EE
E u r o E c o n o m i c a
Issue 1(34)/2015 *ISSN: 1582-8859*

Tourism as backer for regional development. A real deal or just another hope?

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Abstract. The present paper aims to estimate the economic impact of tourism in Centre development region of Romania, using the regional input-output analysis. **Prior Work** in the field of assessment of tourism impact suggest input – output analysis as a strong instrument of analysis, previous research papers using this model in various region and countries of the world. The main **approach** of the paper is to develop GRIT model (Generation of Regional Input - Output Tables) previously used by the experts. The **results** of the paper indicate lower backward or forward regional tourism multipliers as compared to those estimated at national level**.** The main findings of the paper has significant **implications** for the decision-makers in order to support tourism sector and better capitalize the tourism natural and cultural patrimony. Furthermore, the methodology could be used in other Romanian development regions. The **value** of the paper consists in adapting input-output methodology at regional level in order to estimate tourism impact

Keywords: tourism, multipliers, input- output analysis, Centre development region

1 Introduction

Leonardo da Vinci once said that "*Experience does not err. Only your judgments err by expecting from her what is not in her power*". Sometimes, the interpretation of figures is difficult, especially when lacking expertise in the field, and the researcher is predisposed to interpret a phenomenon without tacking into account local characteristics or the investigated field is unfamiliar to him.

The analysis of the evolution and development of the tourism industry using different numerical expressions (e.g. indicators and indices) represent a valuable tool, being the expression of various current issues and representing warning signals of future situations or problems, measuring risks and the need for action and representing measuring and identifying instruments of previous actions. Tourism involves organized and regulated effort (Urry, 2002) which has a global sphere of influence, generating a significant economic, social and environmental impact, both within communities and beyond. In recent years, the tourism industry has strongly grown on many world countries, from the developed to the developing countries and in poor countries such as those located in African or Asian continent.

The development of tourism is based on a complex set of physical resources (natural and man-made attractions) and infrastructure (accommodation, food, recreation, transportation, municipal infrastructure, etc.) that have a significant impact on the regions where they are located. However, tourists do not buy infrastructure and tourism resources, but the experiences offered, hence tourism is based on experience, which ultimately means that we need to understand both consumption and production, which in tourism become inseparable (Cooper and Hall, 2008).

In recent decades, the travel and tourism industry had a significant contribution to global growth, and the observations and forecasts of academics, researchers, managers, planners, and policy makers indicated that it will continue to expand in the coming decades, as long as industry remains competitive. In the 1990's, the most used instruments of measuring tourism impact referred to tourism multipliers, input-output analysis (IOA), cost-benefit analysis (CBA), economic-based method (EBM), tourism economic assessment model (TEAM) and so on. Generally, addressing multiplier concept refers to final economic effects, not tacking into consideration what particular industry benefits from the direct effects or from the final effects (Massieu, 2006). The IOA uses input-output tables describing the industrial structure of an economy and the interrelationships between sectors (Sinclair et al., 2003) and it shows short-term economic effects of tourism sector compared with the effects of other economic sector (Mill and Morrison, 1992). The CBA is particularly used in investment projects. It is a hypothetical experiment intending to *answer the question of whether or not society would be better off after the implementation of a proposed project* (Smith, 1995). Also, it can determine which economic sector will produce most benefits (e.g. income, employment, foreign exchange, tax revenues) relative to the costs of development (Mill and Morrison, 1992). The EBM divides the economic activities of a region into basic activities, which are those exported to other regions, bring incomes and employment in the area in which they are based, and non-basic activities, which depends on the level of economic activity in the basic sector (Lavery, 1989). The TEAM is a more complex technique, requiring significant amount of data, as *it estimates the overall impact of ongoing business operations or the impact of major new capital projects* (Smith, 1995).

Romanian regions with valuable natural and cultural resources, i.e. painted monasteries in Bucovina, wooden churches in Maramures, villages with fortified churches in Transylvania part of UNESCO's World Heritage, were able to reorient via tourism, becoming polar points of attraction for domestic and international tourists, and consequently diversifying local economy in terms of economic activities, such as local handicrafts (e.g. colourful painted eggs, ceramics, hand-carved decorations, folk costumes, rugs with various geometric shapes, masks), guest-houses, restaurants' units, etc. In territorial profile, tourism caused significant changes, supporting economically and socially the less developed regions such as North-East, South-West, South-Muntenia, being necessary to consider its potential of recovery (Scutariu et al., 2009). Sustainable management decisions bring an equitable distribution of economic benefits for the residents.

The present paper aims to investigate the impact of tourism development on a regional scale. Section 2 investigates methodological aspects on tourism multipliers and input-output analysis, computable general equilibrium, social accounting matrix. Section 3 finalises the input-output analysis for the Centre development region. Section 4 concludes the paper and offers final recommendations.

2 Methodological aspects on tourism multipliers and regional input-output analysis

2.1 Tourism multipliers – the evolution of the concept

In the 1960s to the 1980s, economists started to apply the Keynes's concept of the income multiplier in order to estimate the economic impacts of tourism at national, regional or local level (Ryan, 2003). The pioneers in the field of estimating tourism multipliers (TM) are Archer (1977; 1982), Sinclair and Sutcliffe (1978), Liu and Var (1982), Hughes (1994), Wanhill (1994) etc. TM estimation became one of the techniques most used in the literature for many decades (Diamond, 1976; Gee et al., 1989; Mill and Morrison, 1992; Cooper et al., 1993, Hall and Page, 1999; Massieu, 2006), even it has several limitations, and therefore emerging more complex, sophisticated instruments of assessing tourism

impact, such as input-output analysis, computable general equilibrium, tourism satellite account which require a superior amount of data and information.

TM calculation has developed in order to assess the economic impact of tourist expenditures. In its simplest form, TM 'describes the final economic effects, without considering what particular industry benefits from the direct effects or from the final effects' (Massieu, 2006). These tourist expenditures generate effects at three different levels – the direct, indirect and induced effects (Cooper et al., 1993) upon output, value added, income, employment, taxes, import, government revenue, sales or transactions and so on and, consequently, the associated multipliers may be estimated. Vanhove (2005) summarizes the direct, indirect and induced effects as follows:

- *The direct effects* refer to first-round effects of a change in final demand;
- *The indirect effects* refer to the purchases made by tourism industry from other industries within an economy in order to produce its output;
- *The induced effects* occur as income levels rise throughout the economy as a result of the initial change in final demand, and a portion of the increased income is re-spent on final goods produced within the local economy.

