

UNIVERSITY OF ALGARVE

FACULTY OF ECONOMICS

**EVALUATION OF THE ECONOMIC IMPACT OF TOURISM  
EXPENDITURES IN PORTUGAL**

ISA MÓNICA RODRIGUES FIGUEIRAS

Dissertation to obtain the Master Degree in

**TOURISM ECONOMICS AND REGIONAL DEVELOPMENT**

Dissertation made under the supervision of:

Professor Doutor Rui José da Cunha de Sousa Nunes

2015

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EVALUATION OF THE ECONOMIC IMPACT OF TOURISM EXPENDITURES IN  
PORTUGAL

### **Work Authorship Declaration**

I declare to be the author of this work, which is unique and unprecedented. Authors and works consulted are properly cited in the text and are in the listing of references included.

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.....

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*To my parents, Carlos and Fátima*

## ACKNOWLEDGMENT

In this section devoted to an acknowledgment that certainly does not allow me to thank all the people along my journey at the Faculty of Economics during the initial degree in Economics and now the Masters in Tourism Economics and Regional Development directly or indirectly contributed for academic achievement and completion of this step.

The coordinator of the Master Professor Pedro Pintassilgo, was a privilege to attend the Masters that has enriched my academic and personal training.

The great support of my advisor Director of the Faculty of Economics Professor Rui Nunes, I want to thank you for the time you spent, patience, motivation, dedication and for his suggestions that contribute to enrich this work.

To thank Professor Elisabeth Valle awakened in me a curiosity for the thematic Input-Output matrix.

I want to thank my family, for the opportunity and great support they gave me to be able to reach this very important step in my academic life.

Finally, I want to thank Hugo for their unconditional support throughout this academic stage and in my life, principally for their understanding and motivation, without him would have been quite difficult.

## SUMMARY

O turismo é uma atividade que desde o início do século XX tem vindo a crescer e a ganhar uma grande importância a nível mundial, pela crescente relevância que o sector turístico tem vindo a exhibir comparativamente à maioria dos agregados macroeconómicos, como o PIB (Produto Interno Bruto), a produção, o emprego, as importações e as receitas do governo. Como consequência, a análise do turismo tem atraído muito a atenção da comunidade científica.

A área do turismo tem recebido uma atenção especial por parte dos investigadores e profissionais de turismo, principalmente na análise do impacto económico das despesas dos turistas, que tem contribuído para o debate sobre o impacto dos turistas para a criação de riqueza económica e de emprego, bem como a melhoria dos desequilíbrios estruturais de toda a economia. O principal problema do sector turístico deve-se à complexidade na definição do produto turístico, uma vez que não existe um padrão, e que pode variar consoante a nacionalidade, idade e com os gostos individuais dos turistas.

Este trabalho pretende avaliar o impacto económico das despesas turísticas em Portugal, que realizadas ao longo do ano de 2008. A técnica utilizada é a análise *input-output*, ou de entradas e saídas, que tem como base a utilização da matriz input-output de Portugal para o ano de 2008, a mais recente disponibilizada pelo INE (Instituto Nacional de Estatística), contando também com a matriz disponibilizada pelo DPP (Departamento de Prospetiva e Planeamento e Relações Internacionais), juntamente com a criação de um vetor de procura final que contém as despesas turísticas, que permite efetuar o cálculo de vários multiplicadores e, deste modo, avaliar os efeitos diretos, indiretos e induzidos dos gastos turísticos na economia portuguesa.

Este trabalho surge no âmbito de Portugal contar com uma atividade turística que ao longo dos anos tem vindo a crescer e a ganhar algum destaque ao nível mundial, nomeadamente desde os anos 60 do século XX.

De acordo com os dados obtidos para o ano 2008, no Relatório de Competitividade e relativamente do setor “Viagens e Turismo” num ranking de competitividade do turismo que abrange 130 países, surge Portugal a ocupar o 15º lugar.

De acordo com a informação fornecida pelo *World Travel & Tourism Council* (WTTC) para o ano de 2008, relativamente a “*Travel & Tourism*” e a Portugal, a atividade representa 5% do PIB contabilizando os efeitos diretos, sendo de 14% o seu contributo se considerados os efeitos totais. Quanto ao peso que o “*Travel & Tourism*” apresenta como efeito direto para o emprego é de 6,1%, sendo de 16,3% o seu efeito total. De acordo com os valores apresentados, o turismo tem dado uma contribuição substancialmente positiva para a economia Portuguesa e para o crescimento económico de Portugal.

O turismo em Portugal é denominado pelo produto “Sol e Praia”. Dada a sua natureza sazonal, seria importante diversificar o produto turístico, introduzindo novos produtos não sazonais de modo a suavizar as oscilações que ocorrem na procura turística ao longo do ciclo anual.

De acordo com a informação disponibilizada pelo INE, através da Conta Satélite do Turismo (CST), existem duas variantes importantes das atividades turísticas sobre o território económico: o turismo recetor e o turismo interno. No ano de 2008, a estrutura de consumo de ambas as categorias foi direcionada maioritariamente para os produtos caracterizados como “produto turístico” como sejam o “alojamento”, a “alimentação” e o “transporte”. A existência de um maior impacto do turismo recetor na economia portuguesa deverá ser salientado. Tal discrepância decorre do maior volume de receitas turísticas provenientes dos turistas não residentes em comparação com as que têm origem nos turistas residentes.

A técnica utilizada neste trabalho, o modelo *input-output*, foi criado por Wassily Leontief em 1930. Apesar de ser um método com algumas décadas, é um modelo bastante atual e que tem vindo a ser aplicado em diversas áreas inclusive na medição dos impactos económicos do turismo, através da aplicação de multiplicadores, que permitem quantificar os seus efeitos: diretos, indiretos e induzidos. Uma matriz de *input-output* descreve a economia de uma determinada região, num determinado período de tempo, representando as trocas de bens e serviços que existem entre os diversos sectores de atividade. O facto de se trabalhar com uma matriz *input-output* pode ser condicionado pelo seu *gap* temporal visto a sua produção ser feita de cinco em cinco anos, devido à sua complexidade de construção e em reunir toda a informação necessária e ainda pela estrutura económica de uma determinada região não se alterar significativamente, durante esse período temporal.

Do ponto de vista metodológico, a implementação do modelo inicia-se pela construção da matriz de coeficientes de *input* intermédio, tarefa que é realizada cruzando a informação da matriz de produção nacional com o vetor dos outputs setoriais. Em seguida, obtém-se a chamada matriz inversa de Leontief que contém os chamados multiplicadores parciais de produção e que permitem medir os efeitos das despesas turísticas sobre os níveis dos *outputs* setoriais. Finalmente, usam-se os coeficientes diretos de rendimento (valor acrescentado líquido), de emprego e de importações intermédias, de modo a estender-se a medição dos efeitos das despesas turísticas daqueles agregados macroeconómicos.

A implementação da metodologia supradescrita permitiu apurar um conjunto de resultados que apontam para a preponderância dos setores da Restauração e do Alojamento, não apenas como as duas rubricas principais do vetor da procura final turística, como ainda como os setores de atividade de maior influência na determinação dos efeitos totais de output, de rendimento, de emprego. Por outra parte, resulta igualmente claro que as estruturas produtivas daqueles setores de atividade possuem um conteúdo de importações que têm como efeito a redução da sua eficácia como instrumentos de criação de rendimento e de emprego em benefício da economia portuguesa. Tal fenómeno deve-se, sobretudo, aos *inputs* intermédios provenientes do setor industrial e, em menor grau, aos que têm origem no setor da Energia. Estes dois setores, conjuntamente com o setor do Transporte aéreo, representam cerca de 70% do efeito total sobre as importações.

As implicações dos resultados apurados são claras: de modo a contribuir para a redução do efeito de drenagem financeira das despesas turísticas efetuadas no território económico português e simultaneamente a reforçar o seu potencial de criação de emprego e de rendimento, é necessário encetar uma política seletiva de substituição de importações focada nos *inputs* intermédios industriais e energéticos que mais peso exercem na estrutura produtiva das principais atividades específicas do Turismo, designadamente a Restauração e o Alojamento.

Palavras-chave: Turismo, Impactos Económicos, Análise *Input-Output*

## **ABSTRACT**

Tourism activities have been gaining importance all over the world, an expression of this being the growing share of the tourist sector regarding most macroeconomic aggregates, such as GDP, output, employment, imports and government revenue. As a consequence, tourism analysis has been attracting much attention from the scientific community.

One field receiving special attention from both tourism scholars and practitioners is that of economic impact analysis of tourism expenditures, as there is still a debate over the contribution of tourism spending to the promotion of economic wealth and employment as well as the improvement of the structural unbalances of the whole economy.

This work intends to evaluate the economic impact of tourist expenditures in Portugal, in the year 2008. The technique used is input-output analysis. The use of the input-output matrix of Portugal for the year of 2008, coupled with the generation of a final demand vector containing tourist expenditures, allows the calculation of various multipliers and the assessment of direct, indirect and induced effects of tourist expenditures on the Portuguese economy.

