services, the same technological processes in the circumstances of increasing import dependence could result in lower technology effects. Finally, the third structural effect measure the impact of final demand change in the case of the unchanged productivity and technology.

Table 4: **Decomposition of changes in GVA, in 2010-2018 period, million HRK**

Sectors	GVA coefficient change	Technology change	Final demand change	Total increase in GVA
Agri-food	189	320	2,629	3,138
Energy	100	-279	750	571
Industry	81	-75	1,579	1,585
Trade and transport	-702	-159	4,055	3,194
Hospitality	-165	391	8,208	8,433
Services	-333	-921	5,316	4,062
Total	-830	-723	22,536	20,983

Source: Authors' calculations.

Table 4 presents the distribution of the total increase in GVA in analyzed period on three structural factors and aggregate economic sectors. On the level of total economy, increase in GVA generated by foreign tourists is exclusively explained by increase in volume of expenditures (final demand change). GVA coefficient effects are negative, which means decreasing share of GVA in output of economic sectors. In addition, technology change is also negative which indicates lower level of indirect effects. Decreasing share of GVA in output of economic sectors could be explained by increasing share of intermediate consumption and consequently higher indirect or technology change effects. Negative figure for technology change in the circumstances of increasing share of intermediate inputs can be explained only by increasing import dependency. In the period after 2013 when Croatia joined EU, Croatian producers are becoming more integrated in international value-added chains and both imports and exports recorded higher growth rate than economic activity. It is interesting to note that the worst results regarding technology change effects can be found for various types of services and distributive sectors such as trade and transport. The importance of domestic services in production processes of other domestic industries is obviously decreasing.

The highest absolute change in the value of GVA generated by demand of foreign tourists is recorded for hospitality sector (hotels and restaurants and travel agencies). As can be seen, technology effects in hospitality sector are positive which is probably result of high mutual integration of hotels and travel agencies where increase in demand for one type of hospitality service result in increase of the other. Technology change effects are also positive for agri-food sector although higher integration of this sector in tourism value-added chain explain only 10% of total increase in sectoral GVA induced by a demand of foreign tourists.

Table 5: **Decomposition of changes in employment, in 2010-2018 period, number of FTE jobs**

Sectors	Employment coefficients change	Technology change	Final demand change	Total increase in employment
Agri-food	-15,475	-1,925	22,659	5,259
Energy	-798	-562	1,622	261
Industry	-2,634	1,028	10,514	8,909
Trade and transport	-19,079	-408	28,515	9,028
Hospitality	-46,004	2,629	51,928	8,553
Services	-818	-6,673	24,161	16,670
Total	-84,808	-5,911	139,399	48,680

Source: Authors' calculations.

Decomposition of the change in employment induced by expenditures of the foreign tourists in 2010-2018 period is presented by Table 5. Employment coefficients change capture the impact of productivity growth in each individual sector. Unfortunately, official IO tables for Croatian economy are available in current prices only and change in employment coefficients (output per employment) include not only increase in productivity in real terms but also increase in the prices of goods and services produced. Without change in employment coefficients and technology change, significant increase in demand of foreign tourists would require from domestic producers to engage additional 139.4 thousands of employees. Having in mind demographic trends and structural factors, availability of labor supply could in future period present serious limitation for further economic growth based on tourism. Strong demand in less productive, labor-intensive industries, resulted in supply shortages of labor force in the last few years and necessity to import labor from other countries. Further growth of tourism if based on increasing volume of arrivals tourists and not on quality and higher value added of services offered could be faced with serious limitations, not only in terms of labor availability but also in negative impact on environment and lack of adequate communal infrastructure. As can be seen, the effects of labor demand related to the change in employment coefficients were negative, indicating productivity growth along the tourism value-added chain in the analyzed period. However, labor requirements in hospitality sector accounted for 37.2 percent of total number of jobs induced by the increase in the volume of tourists' demand (51.9 out of 139.4 thousand jobs). As in the case of GVA, employment effects related to technology change were negative, indicating the less intensive integration of domestic economic sectors.