TM represents a reflection of the circulation of one monetary unit through an economic system, and the larger the value of TM, the greater the tourism impact on the economy (Hall and Page, 1999). The magnitude of the tourism impact, and consequently the higher values of TM depend on the extent of the leakages from the economy (Saayman et al., 2001). The estimation of Keynesian multiplier values implies a careful estimation of the first round leakages from tourism demand (Sinclair and Sutcliffe, 1978, cited by Sinclair and Stabler 2002).

The higher the linkages between various sectors of the economy, the higher are the value of TM. The diversity of activities within the destination, expressed as a largely function, is when tourism sector buy heavily goods and services from other local economic sector, and consequently the propensity to import is lower (Mill and Morrison, 1992).

Several mathematical expressions of the TM were developed in different research papers (i.e. Lundberg, 1990; Mill and Morrison, 1992; Cooper et al., 1993), see Table 1.

Table 1 Mathematical expression of tourism multipliers

Type of TM/Theory	Formula	Explanations	Source
Tourism income multiplier, or factor by which tourist expenditures should be multiplied to determine the tourist income generated by these expenditures.	$TIM = \frac{1-TPI}{MPS+MPI}$	*TPI* is tourists' propensity to import, or buy imported goods and services that do not create income for the area; *MPS* is marginal propensity to save, or the resident's decision not to spend an extra dollar of income; *MPI* is marginal propensity to import, or the resident's decision to buy imported goods or spend money abroad.	Lundberg (1990)
Multiplier	$K = \frac{1-L}{1-(c-cj-tic)(1-td-b)+m}$	*L* is the direct first-round leakages; *C* is the propensity to consume; *cj* is the proportion of that propensity spent abroad; *tic* is the indirect tax; *td* is the value of direct deduction (income tax, national insurance and	Mill and Morrison (1992)

Type of TM/Theory	Formula	Explanations	Source
		so on); *b* is the level of government benefits; *m* is the value of imports.	
Base theory models of TM	$\frac{E_r}{E_{r\times 2}}=\frac{1}{1-E_{rc}/E_r}$	E_r is total local employment; E_{rc} is local employment servicing local consumer demand; $E_{r\times 2}$ is the direct change is employment created by a change in tourism expenditure.	Cooper et al. (1993)
Keynesian Multiplier Models: measure the income created in an economy by an additional unit of tourist expenditure	$k=\frac{1}{1-c+m}=\frac{1}{1-MPC}$, $k=\frac{1}{1-c+m-i}$ $k=\frac{1}{MTR+MPS+\{[1-MTR-MPS]MPM\}}$ $k=\frac{1-L}{MTR+MPS+\{[1-MTR-MPS]MPM\}}$ $k=\frac{1-L}{leakages}$	*1* is the additional unit of tourism expenditure and leakages are the proportion of this expenditure which goes into savings *(1-c)* and imports *(m); i* is the marginal propensity to invest. *MPC* is marginal propensity to consume; *MPS* is marginal propensity to save. *MTR* is marginal tax rate; *MPM* is marginal propensity to import. *L* is the immediate leakage attributable to tourist spending not entering the economy, or the need to import goods, services and factors to provide directly for tourists' needs.	Cooper et al., 1993; Vanhove, 2005
Ad hoc Models of TM	$A\times\frac{1}{1-BC}$	*A* is the proportion of additional tourist expenditure remaining in the economy after first round leakages; *B* is the propensity of local people to consume in the local economy; *C* is the proportion of expenditure by local people that accrues as income in the local economy.	Cooper et al., 1993; Vanhove, 2005; Ryan, 2003
Orthodox income multipliers	$TypeI=\frac{DInc+IInc}{DInc}$ $TypeII=\frac{DInc+IInc+IndInc}{DInc}$	*DInc* is the direct income *IInc* is the indirect income *IndInc* is the induced income	Vanhove (2005)
Unorthodox income multipliers	$TypeI=\frac{DInc+IInc}{\Delta FD}$ $TypeII=\frac{DInc+IInc+IndInc}{\Delta FD}$	*DInc* is the direct income *IInc* is the indirect income *IndInc* is the induced income ΔFD is the change in final demand (additional expenditure/additional unit of spending)	Vanhove (2005)

As mentioned before, the limitations of the Keynesian version of TM emerge in the development of more complex techniques such as input-output analysis, still these TM remains the corner stone of assessing the impact of tourism development at national or regional level.

2.2. Input-Output Analysis, Computable General Equilibrium, Social Accounting Matrix

Input-Output Analysis (IOA), Computable General Equilibrium (CGE) and Social Accounting Matrix (SAM) are a sibling group of techniques, frequently used to assess the impact of tourism activity. These modelling techniques evolved, incorporating various processes of determination, basically laying on other sources of data and information like surveys.

Input-Output Analysis has developed as an alternative to Keynesian models, in the attempt to estimate the multiplier effects of tourism (Capó and Valle, 2008). Using the IO tables, the structure of an economy is represented by the value of transactions between sectors as a general matrix, where the rows are the sectors that a given sector sells its output to and down the columns are the sectors a given sector purchases its intermediate inputs from (Kweka et al., 2003).

In a national accounting framework, IO models are used to measure the valued added generated by tourism, estimating the total impact of tourism in a local setting (Sinclair et al., 2003), which incorporates the sum of direct, indirect and induced effects of visitor spending (Chen, 2006). A change or shock in the final demand of the tourism industry generates *direct effects*, measured as the first round effect, *indirect effects*, based on the linkages among economic sectors, which result from industries purchasing or providing inputs to each other, and *induced effects*, generated through the interaction between the influenced sector and households (Cline and Seidl, 2010). IOA provides various multipliers for the total output, value added, employment, incomes, imports, taxes and so on.

Tourism is a cross-cutting sector, and thus the measurement of its economic effects becomes difficult, but considering IOA, this limitation can be overcome (Capó and Valle, 2008), through the estimation of tourism multipliers, generally using a standard methodology. In the literature, various studies are available assessing the economic impact of tourism, at regional or national level, underlining the utility of the IOA approach (Lichty and Steinnes, 1982; Archer, 1995; Archer and Fletcher, 1996; Henry and Deane, 1997; Andrew, 1997; Gamage and King, 1999; Kweka et al., 2003; Jones and Munday, 2004; Singh et al., 2006; Hjerpe and Kim, 2007; Surugiu, 2009; Surugiu et al. 2009; Das and Rainey, 2010; Cline and Seidl, 2010; Konan and Chan, 2010; Steenge and Van De Steeg, 2010; Zaman et al., 2010; Kytzia et al., 2011; Pratt, 2011). IOA are used to assess the effect of a specific event or tourism activity (cultural, sports events, epidemics) or different management programs or environmental pressure of tourism activities.