**Keywords:** Tourism, Economic Impacts, Input-Output Analysis

**JEL Codes:** B14, C67, L83

## GENERAL INDEX

	Page
GRAPHS INDEX .....	xi
TABLES INDEX .....	xi
ABBREVIATIONS LIST .....	xii
LATIN ABBREVIATIONS .....	xii
LIST OF VARIABLES AND ARRAYS.....	xiii
CHAPTER I – INTRODUCTION.....	1
CHAPTER II – LITERATURE REVIEW .....	6
2.1. - The input-output model .....	6
2.2. - The input-output model applied in tourism economic impact.....	10
2.3. - Economic tourism impact: The Portuguese experience .....	13
CHAPTER III – METHODOLOGY .....	15
3.1. - The input-output model .....	15
3.2. - Introduction to the input-output table.....	16
3.3. - Data sources.....	22
CHAPTER IV – DISCUSSION OF THE EMPIRICAL RESULTS AND CONCLUSIONS .....	26
4.1. - Income and employment impacts.....	26
4.2. - The leakage effect of Tourism.....	29
BIBLIOGRAPHY .....	31
Annexes .....	36

## GRAPHS INDEX

	Page
Graph 1.1. – Tourism consumption, in 2008 .....	2
Graph 1.2. – Inbound tourism consumption by specific and non-specific products, in 2008 .....	2
Graph 1.3. – Inbound tourism consumptions by specific products, in 2008 .....	3

## TABLES INDEX

	Page
Table 2.1. – Comparing the Characteristics of the Tourism Satellite Account, Input-Output Model, Social Accounting Matrices, and Computable General Equilibrium.....	9
Table 3.2.1. – The four quadrants of an input-output table .....	16
Table 3.2.2. – The national input-output table.....	18

## **ABBREVIATIONS LIST**

CGE	Computable General Equilibrium
DPP	Department of Foresight and Planning and International Affairs
DT	Domestic Tourism
GDP	Gross Domestic Product
GEE	Office Studies and Strategy
GVA	Gross Value Added
INE	National Institute of Statistics
IT	Inbound Tourism
PENT	National Strategic Plan for Tourism
SAM	Social Accounting Matrix
TSA	Tourism Satellite Account
WTO	World Trade Organization
WTTC	World Travel & Tourism Council

## **LATIN ABBREVIATION**

<i>e.g.</i> (exempli gratia)	for example
<i>et al.</i> (et alia)	and other
<i>etc</i> (et caetera)	and so on

## LIST OF VARIABLES AND ARRAYS

$A$	Input coefficients matrix
$e$	Exports vector
$F$	Final demand matrix
$f$	Final demand vector
$h$	Number of value added categories
$I$	Identity matrix
$i$	Index used to denote a vector
$j$	Index used to denote a sector
$L$	Leontief inverse matrix
$m$	Imports vector
$m$	Total imports of a country
$n$	Number of sectors
$k$	Number of final demand categories or items
$u$	Index used to denote a value added category
$x$	Gross output vector

## CHAPTER I – INTRODUCTION

The problem to be investigated with this dissertation is the evaluation of the Economic Impact of Tourism Expenditures in Portugal, in 2008. Tourism expenditures refer to as the amount paid for the purchase of consumption goods and services, as well as valuables, for own use or to give away, for and during tourism trips (Frechtling, 2011). The aim of this dissertation is to evaluate the effects of tourist expenditures on the Portuguese economy. The year chosen to do the analysis is 2008 to coincide with the latest available input-output matrix provided by the National Institute of Statistics in Portugal (INE) and constructed by Department of Foresight and Planning and International Affairs (DPP).

Why Tourism is a matter of interest for Portugal? And why rigorous studies designed to evaluate its impact on the Portuguese economy should be undertaken?

Portugal has a tourist activity that over the years has been growing and gaining some prominence worldwide, particularly since the 60s of the twentieth century.

Tourism is nowadays an important economic activity in Portugal. According to the Competitiveness Report of the 2008 “Travel & Tourism” sector, Portugal occupied the 15th place in a list of 130 countries in the ranking of competitiveness of the tourism sector. In a similar fashion, Amador and Cabral (2009) presented a detailed analysis concerning the evolution of the service sector in Portugal, showing a comparative advantage of the ‘Travel & Tourism’ sector. Moreover, according to WTTC (World Travel & Tourism Council, 2014), in 2013 the total contribution of tourism to Gross Domestic Product (GDP) in Portugal was about 25,6 billion Euros, corresponding to 15.6% of GDP<sup>1</sup>.

In 2008, according to preliminary data from INE, tourism generated approximately 5% of the Gross Value Added (GVA) representing about 7,3 billion Euros.

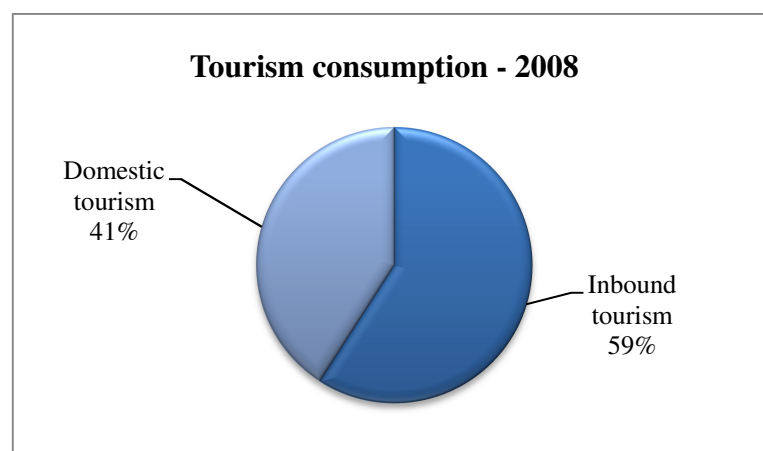
The major issuing countries of tourists to Portugal are: Germany, Spain, France, Netherlands and the United Kingdom. Curiously, Spain accounts for almost half of foreign tourists entering the Portuguese border and, on the whole, these five countries account for over four-fifths of these entries. In 2008, these countries taken together,

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<sup>1</sup> One billion is defined as one thousand million.

accounted for more than 65% of total tourism revenue, also indicate the figure regarding the inbound tourism only. Spain, Germany and the Netherlands occupy the third, fourth and fifth place, respectively, as generating revenue countries. In addition to inbound tourism demand, emphasis should also be attached to internal tourism demand. The interest in domestic tourism demand has been increasing, so it is unsurprising that one of the main goals of the National Strategic Plan for Tourism (PENT) (2006-2015) is precisely to "accelerate the growth of domestic tourism" (see graph 1):

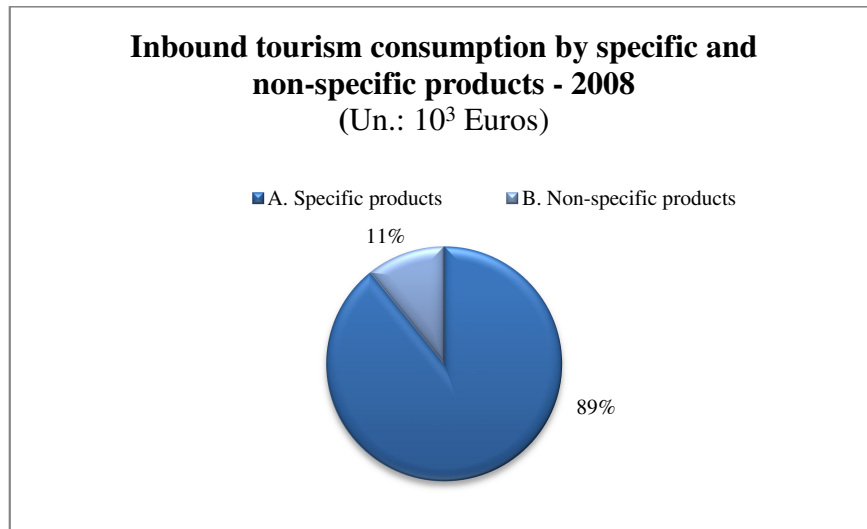
Graph 1.1. – Tourism consumption, in 2008