As Table 5 presents, position of hospitality sector which directly provide services to foreign tourists, regarding the absorption of the increase in demand with productivity growth is more favorable than national average. Thus, almost 90% of total increase in labor requirements induced by increase in tourists' demand has been absorbed by the productivity measured by change in employment coefficient. After hospitality sector, the effects of change in employment coefficients were the highest in trade and transportation and agri-food sector. It is interesting to note that in sector which include various types of services recorded relatively lower effects related to productivity growth which were lower than effects of technology change.

4.3. Economic effects of potential stronger integration of domestic sectors into value-added chain of tourist industry

As comparative analysis revealed, Croatian hotels and restaurants are less integrated with other domestic sectors which produce and deliver required intermediate goods and services. It is especially evident for agri-food inputs where imported products used by hotels and restaurants are the highest compared to other Mediterranean economies. Potentially stronger integration of domestic producers could result in more intensive economic effects induced by demand of foreign tourists. More intensive cooperation of Croatian hotel industry with domestic agriculture, manufacturing industry and various type of services, could result in the increase of the share of domestic inputs through moderate import substitution of intermediates which can be produced domestically at competitive prices and quality. Stronger integration could result in positive effects on the Croatian GVA and employment even without expensive investments in new equipment and premises. In principle, the same production processes would be deployed but instead of imported products, certain proportion of intermediate inputs used in hotels and restaurants would be acquired domestically, for example meat, vegetables or other agri-food products. Under moderate assumption of potential import substitution of 10% of the competitive imports, import dependence of Croatian tourism will still be high compared to other Mediterranean economies. It would not result in any serious distortions in current flows of good and services between domestic sectors and rest of the world. Positive effects, besides in stimulation of domestic economic activity could be also related to environment protection due to transport to lower distance and better monitoring quality and standards.

Table 6 presents the estimated economic effects of stronger integration of domestic producers in value-added chain of tourism sector. Instead of the application of official IO table, results presented in Table 6 are based on the IO table where coefficients for domestic products are assumed to increase in the way that 10% of competitive imports is substituted by domestic products. Total technical coefficients are unchanged under assumption of the application of the same production processes as depicted by official IO table. Expenditures of foreign tourists under assumption of higher level of integration of domestic producers would induce increase in GVA of 485 million HRK or 0.93% in relative terms. Employment is also expected to increase for 2.6 thousand employees (0.96%). The most significant potential for increase of GVA and employment through stronger integration is found for agri-food sector, but also various sectors in manufacturing industry. As can be seen, direct effects of better integration of domestic producers do not directly affect hospitality sector, but the effects are distributed to economic sectors which provide intermediate inputs required by hospitality sector.

Table 6: **Estimated economic effects of stronger integration of domestic producers in value-added chain of tourism sector**

Sectors	Total effects of the expenditures of the foreign tourists		Change in effects due to stronger integration		Relative effects, change in %	
	GVA, in mil. HRK	Employment, in FTE jobs	GVA, in mil. HRK	Employment, in FTE jobs	GVA	Employment
Agri-food	6,654	43,258	139	927	2.13	2.19
Energy	1,686	3,015	32	58	1.95	1.97
Industry	3,815	24,349	91	601	2.45	2.53
Trade and transport	9,069	55,194	64	395	0.71	0.72
Hospitality	19,499	94,899	23	110	0.12	0.12
Services	11,862	52,679	135	522	1.16	1.00
Total	52,584	273,393	485	2,613	0.93	0.96

Source: Authors' calculations.

In order to avoid deterioration in labor market shortages, stronger integration should be coupled with policy measures aimed at stimulation of productivity growth.

CONCLUSION

Results for Croatia confirmed previous findings on the important role of tourism for economic growth in many developing economies (Tang, Tiwari, and Shahbaz 2016; Xiong, Li, and Yang 2022; Prorok, Šerić, and Peronja 2019). Besides estimate of total contribution of tourism in Croatia, this study based on SDA method, provides new insights into the structural factors behind the change in the contribution and the importance of the stronger integration in tourism cluster. SDA enables decomposition of changes in the effects of the increase in final demand, the effects of the technological, employment and GVA coefficients changes.