IOA faces various criticisms, mainly related to:

- It assumes that resources (labour, land, capital) are not used elsewhere, do not come from other industries, do not results in reductions in output elsewhere and flow freely to the tourism and related industries (Dwyer et al., 2004).
- It catches the economic impact of tourism as a snapshot of a particular time or place, which approach is inadequate for a longitudinal examination of tourism impact on economic development (Skerritt and Huybers, 2005).
- It is also limited because does not reveal the distribution effects of tourist spending across different household income segments (Holland and Wyeth, 1993, cited by Daniels et al., 2004).
- Its assumption of linearity in the production and consumption functions, without taking into consideration the economies of scale in the production process, changes in the consumption patterns (Archer, 1995).

Computable General Equilibrium (CGE). As a result of such limitation associated with the IOA, another technique developed in the last two decades, several researchers using Computable General Equilibrium (CGE) as an alternative tool of assessing the economic impact of tourism. CGE is a more

complex and powerful economic tool being highly used at national and regional level, but it is primarily constructed based upon the IO/SAM framework (Adams and Parmenter, 1995; Zhou et al., 1997; Blake, 2000; Dwyer et al., 2003b; Sugiyartyo et al., 2003; Gooroochurn and Milner, 2004; Kweka, 2004; Gooroochurn and Sinclair, 2005; Blake, 2005; Blake et al., 2006; Sun, 2007; Blake et al., 2008; Gómez et al., 2008; Hara, 2008; Blake, 2009; Li et al., 2010).

The CGE model incorporates market concept, the prices and wages moving according to supply and demand, but maintaining the equilibrium in all markets of the economy (Sinclair et al., 2003; Hara, 2008). Similar to the IOA, the CGE estimates the impact of an increase in tourist expenditures, still when prices and wages rise, the real exchange rate varies eroding the competitive advantage of other industries (Sinclair et al., 2003). The CGE technique becomes more flexible than the IOA because it takes into consideration various macroeconomic circumstances when analyzing inter-industry relationships (Dwyer et al., 2000; Dwyer et al., 2004; Singh et al., 2006). The wider effects of tourism on the economy depend on how tourism spending spreads into the economic system.

Pratt (2011) argues that the CGE models are the state of the art in modelling tourism impact, being widely used in assessing the impact of various shocks whose effects may be spread throughout the economy, affecting welfare and income distribution. Considered by academia a superior technique in estimating tourism economic impact, the CGE model has also several implications for the policy development, as the decision makers have more results and wider image on the inter-sectoral linkages (Dwyer et al., 2003a).

Table 2 The assessment of tourism impact: IOA, CGE & SAM techniques

Model developed	What is the issue under investigation?	Specific outcomes	Sources
Input-Output Analysis (IOA)			
Tourism-modified IO model, survey, trade coefficients	*Investigate:* the impact of tourism. *Case Study:* Ely, Minnesota.	The importance of tourism for a rural community.	Lichty and Steinnes (1982)
IOA, Surveys	*Investigate:* compare the results of three separate IO studies carried out to measure and monitor the contribution of international tourism to the economy in comparison with the impacts made by other export sectors. *Case Study:* Bermuda, 1985, 1987, 1992.	International tourism has declined in relative importance over recent years, it is still the major employer of labour in the country and a highly significant generator of income and revenue.	Archer (1995)
IOA, Survey	*Investigate:* the impact made by tourism expenditure on incomes, employment, public sector revenue, balance of payments; BL, FL. *Case Study:* Seychelles, 1991	Certain markets are more effective than others in terms of their contributions to the economy.	Archer and Fletcher (1996)
IOA	*Investigate:* the economic impacts of tourism expenditure and passenger fares. *Case Study:* Ireland, 1990, 1995.	The growth in tourism has kept pace with the rapid expansion in the economy and contributed at a rate above the average.	Henry and Deane (1997)
IO model, linear programming model	*Investigate:* the contribution made by accommodation-centered tourism in the economy. *Case Study:* Cornwall, 1984	Tourism is accommodation-centered and expansion of tourism may not be an optimal strategy in the development of a peripheral economy and may have negative impact on indigenous industries.	Andrew (1997)
Regional input-output multipliers (GRIMP) technique	*Investigate:* compare the initial and flow-on economic effects of tourism spending by two different types of tourists (expatriates and non-expatriates). *Case Study:* Sri Lanka.	Different expenditure priorities are evident between the two groups. Expatriates spend more on retail and wholesale and (on a much smaller scale) on local transport.	Gamage and King (1999)