Source: Tourism Satellite Account, INE

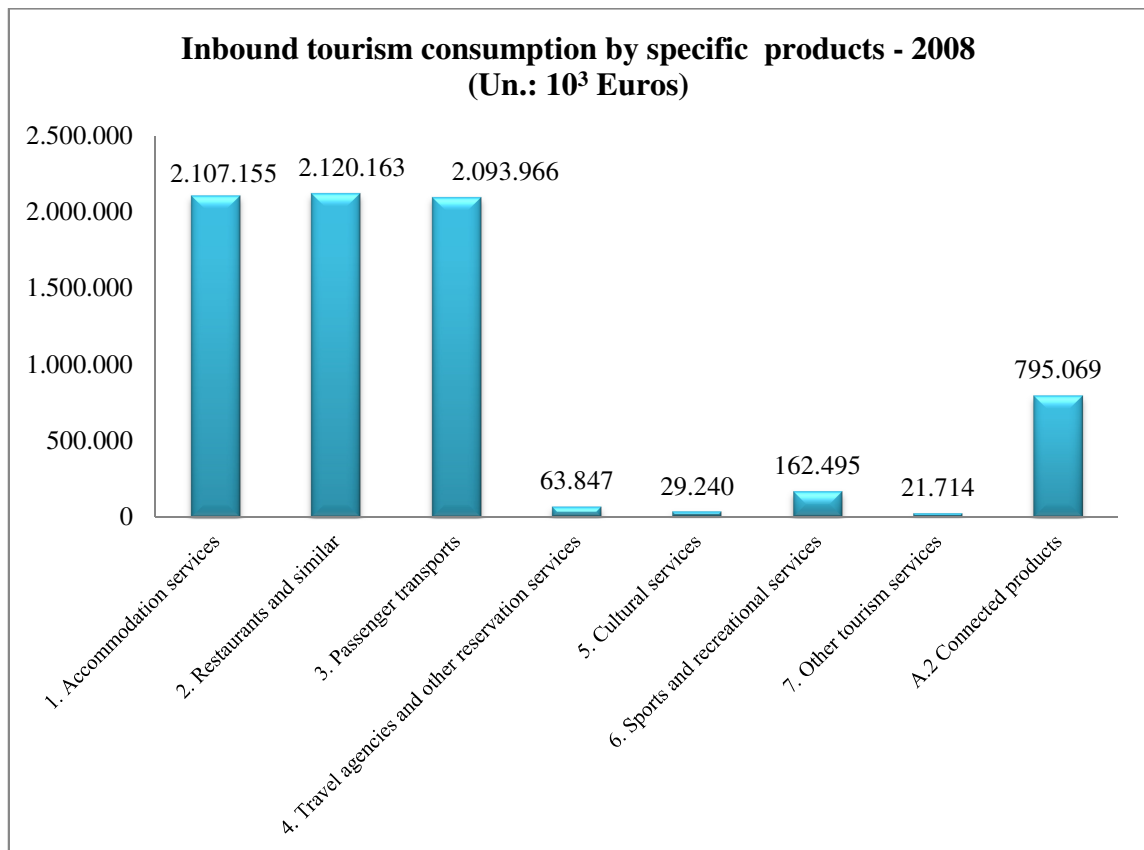
Graph 1.1. shows the importance of both inbound and internal tourism, despite the fact that the former is clearly dominant over the latter. Graph 1.2. shows the structure of inbound tourists consumption (excluding excursionists) *per* type of product. It is quite apparent that specific products of tourism represent the lion's share of consumption *vis a vis* to non-specific products.

Graph 1.2. – Inbound tourism consumption by specific and non-specific products, in 2008



Source: Tourism Satellite Account, INE

Graph 1.3. – Inbound tourism consumption by specific products, in 2008



Source: Tourism Satellite Account, INE

Further disaggregation of specific products, provides additional insight on the structure of inbound tourism consumption (see Graph 1.3.). It can be seen that three items taken together (accommodation, restaurants and transports) account for about 86% of total inbound tourism consumption on specific products.

Seasonality is an important feature as much as a major limitation of tourism at large. In the specific case of Portugal, the seasonal peak of tourism activities occurs during the warmer months of the year, notably July and August. This is because the Portuguese tourist model is mostly based upon the 'sun and beach' formula. Recently, there has been a serious effort, both from tourism authorities and private entrepreneurs, in order to smooth the seasonal cycle of tourism. Despite the occurrence of such efforts, it is commonly accepted that, given the peculiarities of the country, namely the characteristics of the natural capital stock of tourism, seasonality will remain a distinctive feature of tourism in Portugal and, therefore, should still be taken into account in the design and the implementation of development studies in the area (Daniel and Rodrigues, 2010).

It is very well established in the literature that tourism can be an effective instrument to increase the product, employment and welfare levels [Stabler, Papatheodorou and Sinclair (2010); Andereck, Valentine, Knopf and Vogt (2005); Balaguer and Cantavella-Jordá (2002)].

Papatheodorou (1999) refers to tourism as an industry of high importance for the world economy and for many countries as one of the largest single employers and exporting services sector. Yet, applied economists have paid little attention to the empirical examination of possible contributions of this sector to national economies, some authors refers that "*Tourism provides a lot of opportunities for sustainable economic development*" (Zaman, Vasile, Surugiu and Surugiu, 2010).

As regards the use of input-output based modelling techniques for Tourism Analysis purposes, Polo, Ramos, Rey-Maqueira, Tugores and Valle (2008) explain that the first applications took place back in the early 1960s and analysed the leisure phenomenon in general (Archer, 1976; Bryden, 1973). Since then, numerous applications of input-output analysis have been taken place either at the national and regional levels or even in the context of large tourist resorts. A frequent purpose associated with such applications is to calculating effects on output, income, employment and other macroeconomic variables as a result of tourist activities.

Notwithstanding the relevance of the subject, the number and quality of academic studies in this scientific area relating to the Portuguese context remain fairly limited. This dissertation intends to contribute to fill this gap by shedding light upon a number of practical questions, not least the assessment of the effectiveness of tourism to promote both economic growth and employment levels as well as having a positive effect on the equilibrium of the economy as a whole (*e.g.*, the external trade balance).

The remainder of this dissertation is organized as follows. Chapter I introduces the topic that will be addressed in this work. A brief review of the literature deemed relevant for the purpose of this dissertation is provided in Chapter II. The methodology of input-output in carrying out the assessment of the economic impacts of tourism activities, its advantages and limitations, as well as a brief description of some alternative methodologies, is the central concern of this chapter.

Chapter III presents the methodology used throughout this study. The adjustment of the total flows national matrix into a national production matrix is described in detail along with the explicit incorporation in the matrix of some of the most relevant tourism specific products. Such modifications are intended to generate the conditions for the calculation of a wide range of tourism multipliers for Portugal and the year of 2008.

Chapter IV is devoted to present and discuss the empirical results and conclusions following the application of the adopted methodology.

## CHAPTER II – LITERATURE REVIEW

### 2.1. - The input-output model

Input-output analysis became a well-known analytical technique in the field of tourism economic impact. In fact, it has been extensively used in the course of at least the last five decades. Some examples of such applications are provided by Los and Steenge (2010), Lee and Taylor (2005), Dwyer, Forsyth and Spurr (2004), Blake and Sinclair (2003), Tyrrell and Johnston (2001), Dwyer, Forsyth, Madden and Spurr (2000), Lin, Halbrendt, Liang & Wood (1999), Horváth and Frechtling (1999), Zhou, Yanagida, ChaKravority and Leung (1997), Archer and Fletcher (1996), Adams and Parmenter (1995), Johnson and Moore (1993) and Fletcher (1989), among many others.

The input-output model was originally developed in 1930 by the reputed economist Wassily Leontief. In 1953 Leontief proposed a dynamic version of the model. In recognizance of his contribution for the field of economic science, Leontief was awarded the Nobel Prize in the year of 1973. Since the 1970s, input-output models have been extensively employed to assess tourism impacts.

Input-output is seen as a useful framework to analysing various types of economic issues. Namely, it allows the calculation of multipliers of the economic activity. In particular, it is used to evaluate economic impacts of tourism (Surugiu 2009, Zhou *et al.* 1997).

Surugiu (2009) also emphasizes the idea of using input-output analysis as a methodological tool to measuring the economic impact of tourism, particularly at the local level. Multipliers calculated within an input-output framework are able to capture all sorts of effects sometimes expressed as a ratio of total to direct effects (Miller and Blair 2009; Cooper, Fletcher, Gilbert, Shepherd and Wanhill 1998).

Archer (1995) states that impact analysis is an economic approach used to measure *inter alia* the amount of income, government revenue, employment and import generated in

an economy by the direct and secondary (indirect and induced) effects of tourist expenditure.

The distinction between direct and indirect effects is a crucial one. According to Archer (1995), the direct effect is the initial impact on business establishments resulting from the purchasing activity by visitors. In a similar fashion, Lin *et al.* (1999) defines direct effect as the production change associated with a change in the visitor's demand for local goods and services; For example, meals purchasing by visitors in local restaurants. The income generated in the context of the restaurant's activity, as much as job's creation, additional imports and tax revenue, all represent examples of the direct effect.

Also according to Archer (1995), the indirect effect is defined as the additional effects created by the trading which takes place between the various sectors of the economy as a consequence of the initial export receipts. This effect refers to a secondary impact caused by new input requirements concerning those businesses which are directly affected by visitor's expenditures. Returning to the case of the local restaurant, an increase of the restaurant's production will require additional purchases of inputs of the restaurant to their suppliers (*e.g.*, food & beverage, water, electricity, among other consumables) which in turn will translate into additional production, income, employment and so forth. However, this is not the end of the story as the restaurant's suppliers must also increase their demand for inputs from their own suppliers, creating the opportunity for further increases in production, income and so forth. The total indirect effect is simply the result of aggregating over all secondary effects as described above.

Finally, induced effects result, according to Archer (1995), from further substantial effects generated by the re-spending of household incomes created as a direct or secondary consequence of the initial export earnings; for example, a fraction of the income generated in the context of the activities of both tourism entrepreneurs and their suppliers is paid to households in the form of salaries and wages. Households will then spend a large proportion of such additional income on all sorts of consumer goods which, in turn, will represent a further boost to production, income and so on. These changes represent the induced effects.