The increase in GVA and employment induced by expenditures of foreign tourists was the important driver of economic growth in Croatia. Structural decomposition found that impact of the volume of expenditures, measured by change in final demand of tourists, have been the most important factor in inducement of economic effects. Effect of technological change has been negative, meaning that the same value of expenditures would induce less intensive GVA and employment effects in 2018 compared to 2010. The results found for Croatia where the increase in tourism employment is primarily driven by the final demand while impact of technology change recorded employment-destruction effect are in line with recent empirical studies (He et al. 2022). Negative effects of technology change indicates that the level of integration of domestic producers along tourism value added chain decreased in the analysed period. Comparative analyses with similar destinations indicate higher level of import dependence in main inputs used by hospitality sector, such as agri-food and other industrial products. Due to high labour requirements, tourism growth significantly affected labour market in Croatia. As productivity growth along tourism value added chain was able to absorb only 60% of

increased labour requirements related to growth in volume of tourism arrivals, lack of labour supply in recent periods has to be compensated by imported labour force. In the future period, instead of constant increase in volume of tourism services, more intensive and sustainable economic effects could be achieved by restructuring of tourist supply towards the higher share of more qualitative services based on high productivity and stronger integration of domestic producers.

The findings of the study could represent a solid basis for policymakers in their decision-making processes, and more importantly, this study could potentially represent a stepping stone for many future papers employing the SDA methodology in Croatia and in other EU countries.

REFERENCES

Barišić, P. and Cvetkoska, V. (2020), "Analyzing the Efficiency of Travel and Tourism in the European Union", *In: Mladenović, N., Sifaleras, A. & Kuzmanović, M. (eds.) Advances in Operational Research in the Balkans. Springer Proceedings in Business and Economics. Cham, Springer International Publishing*, 167-186 doi:10.1007/978-3-030-21990-1_10.

Bazaza, O. (2020), "Role of Tourism in Global Economic Integration", *Technium Social Sciences Journal*, Vol. 5, No. 1, pp. 61-69.

Boiko, M., Bosovska M., Vedmid N., Melnychenko S., and Okhrimenko A. (2017), "Development of the tourism cluster", *Problems and Perspectives in Management*, Vol. 15, No. 4, pp. 134-149. 10.21511/ppm.15(4).2017.12

Chu, D. P. (2014), "On the Developmental Strategies and Measures for Sustainable Regional Tourism Industrial Clusters*-Taking Fujian Province as an Example", *Proceedings of the 10th Euro-Asia conference on environment and corporate social responsibility: Tourism, society and education session*, pp. 265-273.

Dietzenbacher, E. and Los, B. (1998), "Structural Decomposition Techniques: Sense and Sensitivity", *Economic Systems Research*, Vol. 10, No. 2, pp. 307-324 https://doi.org/10.1080/09535319800000023

Eurostat (2023) Supply, use and input-output tables. https://ec.europa.eu/eurostat/databrowser/view/naio_10_cp1700/default/table?lang=en. viewed 10 January 2023.

Han, L. and Li, L. (2021), "Sustainable Development of Tourism under the Background of Low-Carbon and Green Economy", *Advances in Materials Science and Engineering*, 8587024, pp. 1-8 https://doi.org/10.1155/2021/8587024

He, L., Zha, J., Tang, J., Tan, T., and Yu, Q. (2022), "Drivers of employment effects in tourism-related sectors: the case of Mainland China", *Tourism Review*, https://doi.org/10.1108/TR-03-2022-0149

Ivandić, N. (2021), "Accommodation and food services supply chains: an input-output methodological framework", *DIEM*, Vol. 6, No. 1, pp. 14-24 https://doi.org/10.17818/DIEM/2021/1.2

Kachniewska, M. (2013), "Towards the Definition of a Tourism Cluster", *Journal of entrepreneurship management and innovation*, Vol. 9, pp. 33-56 10.7341/2013913

Lee, L.-C., Wang, Y., and Zuo, J. (2021), "The nexus of water-energy-food in China's tourism industry", *Resources, Conservation and Recycling*, Vol. 164, 105157 10.1016/j.resconrec.2020.105157

Luo, F., Moyle, B. D., Moyle, C-I. J., Zhong, Y., and Shi, S. (2020), "Drivers of carbon emissions in China's tourism industry", *Journal of Sustainable Tourism*, Vol. 28, No. 5, pp. 747-770 10.1080/09669582.2019.1705315

Marušić, Z., Čorak, S., Ivandić, N., Beroš, I., and Andrušec, M. (2020), "Stavovi i potrošnja turista u Hrvatskoj - TOMAS Hrvatska 2019", Institut za turizam, Zagreb. viewed 10 January 2023 http://www.iztzg.hr/hr/institut/projekti/istrazivanja/

Mikulić, D. (2018), *Osnove Input-Output Analize s Primjenom na Hrvatsko Gospodarstvo*, Ekonomski Institut, Zagreb.