Model developed	What is the issue under investigation?	Specific outcomes	Sources
Open IO static model; intra- and inter- sector effects	*Investigate:* the economic impact of tourism and assesses its potential contribution for the economy, BL, FL. *Case Study:* Tanzania	Tourism has a significant impact on output and incomes, especially taking into account the strong inter-sector linkage effects. No significant employment gains. The tourism sector also contributes to tax revenue and foreign exchange earnings.	Kweka et al. (2003)
Regional IO tables, Survey among tourism providers, TSA	*Investigate*: the economic effects of tourism spending, in the context of varying regional economic conditions and constraints. *Case Study:* Welsh, 2000 Brecon Jazz Festival, 1999 Rugby World Cup.	Tourism activity brings significant employment and other benefits for a host locality.	Jones and Munday (2004)
IOA	*Investigate*: the impact of the tourism industry on other sectors of the economy, BL, FL; two IO models for 1974, 1993 to identify structural change between tourism and other sectors of the economy; multiplier effect of tourist spending. *Case Study:* Jamaica	Tourism has the capacity to stimulate and induce growth in other sectors of the economy.	Singh et al. (2006)
IMPLAN input–output modelling and REMI (Regional Economic Models)	*Investigate*: regional economic impact analysis (EIA) to assess the regional economic impacts of rafting. *Case Study:* Grand Canyon National Park	Rafting has both positive and adverse impacts on the economy.	Hjerpe and Kim (2007)
IOA	*Investigate*: the importance of tourism sector for the economy, BL, FL. *Case Study:* Romania, 2000, 2005.	Tourism sector has a relatively modest contribution on the economy.	Surugiu (2009)
IOA	*Investigate*: the economic impact of tourism sector, BL. FL. *Case Study:* Romania, 2005.	Tourism sector registers very low output, income, value added, employment multipliers.	Surugiu et al. (2009)
Extrapolation models & IOA	*Investigate*: the economic impacts relating to sales, employment, income and tax revenue to federal, state and local governments. *Case Study:* 15-county regions in the Arkansas Delta Byways.	Farms will benefit from increases in income, no significant increase in jobs mainly due to the family nature of the enterprises.	Das and Rainey (2010)
IMPLAN IOA, combination of non-market valuation and IOA	*Investigate*: the relationship between environmental quality and the regional economy. *Case Study:* Chaffee County, Colorado.	The losses offset from maintaining environmental quality significantly outweigh the regional impacts of any of the tax policies.	Cline and Seidl (2010)
IOA, fuel-by-sector matrix, energy intensity matrix	*Investigate*: the greenhouse gas intensity of Hawaii' s key export, tourism. *Case Study:* Hawaii, 1997.	Identifies key economic sectors in terms of GHG emissions, and the source of final demand for those sectors. Visitors' emissions and fossil fuel use are considerably higher than that of residents.	Konan and Chan (2010)
IO tables industry-by-industry type, tourism expenditure vector using TSA tables	*Investigate*: the importance of tourism. *Case Study:* Aruba, 1999	Small multipliers, lack of interconnectedness between the island's industries. A collapse of tourism is likely to have, in the long run a more than 30% impact on employment and GDP.	Steenge and Van De Steeg (2010)
IOA	*Investigate*: the economic impacts relating to production, VAT, earnings. *Case Study:* Romania, 2000, 2008.	Tourism registers small multipliers	Zaman et al. (2010)
An augmented regional IO model, Survey	*Investigate*: an augmented IO model to better understand the dynamics of the regional economy and its impact on land use. *Case Study:* Davos, 2002.	The economic impact of increasing bed capacity is highly dependent on the tourist category triggering the development.	Kytzia et al. (2011)
IOA, CGE	*Investigate:* how the output and income impacts of tourism change as the value and volume of tourism evolves. *Case*	The size of tourism's economic contribution is dependent on the import propensity of tourists' spend	Pratt (2011)

Model developed	What is the issue under investigation?	Specific outcomes	Sources
	Study: Hawaii, 1967, 1977, 1992, 1997, 2002, 2005.	as well as the import propensities of tourism oriented sectors and their BL and FL.	
Computable General Equilibrium (CGE)			
CGE, ORANI-F model	*Investigate*: the effects of tourism in the industrial and regional structures of the economy. *Case Study*: Australia.	Queensland, the most tourism-oriented of the Australian states, would be the net loser from an economy-wide expansion of tourism.	Adams and Parmenter (1995)
CGE, IOA	*Investigate:* the impacts on Hawaii's economy from a reduction in visitor expenditure. *Case Study*: Hawaii, 1982.	A 10% decline in visitor expenditure affects the industries closely related to tourism (hotel, transportation, eating and drinking industries). The IO model shows larger effects in magnitude relative to the CGE model because the latter allows for resource reallocation.	Zhou et al. (1997)
CGE	*Investigate:* both the effects of tourism and the effects of tourism taxation. *Case Study*: Spain, 1992.	Increase in tourism demand increase welfare. Tourism activities are highly taxed. Domestic tourism is subsidised.	Blake (2000)
CGE, M2RNSW model	*Investigate:* the effects of an increase in world, interstate and intrastate tourism on the economy, focusing on the assumptions that tourism generate maximum impacts. *Case Study*: New South Wales, Australia.	CGE instrument for policy makers.	Dwyer et al. (2003b)
CGE, SAM	*Investigate:* the effects of globalization via tariff reductions, as a stand-alone policy and in conjunction with tourism growth. *Case Study*: Indonesia, 1993	Globalization combined with tourism does not necessarily have adverse effects on the domestic economy.	Sugiyartyo et al. (2003)
CGE	*Investigate:* the effects of the reform of the current structure of indirect taxes, in a relatively tourism-dependent economy. *Case Study*: Mauritius.	Tourism sectors are undertaxed.	Gooroochurn and Milner (2004)
SAM, CGE	*Investigate:* potential contribution of tourism for economic growth using a SAM. *Case Study*: Tanzania, 1992.	Tourism expansion has substantial impact on the economy as shown by increases in real GDP, total welfare and exports.	Kweka (2004)
CGE, Gini Coefficient and the Generalized Entropy	*Investigate:* the effects of tourism taxation. *Case Study*: Mauritius.	Taxing tourism is relatively more efficient and equitable than levying other sectors.	Gooroochurn and Sinclair (2005)
CGE	*Investigate:* the economic benefits and costs of hosting the Olympics. *Case Study:* London 2012 Olympics	The net benefits are positive, and large relative to the investment in the bidding process.	Blake (2005)
CGE, Survey	*Investigate:* the ways in which productivity in tourism businesses can be increased by studying the roles of changes in physical capital, human capital, innovation, and the competitive environment. *Case Study*: UK, 2001	Productivity drivers have positive contribution, improving efficiency and welfare, notably increases in human capital and innovation.	Blake et al. (2006)
CGE	*Investigate:* the economic benefits and costs of hosting the Olympics. *Case Study:* London 2012 Olympics	The lowest-income households are not the main beneficiaries, as households with low (but not the lowest) income benefit more from the earnings and price channel effects of tourism expansion.	Blake et al. (2008)
Dynamic general equilibrium model	*Investigate:* under what conditions an overnight stay tax (tourism tax) is a relevant policy option to increase local income and welfare by reducing congestion, improving the environment and increasing the output quality.	Tourism taxation improves environmental quality and reduces the accommodation capacity and the number of visitors in the long-term.	Gómez et al. (2008)