Even though input-output analysis has proved to be a suitable framework to calculating tourism multipliers, it can also be combined with other methodological approaches for

policy analysis such as optimization and scenario modelling. In the particular case of tourism economic impact, Social Accounting Matrices (SAM) and Computable General Equilibrium Models (CGE) are also popular analytical settings along with that provided by input-output. Depending on the specific purposes of each study and the data which is actually available, researchers often use SAM or CGE as alternative methods, or even a combination of methods to obtain multiplier values. Typically, the information contained in input-output tables is combined with that of Tourism Satellite Account (TSA) so a proper informational environment is set up to perform tourism economic impact analysis.

SAM can be seen as an extension of the input-output table. Because it provides more detail as compared to the input-output table, SAM shows an increased potential for policy analysis. Wei, Shuib, Ramachandran, and Herman (2013), Polo and Valle (2012) and Zhou *et al.* (1997) define SAM as a framework designed to capture income and expenditure flows of the economic actors/units over a specified accounting period. For Wei *et al.* (2013), SAM extends the intersectoral links of input-output tables by showing the links between production sectors and all institutions operating within the economy.

According to Zhou *et al.* (1997), SAM is also the primary data for CGE models. For Wei *et al.* (2013), SAM is an extension of input-output tables and TSA.

TSA allows one to obtain the size of the tourism sector, as well as its contribution to some of the main macroeconomic aggregates. This is accomplished in a manner which is fully consistent with the national systems of accounts (Dwyer *et al.* 2004). The World Tourism Organization (WTO) has developed a framework designed for the construction of TSAs and a number of governments are now seeking to put them in place. A TSA is essentially a form of static “snapshot” of the tourism sector with the rest of the economy as a scenario (WTO 1999).

Indeed, TSA just accounts for the direct effects of tourism while the indirect and induced effects are ignored altogether. In this way, an extension of this methodology with the incorporation of elements available in the input-output table could represent a potential solution (Smeral, 2006). Nevertheless, according to Pao (2005), TSA represents a major step forward in the measurement of the economic impact of tourism.

On the other hand, CGE can be seen as an extension of input-output in the sense that it fully incorporates and takes advantage of the inter-industry relations displayed in input-

output tables. In addition, CGE modelling extends the scope of its application to areas other than production; namely, consumption of commodities and distribution and redistribution of income. This means attaching more relevance to various institutions such as households and public administrations. Zhou *et al.* (1997) define the CGE method as an alternative tool for regional analysis, which incorporates general links between production structures, incomes of various groups, and demand patterns.

Table 2.1. provides a summarized comparison of the techniques discussed above.

Table 2.1. – Comparing the Characteristics of the Tourism Satellite Account, Input-Output Model, Social Accounting Matrices, and Computable General Equilibrium Model

Macroeconomic policy analysis tool	Level of effects on a macroeconomy	Shocks that can be analysed	Results	Strengths	Boundaries
TSA	Direct	Changes in visitor consumption by product	Tourism's contribution to GDP and employment by industry for a given year	Explicitly incorporates visitor demand by product and industry TSA is an account that is often updated annually and benchmarked every 5 years	Certain elements of direct impact only; cannot present details for different types of firms, households or other institutions
Input-Output	Direct, indirect and induced effects on output, income and employment	Changes in consumption by product or industry	National output, income, employment, value added	Well-understood, standardized construction and presentation	Assumes no constraints on availability of factors of production; that prices and wages do not vary; that distribution of factor inputs required by outputs does not vary
Social Accounting Matrix	Indirect and induced effects on output, income and employment; by disaggregated household s, firms and other institutions, products, types of demand and other elements of the macroeconomy	Changes in consumption by product or industry; changes in policy: tax rate, government spending, price inflation	National output, income, employment, value added; product prices, wages rates; broken down by type of household, labor and capital source	Disaggregates households, firms and other institutions, products, types of demand and other elements of the macroeconomy according to analytical needs and data resources	No standard methodology or presentation; same Boundaries as Input-Output model
Computable General Equilibrium models	Indirect and induced effects on output, income and employment; prices and wage rates by industry	Changes in consumption by product or industry; changes in policy: tax rate, government spending, price inflation	National output, income, employment, value added; product prices, wages rates; broken down by type of household, labor and capital source	Allows factor of production prices to vary; effects of resource constraints covered; all markets clear	No standard methodology or presentation; posited relationship equations, parameters, elasticities seldom made public; heavily dependent on assumptions requires massive input data that is seldom current; require validation against the actual economic

Source: UNWTO 2011

## **2.2. - The input-output model applied in tourism economic impact**

The interest of economists in tourism dates back to the period immediately after the World War II at which the rapid increase in *per capita* income in the Western economies took place along with a dramatic reduction of transport costs which in turn gave rise to mass international and domestic tourism. In the 1970s, international tourism has become a key export being responsible for significant levels of production, income, employment and tax revenues of the recipient countries (Archer 1982). At the same time, domestic tourism has also become an important source of revenue for regions, countries, cities and recreation areas (Archer 1982). Not surprisingly, input-output models (or approaches inspired by it) have been used since 1960 to quantify the impact of international tourism on national economies of large, medium and small size, as well as regions, cities and recreation areas worldwide (Polo *et al.* 2008).

Throughout the years, research has been conducted concerning the economic impact of tourism both at national and regional levels (Song, Dwyer, Li and Cao, 2012). At the national level one can mention the studies of Munjal (2013) for India, Atan and Arslanturk (2012) for Turkey, Zhong, Hara, Ro and Dickson (2011) for Florida, Surugiu (2009) for Romania, Filho and Guilhoto (2008) for Brazil, Pao (2005) for Macao, Arabsheibani and Labarthe (2002) for Peru, Kweka, Morrissey and Blake (2001) for Tanzania. Input-output models have also been applied to tourist oriented countries such as the Seychelles (Archer *et al.*, 1996) and Bermuda (Archer, 1995).

Archer (1995) analysed the contribution of tourist expenditures in the Bermudian economy, across three input-output studies, regarding the years of 1985, 1987 and 1992. The author investigated the contribution of tourism to exports, income, employment, and public sector revenue in Bermuda. Despite the fact that tourism appears to represent a significant contributor to the generation of income and revenue to the country's economy, the study also shows a diminishing contribution of tourist expenditures to employment, particularly in the most recent year (1992) as compared to 1985 and 1987.

Archer *et al.* (1996) evaluated the contribution of tourist expenditures on income by country of origin to the Seychelles economy. They concluded that tourist flows generated at various countries are associated with different impacts on the economy of

the Seychelles. Therefore, this type of comparative studies can represent a powerful tool for policy-makers.

Kweka *et al.* (2001) investigated the importance of the tourism sector in Tanzania, through input-output analysis focusing their attention on income, output, employment and tax revenue. They used the concept of multiplier to evaluate the significance of different sectors for the purpose of measuring, the international impacts of tourism expenditure in Tanzania. The authors concluded that tourism has a significant impact on output based upon strong inter-sector and linkages. In contrast, the income impact is insignificant, a result that is explained by the very low value added direct coefficient, due to the low level of wages in the sector. In Tanzania tourism shows potential to enhance economic growth.

Arabsheibani *et al.* (2002) used the Peruvian 1988 input-output table to analyse the effects of tourism expenditures on output, income and employment and to obtain the corresponding direct, indirect and induced effects. They concluded that tourism shows potential to generate significant economic benefits.

Filho *et al.* (2003) analyse the tourism contribution to the Brazilian economy concerning the year of 1999. The authors make use of an input-output matrix distinguishing between tourist and non-tourist sectors. The linkage index of Hirschmann-Rasmussen was also applied. The authors concluded by the existence of six key-sectors: regular air transportation, non-regular air transportation, travel agents and agencies, supporting activities of air transport, hotels and other types of temporary accommodation, restaurants and others food establishments. They stress the importance of implementing policies and programs to promote the development of the tourism sector in Brazil, as this sector contribute significantly to the growth of the economy.

A study carried out by Pao (2005) on the economic impact of tourism in the Chinese province of Macao, also presented methods to measuring the economic impact of tourism: Input-Output, CGE Models and TSA. The author refers to the importance that tourism multiplier effect has in other activities in the economy.

Surugiu (2009) analysed the economic impact of tourism in Romania, measuring the impact on hotels and restaurants, through input-output analysis. The main objective was to determine the role and importance of different economic aggregates such as value added, income and employment and to analyse the existing connections within the

economy. The author defines tourism as one of the largest, dynamic as well-developed sector of the Romanian economy. To illustrate the above statement, the author argues that tourism shows high growth rates and considerable volumes of foreign currency inflows. Furthermore, it affects various sectors of the economy, which contribute positively to the development of the tourism industry. The study concludes that tourism has a considerable contribution to GDP, a situation that is explained by the high degree of intersectoral connection of the tourism industry with non-tourist sectors, thereby rendering the indirect effect of tourism expenditures quite a significant one.

Zhong *et al.* (2011), based upon the activity of tourism industry of the metropolitan area of Orlando as a case study, investigated the effect on tourism as a result of the economic crisis of 2007, in the American state of Florida. The authors used an input-output model to quantify the impacts. They found large discrepancies between actual figures and those estimated by the model and concluded that the input-output model has a tendency to overstate the negative impacts of tourism.