Mikulić, D., Keček, D., and Žajdela Hrustek, N. (2017), "Overall contribution of the foreign tourist demand on Croatian economy", In: Tourism and Creative Industries: Trends and Challenges. 4th International scientific conference: TOSEE - TOURISM IN SOUTHERN AND EASTERN EUROPE, Opatija, pp. 393-407.

Miller, R. E. and Blair, P. D. (2009), *Input-Output Analysis: Foundations and Extensions*, Cambridge University Press, New York.

Oxford Institute for Energy Studies (2015), *Driving Forces of China's Energy and Emission Growths Between 2007 and 2010: A Structural Decomposition Analysis*. OIES PAPER: EV 62.

Peterson, B. and Olinick, M. (1982), "Leontief Models, Markov Chains, Substochastic Matrices, and Positive Solutions of Matrix Equations", *Mathematical Modelling*, Vol. 3, No. 3, pp. 221-239 https://doi.org/10.1016/0270-0255(82)90027-6

Prorok, V., Šerić, N., and Peronja, I. (2019), "Analysis of Overall and Pure Technical Efficiency of Tourism in Europe", *Transactions on Maritime Science*, Vol. 08, No 02, pp. 219-229 https://doi.org/10.7225/toms.v08.n02.007

Rørmose, P. (2010), *Structural Decomposition Analysis Sense and Sensitivity*, Statistics Denmark.

Rose, A. and Casler, S. (1996), "Input–Output Structural Decomposition Analysis: A Critical Appraisal", *Economic Systems Research*, Vol. 8, No. 1, pp. 33-62 https://doi.org/10.1080/09535319600000003

Shu, H. Y., Yu, Q., Liu, K. J., Wang, A. X., and Zha, J. P. (2022), "Understanding wage differences across tourism-characteristic sectors: Insights from an extended input-output analysis", *Journal of hospitality and tourism management*, Vol. 51, 88-104 10.1016/j.jhtm.2022.02.030

Sun, Y.-Y. and Hsu, C.-M. (2019), "The Decomposition Analysis of Tourism Water Footprint in Taiwan: Revealing Decision-Relevant Information", *Journal of Travel Research*, Vol. 58, No. 4, pp. 695-708 https://doi-org.ezproxy.nsk.hr/10.1177/0047287518757371

Tang, C. F., Tiwari, A. K., and Shahbaz, M. (2016), "Dynamic inter-relationships among tourism, economic growth and energy consumption in India", *Geosystem Engineering*, Vol. 19, No. 4, pp. 158-169 10.1080/12269328.2016.1162113

ten Raa, T. (2005), *The Economics of Input-Output Analysis*, Cambridge University Press, Cambridge.

Xiong, J., Li, Y., and Yang, Y. L. (2022), "Study on Food-Energy-Water Nexus and Synergistic Control of Tourism in Beijing", *Polish journal of environmental studies*, Vol. 31, No. 4, 3359-EP 3371 10.15244/pjoes/145996

Zha, J., Fan, R., Yao, Y., He, L., and Meng, Y. (2021), "Framework for accounting for tourism carbon emissions in China: An industrial linkage perspective", *Tourism Economics*, Vol. 27, No. 7, pp. 1430-1460 https://doi.org/10.1177/1354816620924891

Davor Mikulić, PhD, Senior Research Scientist
Institute of Economics
Trg J. F. Kennedy 7, Zagreb, Croatia
+385-1-2362235
dmikulic@eizg.hr

Damira Keček, PhD, Assistant Professor
University North
Trg dr. Žarka Dolinara 1, 48000 Koprivnica, Croatia
+385-42-493370
dkecek@unin.hr

Katerina Fotova Čiković, PhD, Assistant Professor
University North
Trg dr. Žarka Dolinara 1, 48000 Koprivnica, Croatia
+385-42-493370
kcikovic@unin.hr