Model developed	What is the issue under investigation?	Specific outcomes	Sources
Dynamic CGE modelling	*Investigate:* how dynamic CGE can be used to analyze the effects of a tourism demand increase and demonstrate the investment, capital and output growth paths that occur in different type of tourism demand shocks. *Case Study:* UK, 2002.	The economic effects of an increase in tourism demand differ under different dynamic conditions.	Blake (2009)
CGE, SAM	*Investigate:* the effects of the reduction in the number of inbound visitor arrivals and of the decrease in visitors' consumption expenditure on the economy. *Case Study:* SARS epidemic in Taiwan.	SARS epidemic has adverse effects on GDP and employment through a decrease in inbound visitors' consumption and on tourism-related industries.	Hao-Yen and Ku-Hsieh (2009)
CGE	*Investigate:* evaluate the magnitude of economic impact of the economic slowdown on tourism. *Case Study:* China, 2002 IO updated to 2008 prices.	The economic slowdown has brought down the annual growth rate of domestic tourism expenditure, which causes a welfare loss in 2008 and 2009.	Li et al. (2010)
Social Accounting Matrix (SAM)			
SAM	*Investigate:* the economic impact of tourism, regional economic multipliers; *Case Study:* Guaraqueçaba, Brazil, 1989-1994.	The economic impacts of any spending by tourists would be small, due to the large amount of imported inputs, commodities, and capital.	Wagner (1997)
IMPLAN, SAM	*Investigate:* the income effects of sport tourism events. *Case Study:* Cooper River Bridge Run (CRBR)	Using SAMs to estimate personal income effects across different households may be inappropriate.	Daniels et al. (2004)
SAM, 2001 IMPLAN	*Investigate:* the impacts of tourism businesses on household income distribution by incorporating secondary and primary employment based income. *Case Study:* Pennsylvania region.	Tourism-oriented activity has relatively large contributions to lower and upper as opposed to middle income households.	Hughes and Shields (2007)
SAM, LINE model combining a Keynesian and an IO framework	*Investigate:* the importance of tourism in regional economies and to decompose regional tourism multipliers. *Case Study*: Denmark	Tourism multipliers are larger in urban than in rural areas.	Zhang et al. (2007)
Four approaches: the supply approach, the simple demand or commodity approach, the simple satellite account approach involving TSAs based on SAM, and the extended TS approach.	*Investigate:* the regional and local impacts of tourism based. *Case Study:* 98 Danish municipalities.	The four approaches give very different results.	Madsen and Zhang (2010)

Note: BL – backward linkage, FL – forward linkage, IMPLAN - Impact Analysis for Planning model

Social Accounting Matrix (SAM) is an extension of IOA, describing the interrelationships of income and transfer flows between the different institutional units (Eurostat, 2008). In tourism, SAM technique was especially used to extend the information comprise in IO tables or as a primary data requirements for CGE models (see Table 2). Zhou et al. (1997) argue that SAM captures not only the product flows, but also income and expenditure flows of the economic agents over a specific accounting period. Even its application is more limited, it is important to underline its usefulness for regional analysis when estimating tourism impact on the economy.

In conclusion, IOA, CGE and SAM modelling have increased their recognition among the academia in the last decades, developing and amplifying their application at national and regional level. In recent years, the CGE is recognized as being the strongest tools in this set of techniques, but the other two should not be underestimated. Their application on solid theoretical background provides significant and valuable data for decision-makers for further developing of tourism plans and strategies.

2.3 Regional input – output analysis in Romania Centre Development Region

Input – Output method allows the analysis of regional interindustry linkages, for this purpose input - output regional methods based on surveys being developed (Richardson, 1972; Emerson, 1971), respectively non-survey estimation of regional input - output tables (Pullen and Proops, 1983; McGregor and McNicoll, 1992; Chase et al, 1993, Round, 1978; Sawyer and Miller, 1983; Robison and Miller, 1988, Flegg and Webber, 2000; Bonfiglio, 2009) or hybrid methods, respectively a combination of both methods, except that the models based on the survey are more expensive. Non-survey input-output methods attempts to identify regional technical coefficients components, from different regional economic profile than the national. Over time, there have been numerous attempts to achieve regionalized input-output tables using non-research methods, in this respect Ralston et al (1986) may be referred.

In the literature, different methodologies to estimate location quotient can be identified, using simple tracking coefficients, although many papers criticizing this approach exist, due to overestimation of regional multipliers (Richardson, 1985 cited by Kronenberg, 2007). These types of estimates using non-survey methods can generate significant errors on regional accounts, as production functions and resource productivity may differ, national versus regional, due to climate, labour characteristics, etc. (Pirasteh et al, 2003).

Regional input-output tables are a useful tool in research, analysis and territorial planning. To this end a system called Generation of Regional Input - Output Tables - GRIT offering hybrid data was developed, following some mechanical steps for generating regional coefficients, while providing the possibility of using additional data to improve the results quality (Pirateh et al, 2003). In developing regional tables, the adjustment of national coefficients and the estimation of regional technical coefficients is one of the key steps, requiring application of mathematical techniques to allocate various inputs used by each sector of the regional economy, various methods have been developed in this approach such as location quotient, percentage of regional supply, supply-demand pool approach, regional purchase coefficients (Kuhar et al, 2009).

Simple location quotient - *SLQ* indicates that the quantitative characteristics (e.g. gross output) are distributed among regions in the country. This technique is based on the assumption that these regional technical coefficients differ from the national coefficient by the size of regional import coefficient. SLQ compares the relative importance of an industry in the region, with the national level. For a given region, regional IO coefficients can be defined as (Miller and Blair, 1985):

$$a_{ij}^{N} = a_{ij}^{R} + m_{ij}^{R} \quad (1)$$

Where a_{ij}^{N} and a_{ij}^{R} are national and regional coefficients, indicating direct demand for input of sector *j* from sector i, and m_{ij}^{R} - regional import coefficients of the product of sector *i* demanded by sector *j*.

If we note with x_i^r and x^r total production of sector *i* in region *r* and respectively total production in region *r* of all sector of activity and respectively x_i^n and x^n total production of sector *i* and respectively total production at national level, *SLQ* can be determined using the following formula (Miller and Blair, 1985):

$$CLS_i^r = \left(\frac{x_i^r / x^r}{x_i^n / x^n}\right) \quad (2)$$

SLQ is estimated using employment, output or value added, income. When $SLQ_i^r \geq 1$, than sector *i* is

more localized or concentrated in the region than the national average and shows the proportion of the total national product *i* realized in region *r* (Miller and Blair, 1985; Kuhar et al, 2009). If the sector *i* is concentrated in the region than nationally, the national input coefficients a_{ij}^{n} apply regionally, and regional surplus generated by sector i is exported to the national level. When SLQ_i^r <1, than sector *i* is seen as being less able to meet the regional demand for its production and direct regional input coefficients a_{ij}^{rr} are estimated reducing national coefficients a_{ij}^{n} which are multiplied with SLQ_i^r, Thus, regional table can be estimated as (Miller and Blair, 1985):

$$\begin{cases} (SLQ_i^r) * a_{ij}^n & if \quad SLQ_i^r \prec 1 \\ a_{ij}^{rr} = a_{ij}^n & if \quad SLQ \geq 1 \end{cases} \tag{3}$$

Purchase only location quotient for sector *i* in region *r* refers to regional capacity compared with the national one to the inputs for sector i, but only to those sector using *i* as input and thus:

$$PLQ_i^r = \frac{x_i^r / x^{*r}}{x_i^n / x^{*n}} \tag{4}$$

Where x_i^r and x_i^n represent regional and total production of product *i*, and x_i^{*r} and x_i^{*n} represent regional and national production of those sectors using *i* as input PLQ_i^r is used in the same manner as SLQ_i^r to adjust uniformly elements of national technical coefficients.