Atan *et al.* (2012) used the 2002 input-output table from Turkey to analyse the tourism impact on the Turkish economy. They concluded that tourism is not a crucial sector but it has important and significant impacts on the economy.

Results show that tourist sectors like hotels, restaurants and transports, use large amounts of inputs supplied by the non-tourist sectors. The tourism sector is so viewed as a structure that, at some extent, feeds many non-tourist sectors of the economy a circumstance that, ultimately, has a considerable impact on growth.

Teigeiro and Díaz (2013) undertook a cross-country study based upon a battery of indicators, such as: tourism income multipliers, imports multipliers and Rasmussen's output multipliers. The authors used a sample of forty countries and concluded that the variables used to explain the size of tourism multipliers, namely the volume of tourists and the level of expenditure, were not found as statistically significant.

Munjaj (2013) attempted to measure the economic impact of the tourism industry in India using TSA and Input-Output analysis. The author concluded that tourism activity favoured investment in the development of the tourism industry which not only enhance tourism activity but also stimulates growth in other industries. He also stresses the importance of tourism to be viewed as an industry and to be treated as such.

Frechtling (2011) emphasizes the importance of TSA to facilitate a better knowledge of tourism demand and their contribution to the economy as a whole. The author something here is lacking the fact that TSA can be worked out together with Input-Output models, SAM, and CGE models, in order to provide valuable information to policy-makers.

Martin-Fuentes and Sarda (2014) studied the economic impact of tourism resulting from Summer University courses, in Spain, using input-output models. They concluded for the existence of positive results translated to more revenue, due to higher levels of consumption in the city.

It can be readily concluded that most of the papers emphasize the importance of input-output to highlight the positive impact that tourism has on several economies, and its influence in the development of many productive sectors.

### **2.3. - Economic tourism impact: The Portuguese experience**

The number of studies discussing the economic impact of tourism in Portugal is scarce. One example of such studies is provided by Bento and Santos (2012). In a similar fashion, studies focusing at the regional and local levels are also not too many. Some examples of the latter are Pereira, Bessa and Simões (2012), Silva (2009) and Eusébio (2006). Tourism is now recognized as a key sector within the set of productive activities of the country (Cunha 1997). The author refers that, in Portugal, tourism is very concentrated in the regions of Algarve, Lisbon and Madeira. Other regions of the country with a strong potential for tourism still wait development projects to be implemented. This may be partially explained by the fact that criteria for the development of Portuguese tourism projects are still based upon the same old fashion ideas of the early sixties; notably, the old fashion 'sun & sea' formula.

In fact, the scope of the country's tourism potential is much wider including many factors that contribute to enhancing its attractiveness: the favourable climate, the beauty of the coastline, the culinary diversity, rich heritage, culture and diverse physical environments offering multiple motivations within a relatively small geographical setting (Albuquerque and Godinho, 2001).

Pereira *et al.* (2012) examined the cultural and religious motivations for tourism at the local level. They focused their attention on the managers of hotels and restaurants of the northern city of Braga. The motivation of this study is to evaluate the tourist product 'culture and religion' thereby launching the bases for the tourist development of Braga and its surrounding area.

Pinto 2010, attempted about tourists in Lisbon more concretely what affect tourist satisfaction regarding Lisbon as tourism destination. This study was carried out based upon questionnaires. She concluded that the expectation of tourists was exceeded.

Barros, Butler and Correia (2010) studied the impact of golf related activities in the Algarve. This research was based on questionnaires. The authors examined the impact of this sport on the length of stay and concluded for the existence of positive results.

In Portugal there are some investigations based on input-output matrices. Some examples are: Eusébio (2006), Vaz, Belbute, Caleiro, Guerreiro and Eduardo (2012a) and Vaz, Belbute, Caleiro, Guerreiro and Eduardo (2012b).

Eusébio (2006) study was about evaluating the economic benefits of tourist expenditures to a particular tourist destination located at the Central Region of Portugal, using a rectangular input-output model that has been developed for the Central Region, for the year of 2003. Based upon an analysis of the daily expenditures of visitors, the Author concluded that housing and food and beverages were responsible for 64% of the total daily expenditure, followed by the acquisition of non-specific tourism products (fuel and services repair of motor vehicles and personal) representing about 23% of the total daily expenditure, while transport services occupy the fourth position with a share of 5.6%. However, this average structure of daily visitor spending shows statistically significant differences according to socio-demographic and economic profile of visitors and visit characteristics.

Vaz *et al.* (2012a) analysed the recent Portuguese experience of constructing regional input-output matrices. Namely, for the regions of the North, Centre, Algarve, Azores and Beira Interior. The authors highlighted the similarities and differences between the regions. In a separate investigation, the same authors constructed an input-output table for the Alentejo, region of Portugal, describing the various procedures and methodological issues involved with such exercise.

## CHAPTER III - Methodology

### 3.1. - The input-output model

Presently, the basic concepts set forth by Leontief represent key components of many types of economic analysis and, indeed, input–output analysis is one of the most widely applied method in economics (Hara, 2008 and Baumol, 2000).

The basic Leontief input–output model is generally constructed from observed economic data for a specific geographic region (nation, state, country, *etc.*). It is concerned with the activity of a group of industries that both produce goods to outputs and consume goods from inputs other industries in the process of producing each industry’s own output (Miller *et al.*, 2009).

The advantage of the input-output method is concerned with the use of the input-output table which allows one to take full advantage of the sectorial detail of the table.

Input-Output analysis has been extensively used to assess the economic impact of tourism on different national and regional economies. Some examples are those of Daniels (2004), Manente (1999), Herce and Sosvilla (1998), Freedman and Sultan (1997), Archer *et al.* (1996), Payeras and Sastre (1994), Briguglio (1993), Fletcher (1989), Archer (1985, 1995), Song and Ahn (1983), Santos, Oritz, Huang and Secretario (1983), Lin and Sung (1983), Fletcher, Snee and Macleod (1981), cited by Capó and Valle in 2008.

The input-output analysis has remote origins in Tableau *Économique* of Francois Quesnay, published in 1758. Quesnay divided French economy into three distinct classes: producers - farmers; owners - landlords; and sterile-class artisans and merchants. Quesnay gave a key contribution to the development of a general equilibrium system of Léon Walras contribution.

Frechting (2011) characterises the input-output model as have a shocks that can be analysed were the changes in consumption by product or in industry, the results of this method national output, income, employment, value added. The strengths well-understood are the standard methodology; standardized construction and presentation. The boundaries assumes no constraints an availability of factors of production; that

prices and wages do not vary; that distribution of factor inputs required by outputs does not vary.

The use of input–output models as a tool to estimating economic impacts of tourism has increased considerably in the past decades because of their ability to provide accurate and detailed information and the ease of interpreting the results (Fletcher 1989; Matias, Nijkamp and Sarmiento, 2008). In its simplest form, the input-output model incorporated quite strong assumptions such as those that establish the exogeneity of the final demand components (consumption, investment and exports). Other important assumptions of the model are: absence of price substitution effects in both intermediate and primary factors; foreign exchange rates are fixed; employment is perfectly elastic, meaning that there will be no shortages of labour, the same being applied to other resources of the Economy. Finally, the critical assumption of the model is that of constant technical coefficients meaning that the demand for inputs is a fixed proportion of the output.

### 3.2. - Introduction to the input-output table

An input-output table represents economic transactions taking place in a certain geographical area during a specific period, usually one civil year (see Table 3.2.1.).

Table 3.2.1. – The four quadrants of an input-output table

First Quadrant	Second Quadrant
Third Quadrant	Fourth Quadrant

Source: Sargento, 2002

The first quadrant of the table is a crucial one, as it displays the complex of inter-industry relations taking place within the economy. In other words, cells in the first quadrant show purchases of intermediate inputs made by industry sectors. Each column of the first quadrant yields the intermediate input structure of a certain industry sector, whereas each row indicates the sectorial sales structures.

The second quadrant displays final demand flows occurring within the economy. Each cell shows the amount of a certain commodity (or service) to satisfy a certain component of final demand. Each column shows the structure of commodities supplied to satisfy the corresponding final demand component. For example, the column concerning household consumption shows how such aggregate is distributed across commodities and services. Analogously, each row shows how a certain commodity or service is distributed across final demand components (consumption, investment and exports).

The third quadrant records the use of the so-called primary inputs (labour, capital or land), made by industry sectors. Hence, each cell shows the payment for a certain primary input made by a certain industry sector. For example, the remuneration of labour made by agricultural companies is shown in the cell intersecting the row of wages and salaries and the column allocated to the agriculture sector. Generally speaking, the third quadrant includes information on the structure of Value Added (wages and salaries and operating surplus), intermediate imports as well as indirect taxes on production and subsidies on production.

Finally, the fourth quadrant comprises the primary factors directly consumed by final demand. For example, the cell intersecting the column of private consumption (one of the components of final demand quadrant) and the row of wages and salaries (one of the components of value added) shows payments by households by household services they use.