Semi-logarithmic Location Quotient and Cross-industry Location Quotient *RSLQ* and *AFLQ*. Round (1978) proposes an alternative model of location quotient, respectively semi-logarithmic location quotient, defined as:

$$RSLQ = \frac{SLQ_i}{Log_2(1+SLQ_j)} \tag{5}$$

The interpretation of coefficients obtained using the above formula is similarly interpreted as follows:

$$\begin{cases} (RCLS_i^r) * a_{ij}^n & if \quad RSLQ_i^r \prec 1 \\ ra_{ij}^{rr} = a_{ij}^n & if \quad RSLQ \geq 1 \end{cases} \tag{6}$$

An alternative of location quotients above mentioned is presented by Flegg et al (1995), Flegg and Webber (1997), Flegg and Webber (2000) which proposes the inclusion of additional measures the relative size of the region.

$$FLQ_{ij}^r = \lambda * SLQ_{ij}^r \tag{7}$$

Where $$\lambda = \left[\log_2(1+x_E^r / x_E^n)\right]^{\delta}, \quad 0 \leq \delta \prec 1 \tag{8}$$

Although δ there is no clear specifications about the value it should take, empirical work conducted for Finland suggesting the value of 0.3 (Miller and Blair, 1985). Recognition of regional specialization gave rise to an improved model of FLQ, respectively Flegg's augmented location quotient, which is determined by the following formula:

$$\begin{cases} \left[\log_2(1+LQ_j^r)\right] FLQ_{ij}^r & if \quad LQ_j^r \succ 1 \\ AFLQ_{ij}^r = FLQ_{ij}^r & if \quad LQ_j^r \leq 1 \end{cases} \tag{9}$$

And thus

$$\begin{cases} (AFLQ_{ij}^{r}) * a_{ij}^{n} & if \quad LQ_{i}^{r} \succ 1 \\ a_{ij}^{rr} = (FLQ_{ij}^{r}) a_{ij}^{n} & if \quad RSLQ \le 1 \end{cases} \tag{10}$$

In order to derive the input-output table is necessary to estimate total production regional output vector, and this can be done from the multiplication of regional production coefficients expressing the relationship between regional and national production. These indicators can be determined using the share of regional gross value added.

$$\underset{n\times 1}{\hat{O}_R} = \left[\left(\underset{n\times n}{\hat{V}a_R} * \underset{n\times n}{\hat{V}a_N}^{-1} \right) * \underset{n\times n}{\hat{C}LS} \right] * \underset{n\times 1}{\hat{O}_N} \tag{11}$$

Where $\hat{O}_R$ - regional output vector; $\hat{V}a_N$ is the diagonal matrix of national GVA; $\hat{V}a_R$ - is the diagonal matrix of regional gross value added; $\hat{O}_N$ - national output vector; $\hat{C}LS$ is the diagonal matrix of coefficients SLQ.

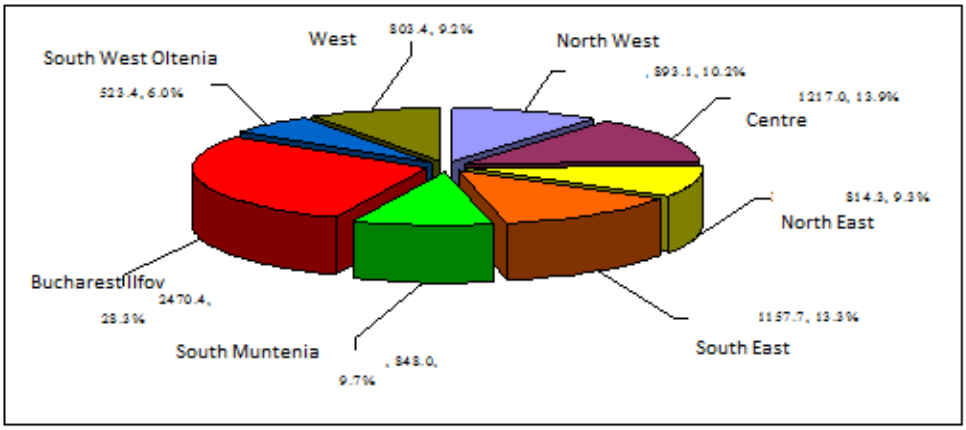
These mathematical methods of regional input-output table have limitations, most times being recommended hybrid methods, namely the combination of field surveys and mathematical modeling estimations. Generating regional input-output tables allows the estimation of the multiplier underlining the impact of tourism sector in the regional economy.

3 Input-Output analysis for the Centre development region

Centre Development Region is among the most dynamic economic regions with a GDP per capita in 2008 of 6,187 Euros, placed on third place on national level after the Bucharest-Ilfov (15,742 Euros) and West (6,484 Euros). Tertiary sector is dynamic, rapidly growing, while industrial sector still holds a significant share among developed branches, such as automobile industry, metal processing, chemical and pharmaceutical, textile, food industry. In tertiary sector few areas have been noted: telecommunications, finance and banking, transport and tourism.

Tourism sector has experienced major growth although, in recent years, its natural and cultural tourism potential has not been exploited enough, emphasizing its remarkable resources. In terms of tourist arrivals and overnight stays, in 2008, Centre development region occupies the second place after South-East development region, with approximately 1,291.5 thousand visitors and 3,152.1 thousand overnight stays respectively, representing 18.1% and 15.2% of the total volume nationally registered. In 2010, Centre development region ranks first in terms of tourist arrivals and second place of overnight stays with a total of 1,126.9 thousand tourists (18.6%) and 2,719.4 thousand overnight stays (16.9%).

In terms of gross value added (GVA) contribution of hotel and restaurant sector, Centre development region has a contribution of 1,217 million lei, representing 13.9% of national sectoral GVA, the second largest contribution after Bucharest-Ilfov development region having a share of 28.3% (see Figure 1.). Regional tourism activity is characterized by the diversity of existing resources (spas and mineral waters, salt lakes, sapropelic mud, gas pits, historical and architectural monuments, churches, memorial houses, ethnography and folklore, protected areas, mountain landscapes) supporting various forms of tourism, including cultural tourism, religious tourism, mountain tourism and winter sport tourism, spa tourism, business tourism, rural tourism and agro tourism, ecotourism etc.



Source: processed data from NIS

Figure 1 Regions' contributing to GVA creation in hotels and restaurants

Taking into consideration tourism importance of Centre region at national level and hotel and restaurant contribution to national GDP creation, regional input-output table was developed for this region. The approach aims to emphasize the contribution of tourism to support regional production. The aggregation of regional branches was performed taking into account the available data provided by Romanian National Institute of Statistics (RNIS) and merging existent sectors (zero GVA), resulting in final eight industries (see Table 3).

Table 3 Economic sector in Centre development region

Abv.	Economic branch
A01	Agriculture, hunting, forestry, fishing
A02	Industry
A03	Construction
A04	Commerce
A05	Hotel and restaurant
A06	Transport, storage and communication
A07	Financial intermediation, real estate, renting and business activities to enterprises
A08	Public administration and defence, education, health and social assistance

Given the above mentioned methodology, regional direct technical coefficients were determined a_{ij}^{rr} which are, in fact, the core of input-output table. National direct technical coefficients were adjusted with the vector of the share of the regional gross value added which approximates the regional structure of economic activities. The generation of input-output table allows the analysis of regional economy, namely the main macroeconomic indicators and their composition by sector of activity (see Table 4). Total production of Centre development region is dominated by industry and construction, while service sector has the highest contribution to GVA creation.

Table 4 Centre Development region: Comparative analysis of macroeconomic indicators

		Romania	Centre Region
Total production	Million lei	985,670.9	122,148.6
Gross value added	Million lei	458,535.5	51,345.3
Intermediate consumption	Million lei	527,135.4	61,493.9

		Romania	Centre Region
GVA structure			
Agriculture	%	7.4	7.8
Industry and construction	%	37.8	42.5
Services	%	54.8	49.7
Production structure			
Agriculture	%	7.4	7.4
Industry and construction	%	47.3	57.9
Services	%	45.2	34.8

Source: estimation of the authors

Regional input-output table of Centre development region is presented in Table 5, including sales and acquisitions of economic branches. The processed data indicates that the largest inputs for final demand of hotel and restaurant sector at regional level result from industry (1245.0 million lei) and agriculture (153.4 million lei). At the same time, the hotel and restaurant sector offers inputs of goods and services for industry (242.7 million lei), public administration and defence, education, health and social care (177.8 million lei).

Both on national and regional level, hotel and restaurant sector is final stimulating sector, arousing production of backward branches and offering fewer inputs necessary to generate the production of other economic branches. Total intermediate consumption of hotel and restaurant sector rose to 1,691.4 million lei, while total production to 3,223.2 million lei, representing 2.92% of the total regional production.

In terms of acquisition of hotel and restaurant sector to assure regional tourism demand compared with total purchases of goods and services by the sector at national level, the most significant share is found in self consumption and acquisitions of industrial sector, or 16.5% , followed by agriculture (12.5%). At regional level, hotel and restaurant acquisitions are predominantly designated to industry and agriculture sectors, although their share declined in favour of other value added components (e.g. compensation of employees, taxes).

Table 5 Regional Input-Output Table for Centre Development Region, 2008

(mil. lei, Ron)

	A01	**A02**	**A03**	**A04**	**A05**	**A06**	**A07**	**A08**
A01	2605.0	2172.3	5.5	118.6	153.4	2.3	10.0	0.9
A02	1367.1	30237.9	2802.3	2961.0	1245.0	1134.8	2855.7	3208.3
A03	21.3	101.3	1096.2	15.2	46.7	24.2	197.2	47.6
A04	0.0	0.0	0.0	433.9	0.0	0.0	0.0	0.0
A05	11.4	242.7	4.2	9.6	85.2	36.8	73.3	177.8
A06	23.5	426.9	48.2	81.1	33.0	652.3	212.0	147.8
A07	152.7	1917.1	1123.7	145.5	122.2	363.0	2017.4	406.4
A08	5.7	60.1	0.3	0.3	5.9	3.2	8.3	32.6
Intermediate consumption	*4186.6*	*35158.2*	*5080.3*	*3765.3*	*1691.4*	*2216.7*	*5373.8*	*4021.5*
Total production	**2591.3**	**107052.4**	**16333.6**	**12485.8**	**3223.2**	**9311.6**	**4847.2**	**17100.7**
% total	*7.38*	*49.91*	*7.94*	*8.01*	*2.92*	*3.92*	*10.01*	*9.90*

Source: estimation of the authors

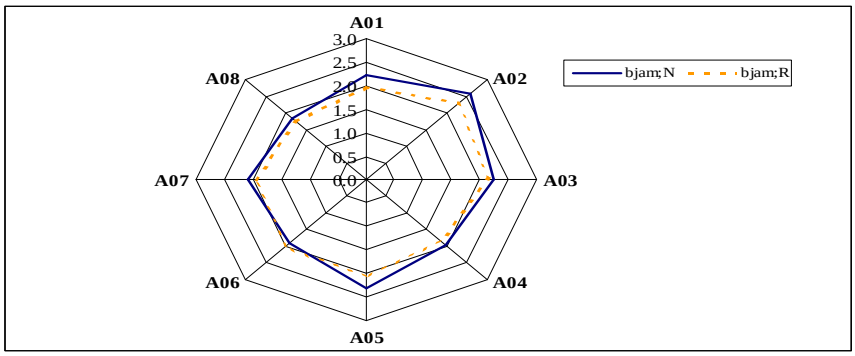
Hotel and restaurant branch in the Centre development region offers 16.6% of total sales of industrial branch registered at national level, while public administration and defence, education, health and social care branch provides 15.3% and agriculture 12.3%. The sales to industrial sector at regional level are higher compared to the national level, as well as for public administration and defence, education, health and welfare, emphasizing the intensification of business relationships and the educational and research partnerships with other countries.