With a national input-output table (see Table 3.2.2.):

Table 3.2.2. – A national input-output table

	1	2	...	N	1	...	K		
1	<b>Z</b>				<b>F</b>			<b>e</b>	<b>X</b>
2									
:									
n	<b>m'</b>				0			0	<b>m</b>
1	<b>V</b>				0			0	<b>V</b>
:									
h									
	<b>x'</b>				<b>y'</b>			<b>e</b>	

Source: Adapted from Hoen (2002)

According to Hoen (2002), block  $Z$  denotes intermediate flow operations. Thus, it is the section of the matrix representing the interaction activity among productive sectors of the economy. It shows the complex of mutual dependencies within the production sphere of the economy. The generic term  $Z_{ij}$  of the  $n$  by  $n$  matrix  $Z$ , denotes the intermediate deliveries from sector  $i$  to sector  $j$ .

A substantial fraction of the production is used directly for consumption or investment. The final demand blocks,  $F$  and  $e$ , include these deliveries. These contain flows of products used for consumption, investment, government expenditures, changes in inventories and exports. The generic element  $f_{ij}$  of matrix  $F$  denotes the deliveries from sector  $i$  to final demand category  $j$ . The  $n$ -vector  $e$  contains flows of products to satisfy the needs of non-resident economic agents (exports).

In order to carry out their normal activities, productive sectors also require primary inputs, such as labour, capital and land. The utilization of primary inputs requires corresponding payments for labour (wages and salaries), capital (profits and interests), and land property (rents). All these operations are recorded in the third quadrant of the matrix through block  $V$  which also includes net indirect taxes on production (indirect taxes less subsidies). Additionally, intermediate use of imported inputs is also included in this quadrant through vector  $m'$ . The generic term  $v_{uj}$  of matrix  $V$  denotes the amount of the value added category  $u$  used by sector  $j$ . The  $n$ -vector  $m'$  contains total

intermediate imports *per* sector. Of course, if imports were known *per* sector of origin,  $m'$  would become a square matrix  $M$  of  $n$  by  $n$  size.

Summation over the elements of the rows of the input-output table yields a  $n$ -vector  $x$  of sectoral outputs. Summation over the elements of the columns of each category of final demands yields a vector of total macro-economic demand  $y'$  and total exports  $e$ .

Summation over the rows of the input-output table yields total inputs *per* sector. Summation over the elements of the rows of the  $V$  – matrix yield a vector of total value added per sector  $v$ . Similarly, summation over the elements imports total imports  $m$ .

The national input-output table for Portugal is actually a transactions table constructed on the principles of double-entry bookkeeping. The elements in a row of an input-output table denote the outputs of a sector. Output is measured as the sum of money paid to this sector to obtain commodities from this sector. Inputs are measured as the sum of money paid by this sector to obtain commodities from the other sectors and primary inputs. Hence, the double entries stem from the fact that the row displays where the money of sector came from (and the commodities went to) whereas the column shows where the money of a sector went to (and the inputs came from). Total inputs of a sector and total output of this sector are equal to each other.

From the input-output table one can derive several relations and coefficients.

For the sake of simplicity of notation, suppose that final demand and exports are aggregated into one  $n$ -vector  $f$ . Then, total output equals

$$x = Zi + f \quad (1)$$

where  $i$  denotes a summation vector (every element is equal to 1) of appropriate length.

In matrix form of intermediate demands can be expressed as,

$$Z = A\hat{x} \quad (2)$$

Solving equation (2) for  $A$  gives,

$$A = Z\hat{x}^{-1} \quad (3)$$

$\hat{x}$  denotes a diagonal matrix of the elements of vector  $x$ . The elements of matrix  $A$  consist of input coefficients  $a_{ij}$  defined as the amount of product  $i$  required per unit of

output  $j$ . Mathematically, they are calculated by dividing the amount of input supplied to a certain sector to the output of that sector. In a formal manner:

$$a_{ij} = \frac{z_{ij}}{x_j} \quad (4)$$

Substituting equation (2) into (1):

$$x = Ax + f \quad (5)$$

or,

$$x = (I - A)^{-1}f = Lf \quad (6)$$

where  $I$  is an identity matrix of appropriate dimension and  $L$  is the Leontief inverse matrix derived from the input coefficient matrix  $A$ . A sufficient condition for the existence of the Leontief inverse matrix is that no column sum is larger than 1 while at least one column is smaller than 1:

$$\sum_{i=1}^n a_{ij} \leq 1 \forall j \quad \text{and} \quad \exists k \quad \text{with} \quad \sum_{i=1}^n a_{ik} < 1 \forall k \quad (7)$$

The Leontief inverse can also be expressed as a series of matrices based on the input coefficient matrix:

$$L = \sum_{i=0}^{\infty} A^i = I + A^1 + A^2 + A^3 + \dots \quad (8)$$

In its simplest version, the input-output model assumes that matrix  $A$  is constant over time, which implies that the input coefficients remain constant over time and for every level of output. The assumption of fixed inputs coefficients is associated with the so-called Leontief-type technology meaning that no substitution among inputs is possible. All inputs are required in fixed proportions implying a production process at constant returns to scale. Hence, if sector  $i$  doubles its output, it must double every entry in the corresponding column of the input-output table.<sup>2</sup> When the assumption of constant input coefficients is satisfied, it is possible to estimate total output in year  $t + 1$  if final demand in  $t + 1$  and the input-output table of the year  $t$  are known:

$$x_{t+1} = L_t f_{t+1} \quad (9)$$

---

<sup>2</sup> If the input-output table is expressed in money terms, this assumption will change slightly. Then, it is assumed that if sector  $i$  wants to double the value of its output, it has to double its expenses on every input.

Equation (9) determines output as a function of final demand. The assumed causality between final demand and total output shows how the Leontief inverse matrix handles indirect effects. Suppose, for example, that final demand of a country is known. This final demand is the direct effect: matrix  $I$  times vector  $f$  in equation (8). In order to satisfy the additional demand for their products, sectors buy inputs from each other, which is the first order indirect effect, matrix  $A$  times vector  $f$ , in equation (8). These inputs  $Af$  have to be produced as well, which requires additional inputs. Since this leads to another increase in demand, the process continues indefinitely, as reflected by the product of the matrices  $A^2$ ,  $A^3$ , *etc.*, with the vector  $f$  as in equation (8). These are the second and higher order indirect effects.

The process described above highlights the relationship between the input coefficients matrix ( $A$ ) and the Leontief inverse ( $L$ ). Matrix  $A$  contains the first order indirect effect, *i.e.* an element  $a_{ij}$  displays the amount of commodity  $i$  needed to produce one additional unit of commodity  $j$ . The Leontief inverse matrix incorporates all indirect effects plus the direct effect ( $I$ ). Element  $l_{ij}$  therefore displays the total increase in the output of commodity  $i$  as a result of one unit increase in the final demand for commodity  $j$ .

It is possible to use equation (9) to computing the effects of an increase in final demand, assuming that  $A_t$  is fixed<sup>3</sup>. Post multiplying the Leontief inverse matrix by a vector final demand changes ( $\Delta f$ ) result in a vector with changes in total output caused by the shifts in final demand ( $\Delta x$ ). Again, the Leontief inverse matrix shows the direct and indirect effects: if the demand for agricultural commodities increases, the production of agriculture increases (direct effect), and consequently agriculture has to buy more inputs from the other sectors in order to produce the increase in demand (first order indirect effect). Hence, demand increases in other sectors as well, leading to an increase in production for all sectors. This additional production requires further additional inputs, *etc.* (higher order indirect effects). Both the direct and the indirect effects of a one unit change in final demand are included in the Leontief inverse matrix. It shows the effects on total production of each sector due to a change in final demand of any sector or group of sectors.

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<sup>3</sup> This assumption implies that the marginal input coefficient is equal to the average input coefficient.

### **3.3. - Data sources**

The original aim of this dissertation is to estimate the impacts of tourism to the Portuguese economy, for the year of 2008.

In order to accomplish such a task, it was deemed useful to consult the existing database, provided by the INE. After some investigation it was decided to use the data contained in the National Accounts by activity sectors, including the input-output matrix for the year under study. The matrix used to evaluate the impacts is the national production input-output table at basic prices 2008 (P64 x P64), excluding imports. To assist this work it has become necessary to rely on a more disaggregated matrix, available on the work done by Dias and Domingos (2011), with this matrix 85x85 product-by-product, for the year 2008, in DPP. Those matrices provide detailed information on the national economy.

As far as tourism data is concerned, it was decided to use the TSA for 2008, also provided by the INE.

Input-output tables, as primary source of data, do not include an adequate classification of the tourism sector. Therefore, it was necessary to identify the tourist components of the elements composing the sectorial/product classification scheme of the Input-output matrices.

To obtain the necessary information for the measurement of the economic impacts of tourism activity on the national economy, it was necessary to combine the information of the input-output matrix with that of the TSA. Additionally, it was necessary to work out the aggregation scheme of the matrix products in order to isolate the products featured as specific to tourism, such as: accommodation, restaurants and transportation.

The sectoral aggregation scheme contained in the TSA is as follows: 1. Agriculture, forestry and fishing; 2. Extractive industry; 3. Manufacturing industry; 4. Electricity, gas and water; 5. Construction; 6. Wholesale and retail trade, restaurants and hotels; 7. Transport and communications; 8. Business activities; and 9. Other service activities.