Table 6 Purchases and sales of hotel and restaurant branch, 2008

	$\%(x_{i5}^R/x_{i5}^N)$	$\%(x_{5j}^R/x_{5j}^N)$	$\%(x_{i5}^R/\sum_{i=1}^{n} x_{i5}^R)$	$\%(x_{i5}^N/\sum_{i=1}^{n} x_{i5}^N)$	$\%(x_{5j}^R/\sum_{j=1}^{n} x_{5j}^R)$	$\%(x_{5j}^N/\sum_{j=1}^{n} x_{5j}^N)$
A01	12.5	12.3	3.20	6.00	1.77	1.96
A02	16.5	16.6	25.98	36.71	37.87	31.09
A03	8.4	9.8	0.97	2.71	0.65	0.91
A04	0.0	11.1	0.00	0.00	1.49	1.83
A05	16.5	16.5	1.78	2.52	13.29	10.97
A06	5.4	7.8	0.69	2.98	5.75	9.98
A07	9.5	8.4	2.55	6.25	11.43	18.61
A08	9.7	15.3	0.12	0.29	27.74	24.65

Source: estimation of the authors

Backward and forward output multipliers. Having as main virtue generating multipliers, the next step was to generate the regional output multipliers in the regional economy. These multipliers reflect the relationships between tourism and other branches. This technique should be regarded carefully, considering the characteristics of input-output table and the method of generating regional input-output table. The rank for each national and regional multiplier allows highlighting the differences in the relative importance of sectors in support of production.



Source: estimation of the authors

Figure 2 Comparative representation of regional and national backward multipliers, 2008

The sector with the greatest potential of generating production in the Centre region is industrial sector, hotel and restaurant being on third place, so that an increase in final demand by one unit, increases the production by 2053 units. The multiplier of tourism sector is below the national average, probably due to Bucharest-Ilfov region which is by far the biggest generator of GVA in hotel and restaurant sector. Although the second region at national level regarding the GVA generation in tourism sector, the receipts of business tourism in Bucharest generates a multiplier effect superior to other forms of tourism. The forward multiplier is lower than the backward multiplier, positioned on sixth place, both

on regional and national level.

Hypothesis regarding regional tourism demand. An increase in final demand in hotels and restaurants industry by 10% it was considered in order to analyze the impact on regional production. Thus, a 10% increase in demand for hotels and restaurants industry leads to increases by 5.34% of total regional production, including the production of this sector by 5.01% and 0.33% of production in other industries, especially services (transport, storage and communications - 0.0635%; public administration, education, health and social - 0.10%; financial intermediation, real estate, renting and business activities mainly businesses - 0,05%) (see Table 7). The data reflects weak regional interconnection between tourism and other sectors, the lack of integrated development of the sector, its inability to rely on domestic production, particularly manufacturing (food industry, textile industry).

Empirical evidences show that tourism has the capacity to support the development of economic sectors at national and regional level, but inadequate policies based on local investments to strengthen cooperation of economic agents, lack of private partnerships between tourism operators did not allow optimal exploitation of the resources existing in Centre development region.

Table 7 Backward and forward output multipliers in Centre development region, year 2008, hypothesis regarding the change of tourism demand

	$b_j^{am;N}$	***Rk.***	$b_j^{av;N}$	***Rk.***	$b_j^{am;R}$	***Rk.***	$b_j^{av;R}$	***Rk.***	**%(** $b'^{am;R}_j / b_j^{am;R}$ **)**
A01	2.281	*4*	2.191	*3*	1.963	*5*	1.827	*3*	0.0211
A02	2.727	*1*	7.109	*1*	2.298	*1*	6.623	*1*	0.0404
A03	2.314	*3*	1.327	*5*	2.143	*2*	1.209	*5*	0.0231
A04	2.031	*6*	1.058	*7*	1.852	*7*	1.046	*7*	0.0234
A05	2.463	*2*	1.098	*6*	2.053	*3*	1.092	*6*	5.0113
A06	1.982	*7*	1.670	*4*	1.991	*4*	1.297	*4*	0.0635
A07	2.172	*5*	2.393	*2*	1.941	*6*	1.874	*2*	0.0533
A08	1.899	*8*	1.024	*8*	1.743	*8*	1.014	*8*	0.1042

Note: $b_j^{am;N}$ - national backward output multiplier ; $b_j^{av;N}$ - national forward output multiplier; $b_j^{am;R}$ - backward output multiplier of Centre development region; $b_j^{av;R}$ - forward output multiplier of Centre development region; b' - adjusted multiplier
Source: estimation of the authors

4 Final recommendations

Indicators have become increasingly used in planning and management of a destination but often, the establishment and use of various evaluation and measurement indicators should take into account decision-making process, being a catalyst for the implementation of effective measures and providing viable solutions to different problems. Sometimes the indicators can be used in the formulation of goals, giving a more precise direction and consistency of tourism policies and strategies. The indicators could be involved in the evaluation process and achievement of the objectives and their correction is important as they become inconsistent with the implementation plans. They are the bridge to shape a dialogue between the various stakeholders involved in the development of tourism programs, policies, strategies, as the objectives were prioritized and tourism stakeholders monitor their achievement.

Tourism development considering the sustainability principles became the driving force of all policies, strategies, development measures, and no action can be conceived without taking into consideration sustainability as development objective. Sustainability is a condition *sine qua non* for tourism development.

In Centre development region is necessary to develop alternative forms of tourism, broadly defined as being consistent with the natural and cultural values, and those of the communities, in order to allow both guests and hosts to enjoy positive interaction and to share experiences (Eadington and Smith, 1992). Small-scale alternative tourism, locally controlled has become preferred and gradually adopted and adapted to the needs of various destinations. In recent years, the focus was mainly on protecting the environment and supporting "soft", small scale activities (e.g. climbing, mountaineering, hiking, running, canoeing, horseback riding, wildlife, cycling), which addresses a relatively small number of tourists. Ecotourism has become a growing form of tourism practiced as an example for the cultivation of tourism activities, which brings intrinsic value, being developed on a small scale, highlighting the identity of the host communities, while generating benefits that having an educational value and minimal impact on the environment, contributing to the conservation of habitats and species (Beeton, 1998; Wearing and Neil, 1999; Blamey, 2001; Nistoreanu, 2003; Fennell, 2008).

On the other hand, the image of a destination, as component of tourism offer, represents a key attribute that facilitates the decision to purchase a tourism product. The image of a destination contributes to the differentiation from other similar destinations (Holloway, 1994). To create a strong and consistent image among consumers, marketing policies and advertising campaigns of tourist offices, private operators etc. have a tremendous role. Providing qualitative travel products (beaches, accommodation, food products) is no longer sufficient, and creating a positive image in the minds of consumers can offset other weaknesses related to high prices, thus offering added value and keeping a loyal clientele.

5 Acknowledgement

This paper is supported by the Sectoral Operational Programme Human Resources Development (SOP HRD), financed from the European Social Fund and by the Romanian Government under the contract number SOP HRD/89/1.5/S/62988.

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