The first step is looking at the information in the matrix and select the tourism products: “Water transport”; “Air transport”; “Accommodation”; “Restaurants”; “Rental services”; “Travel agency”; “Other tourism services”.

The second step is aggregating the remaining products in respect to their nature: for example instead of “Agriculture”, “Forestry” and “Fishing” put all together “Primary”. The same logic applies to “Extractive”. This activity is an aggregation of four products: coal, crude oil, natural gas produced and other extractive. As far as “Industry” is concerned, it is an aggregation of twenty three manufacturing products. In products “Energy” aggregate two products, the both matrices. “Construction” aggregates all construction activities: “Construction of building”, “Civil engineering works” and “Specialized construction works”. “Trade” aggregates three products. “Transport” aggregates over eight products, excluding water and air transport services, but this item aggregate the “Interurban railway transport” and “Long distance road transport” that has some importance for tourism activity. “Private services” aggregates over twenty products, representing the remaining private products. “Public services” aggregates over nine products consisting of public provisions by the Government and other public entities. Adjustment procedures lead to the generation of a 16x16 product-by-product matrix (see the aggregation in Annex A and Annex B).

Moreover, in order to attach extra realism to the analysis, it has been decided to further disaggregate the crucial sector “Accommodation and Restaurants”. To be more specific, this sector has been broken down into accommodation and restaurants, as it is well recognized that these two services are the most representative in terms of the typical tourist basket of goods. As it has done for the construction of the above matrix, it was necessary to readjust the product according to the TSA once again (see Annex B).

Calculation of the Leontief inverse matrix requires some manipulation. The first step is obtaining the so-called intermediate input coefficients matrix by dividing the elements in each column of the intermediate flows matrix by its corresponding total. Then, the input coefficients matrix is subtracted from a conformable identity matrix to obtain the so-called Leontief matrix which must then be inverted, see in Annex D - Intermediate input coefficients matrix 16x16 sectors.

Annex D displays a (16x16) matrix containing the intermediate input coefficients of the Portuguese economy for the year of 2008. Interpretation of the elements of the matrix is quite straightforward. For example, the element located at the intersection of the third row with the first column (0,2371) denotes the value of “Industry” products required to produce one unit of primary products (agriculture, forestry and fishing). Similar interpretation applies to the other elements of the matrix.

The set of the elements pertaining to the column concerned to a certain sector yields the intermediate input structure of that sector. Hence, the set of elements at the first column of the matrix provides a representation of the input structure of the Primary activities sector.

Annex E shows the contents of the Leontief inverse matrix. Each element of this matrix provides a quantitative measure of the impact on a particular sector output resulting from a unit change in final demand for a certain type of product. Elements of the matrix are also known as simple output multipliers. For example, the element located at the intersection of the third row with the first column (0,415) denotes the impact on the output of the “Industry” as a result of a unit change in the final demand for primary products. Furthermore, the total value concerned the first row of the matrix indicates the impact on the output of the whole economy resulting from a unit change in the final demand for “Primary” products.

According to the TSA nomenclature, there is a distinction between Inbound Tourism (IT) and Domestic Tourism (DT), the former concerning to non-residents visitors and the latter to resident visitors. Data inserted in the 2008 TSA allows one to conclude that IT and DT are responsible for 59% and 41% of total Tourism Consumption on the Economic Territory, respectively. Furthermore, the structure of consumption of IT is also quite different from that of DT. In fact, 88% of IT total consumption concerns to specific products of Tourism, while for DT such figure stands about 94%. As far as the spending structure is concerned, the main distinctive features between those two segments of Tourism are: Some types of services such as those delivered by travel agencies and tour operators, recreation & leisure, transports and other tourism services, represent a relatively large share of total spending by domestic tourists. In contrast, non-resident tourists spend relatively more in accommodation (23.8% against 15.6%), connected products (11.2% against 2%) and non-specific products (12.3% against 5.8%). Also notice that the share of total spending allocated to restaurant and similar services is identical for both segments of tourists (one fourth of total spending).

To achieved the vector based on TSA in order to the matrix 16x16 was necessary aggregated the “Water transport”, “Air transport”, “Accommodation”, “Restaurants”, “Rental services”, “Travel agency” with “3.3 Water transport”, “3.4 Air transport”, “1. Accommodation services”, “2. Restaurants and similar”, “3.6 Transport equipment rental services” and “4. Travel agencies and other reservation services”, respectively.

For the other products the procedure was to “Industry” aggregated “Goods” (Connected and Non-specific products), “Trade” included “Distribution margins” (Connected and Non-specific products), “Transport” involved “3.1 Interurban railway transport”, “3.2 Long distance road transport”, “3.5 Transport supporting services” and “3.7 Maintenance and repair of transportation equipment”, “Private services” included “Services” (Connected and Non-specific products), and finally “Other tourism services” combined “5. Cultural Services”, “6. Sports and recreational services” and “7. Other tourism services”, see Annex F.

Setting up the appropriate matrices and vectors represents a fundamental part of this dissertation leading to measuring the impact of tourist expenditures on the Portuguese economy.

In order to obtain the tourism vector was necessary multiplied the matrix through the vector to get the vector with the tourism impact coefficients, see in Annex G.

## **CHAPTER IV – DISCUSSION OF THE EMPIRICAL RESULTS AND CONCLUSIONS**

Firstly, it should be noted that, according to the results of this study, the impact of a one euro spending made by resident tourists does not seem to be much different with regard to non-resident tourists. Therefore, distinction between these two segments of tourists will be ignored throughout this study.

Total multiplier values obtained from the application of the input-output model are consistent with what would be expected for a relatively open and weakly integrated economy such as that of Portugal. Although the estimated value of the income multiplier (0,64) stands substantially below as compared to those reported in scientific journals for other countries, such discrepancy is actually explained by the fact that induced effects are not included within the estimate provided by the present study. For most cases, the induced effect account for a highly significant fraction of tourism multiplier estimates. The aforementioned income multiplier estimate means that, on average, for every euro spent by tourists in the Portuguese economic territory 64 cents of primary income are generated in the form of remuneration to production factors, such as wages and profits.

Looking at the results in more detail, it can be concluded that two major tourism characteristic activities (“accommodation” and “restaurant” services) represent the two most important items of tourist expenditure. Together, they account for 45.6% of total tourist expenditure (see Annex H). Also, in terms of their joint contribution to the main national macroeconomic aggregates such as gross output, income and employment, sectors producing the aforementioned services account for 4.1%, 5.4% and 5.8% of the respective national totals<sup>4</sup>.

### **4.1. - Income and employment impacts**

Accommodation and restaurant services stand among the most important contributors to the Tourism wealth generation process, as they account for about one-third of the total

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<sup>4</sup> Dias and Domingos (2011), with this matrix 85x85 product-by-product, for the year 2008, in DPP.

income effect. Additional relevant contributors are “Trade” and “Private services” which together account for 26% of the total income effect. Also notice the relatively modest contribution of some sectors producing goods and services directly purchased by tourists; it is the case of “Air transport” representing 17.1% of direct tourist expenditures, 8.8% of the total output effect but only 3.1% of the total income effect (see Annex H).

The performance of the “Accommodation” and the “Restaurant” sectors is therefore crucial to the effectiveness of Tourism as a tool to generating income as well as a job creator to the Portuguese economy.

At first glance, both sectors appear to be quite effective both in terms of income and employment. In fact, the direct income coefficients for “Accommodation” and “Restaurants” are 0,396 and 0,507, respectively. Both figures stand above the national average one of 0,362. With regard to the direct employment coefficients, the situation is not much different: 17 and 23 jobs created per million Euro for “Accommodation” and “Restaurants”, respectively, against a national average of 15 jobs created per million euro (Annex I).

Other items of tourism expenditure do not show comparable quality results. For example, “Air transport” ranks rather poorly in terms of either income or employment. Although at a lesser extent, a similar statement can be addressed to other sectors such as “Rental services” or “Travel agencies”.

However, the direct effect of tourism demand represents only part of the true story concerning the magnitude of the tourism multiplier. The output expansion that follows the initial change in tourism final demand will lead to increased demand for intermediate goods used by sectors such as “Accommodation” or “Restaurant” services. In this respect, it may prove instructive to look at the contents of the columns of the input coefficients matrix concerning those two sectors (see Annex H). It can be concluded that, although “Restaurant” services exhibit a high direct income coefficient, it is also much dependent upon intermediate inputs supplied by “Industry” representing 18.3% of its gross output. It is also a matter of fact that Industry does not show a similar ability to generate income. In this respect, “Industry” is one of the poorest activities among the 16 sectors composing the aggregation scheme used throughout this study: its direct income coefficient is a mere 0,2, significantly below the national average figure

of 0,362. This explains why, despite its high income generation potential as shown by its direct income coefficient, “Restaurant” services does not perform equally well in terms of total income impact: it contributes to the total income effect by 20.4% (Annex H). Yet, such figure is not even lower because the “Restaurants” sector also requires inputs from some highly income generating sectors, such as “Trade”; and also because the “Industry” sector itself, despite being largely dependent upon industrial and energy inputs, it also requires inputs from the “Trade” sector. Therefore, the Trade sector exercises a mitigating role as regards to the negative impact of low income inputs.

To some extent, what has just been said to the “Restaurant” sector also applies to the case of “Accommodation” services: it accounts for 20.4% of total tourist expenditure while its share of responsibility to the total income effect does not exceed 12.8% of the overall figure. Again, despite showing a strong direct income effect, “Accommodation” is largely dependent on “Industry” and “Energy” sectors (together represent 15.1% of Accommodation’s output) (Annex I).

A rather extreme example of a low income generation sector is that of “Air transport”. Besides being one of the poorest direct contributors to income (direct income coefficient of 0,111), “Air transport” also relies heavily on industrial inputs (23.7% of its output) and on “Transport” (22.4% of its output). The latter sector has a direct income coefficient standing well below the national average of 0,362. All in all, despite accounting for 17.1% of tourist expenditure, the “Air transport” sector yields a modest contribution to the total output effect (8.8%) and an even more modest one to income (3.1%) (Annex I).

Summarizing the income results, the most effective sectors appear to be “Private sectors”, “Trade” and “Transport” (excluding air transport). “Restaurant” services is the main absolute contributor to income but not as much effective as the aforementioned three sectors by the reasons explained above.

As far as employment is concerned, the overall picture is not much different from that of income. Yet again, “Restaurants” and “Accommodation” perform well as direct job creators. Their direct employment coefficients are 23 and 17 per million Euro, respectively, above the average national figure of 15 per million of Euro<sup>5</sup> (Annex I).

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<sup>5</sup> The direct employment coefficient is defined as the average number of employees per million euro of gross output. The overall national coefficient is 15.172 employees per million euro of output.

However, similarly to the case of income, too much dependence on industrial and/or energy inputs compromise their potential to promote employment indirectly through their connection networks with other sectors.

Even so, the fact that Industry exhibits a relatively better position in the sectoral league table as compared to that regarding income, allows both “Restaurants” and “Accommodation” to show a relative high level of effectiveness in terms of job generation. Also, the fact that “Primary” activities (by far, the most effective direct contributor to direct employment) is a major supplier to the industry, strengthens the role of both sectors as job creators.

Besides “Restaurants” and “Accommodation”, a special mention should be addressed to “Private services” (includes various tourism services such as recreational and sporting services). Its contribution to the total employment effect attains 12.4% even though its share of tourist expenditure does not exceed 1.9%, thereby rendering this sector an example of high effectiveness in terms of employment promotion. Other sectors deserving a positive mention are “Trade”, “Primary” activities and even “Industry”. On the negative side, the case of “Air transport” should be highlighted (Annex I).

#### **4.2. - The leakage effect of Tourism**

The leakage effect takes the form of ‘exit doors’ located at certain points of the economic circuit, each of which representing a specific escape modality. Some of these modalities reflect the lack of capacity of the national production system to satisfy resident unit’s new demands in the form of household consumption, intermediate consumption and investment by the corporate and government sectors.

Additional leakage modalities include profit expatriation mainly by multinational tourism companies, tax payments to the public administrations as well as contributions to the Social Security system. A further leakage source is saving. This is because whenever households decide to save, a certain monetary amount is withdrawn from the economic circuit so it will no longer be available for purchasing goods or paying for labour, among other economic operations.

In every case described above, failure of the national production system to fully satisfy market demands will translate into additional imports and the corresponding financial leakage thereby reducing the strength of the tourism multiplier process.

Given the available information, many leakage sources will be ignored altogether. Instead, attention will be confined to the imports effect resulting from failure of the national production system to meet either direct tourist demands or demand for intermediate inputs by national production units.

Looking at the set of direct import coefficients, it can be readily concluded that two sectors, “Air transport” and “Industry”, are especially prone to import intermediate inputs. Their coefficient values stand much above those regarding the remaining sectors: 0,369 and 0,360, respectively, against an average figure of 0,142 (Annex I). All other sectors, except “Energy”, show below-the-average coefficient values. In particular, “Restaurants” and “Accommodation” occupy mid-table places. Hence, it is not at all surprising that the two aforementioned sectors (“Industry” and “Air transport”) together account for almost two-thirds of the total imports effect. Therefore, these sectors represent the two main leakage channels through which part of the potential of tourist expenditure to benefit the Portuguese economy is lost.

As a final and most relevant conclusion out of the present study, the role of non-tourist sectors such as Industry and Energy to co-determine the size of economic effects resulting from tourist activities, should be emphasized. Such role comes mainly from the specific sectoral linkages involving tourist and non-tourist sectors. In particular, the specific linkage relating Industry to Restaurants as well as to Accommodation at a lesser extent. The fact that Restaurants and Accommodation both rely heavily on industrial and energy inputs, determines at large extent income, employment and imports effects of tourism expenditure.

For the purposes of tourism policy formulation to promote tourism activities and the optimization of its effects on the national economy, it is imperative to consider the possibility of carrying out a genuine and selective import substitution policy centered mainly on the inputs used by most major tourist sectors, in order to reduce the effect of financial drainage and boost the impact of tourist expenditure on income and employment.

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## ANNEXES

## Annex A – The adjustment at 64 products

<b>P64</b>	<b><i>Products</i></b>
	<b><u>Primary</u></b>
<b>01</b>	Products of agriculture, hunting and related services
<b>02</b>	Products of forestry, logging and related services
<b>03</b>	Fish and other fishing products; aquaculture products; support services to fishing
	<b><u>Extractive</u></b>
<b>B</b>	Mining and quarrying
	<b><u>Industry</u></b>
<b>10_12</b>	Food products, beverages and tobacco products
<b>13_15</b>	Textiles, wearing apparel and leather products
<b>16</b>	Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials
<b>17</b>	Paper and paper products
<b>18</b>	Printing and recording services
<b>19</b>	Coke and refined petroleum products
<b>20</b>	Chemicals and chemical products
<b>21</b>	Basic pharmaceutical products and pharmaceutical preparations
<b>22</b>	Rubber and plastics products
<b>23</b>	Other non-metallic mineral products
<b>24</b>	Basic metals
<b>25</b>	Fabricated metal products, except machinery and equipment
<b>26</b>	Computer, electronic and optical products
<b>27</b>	Electrical equipment
<b>28</b>	Machinery and equipment n.e.c.
<b>29</b>	Motor vehicles, trailers and semi-trailers
<b>30</b>	Other transport equipment
<b>31_32</b>	Furniture; other manufactured goods
	<b><u>Energy</u></b>
<b>D</b>	Electricity, gas, steam and air-conditioning

Annex A – The adjustment at 64 products (cont.)

<b>P64</b>	<b><i>Products</i></b>
	<b><u>Construction</u></b>
<b>F</b>	Constructions and construction works
	<b><u>Trade</u></b>
<b>45</b>	Wholesale and retail trade and repair services of motor vehicles and motorcycles
<b>46</b>	Wholesale trade services, except of motor vehicles and motorcycles
<b>47</b>	Retail trade services, except of motor vehicles and motorcycles
	<b><u>Transport</u></b>
<b>49</b>	Land transport services and transport services via pipelines
<b>52</b>	Warehousing and support services for transportation
<b>53</b>	Postal and courier services
<b>58</b>	Publishing services
<b>59_60</b>	Motion picture, video and television programme production services, sound recording and music publishing; programming and broadcasting services
<b>61</b>	Telecommunications services
<b>62_63</b>	Computer programming, consultancy and related services; information services
	<b><u>Private services</u></b>
<b>33</b>	Repair and installation services of machinery and equipment
<b>64</b>	Financial services, except insurance and pension funding
<b>65</b>	Insurance, reinsurance and pension funding services, except compulsory social security
<b>66</b>	Services auxiliary to financial services and insurance services
<b>L</b>	Real estate services
<b>69_70</b>	Legal and accounting services; services of head offices; management consulting services
<b>71</b>	Architectural and engineering services; technical testing and analysis services
<b>72</b>	Scientific research and development services
<b>73</b>	Advertising and market research services
<b>74_75</b>	Other professional, scientific and technical services; veterinary services
<b>78</b>	Employment services
<b>80_82</b>	Security and investigation services; services to buildings and landscape; office administrative, office support and other business support services
<b>95</b>	Repair services of computers and personal and household goods

Annex A – The adjustment at 64 products (cont.)

<b>P64</b>	<b><i>Products</i></b>
<b>96</b>	Other personal services
<b>T</b>	Services of households as employers; undifferentiated goods and services produced by households for own use
	<b><u><i>Public services</i></u></b>
<b>36</b>	Natural water; water treatment and supply services
<b>37_39</b>	Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services
<b>84</b>	Public administration and defence services; compulsory social security services
<b>P</b>	Education services
<b>86</b>	Human health services
<b>87_88</b>	Social work services
<b>94</b>	Services furnished by membership organisations
<b>U</b>	Services provided by extraterritorial organisations and bodies
	<b><u><i>Other services activities disaggregated</i></u></b>
<b>50</b>	Water transport services
<b>51</b>	Air transport services
<b>I</b>	Accommodation and Restaurants and similar
<b>77</b>	Rental and leasing services
<b>79</b>	Travel agency, tour operator and other reservation services and related services
	<b><u><i>Other tourism services</i></u></b>
<b>90_92</b>	Creative, arts and entertainment services; library, archive, museum and other cultural services; gambling and betting services
<b>93</b>	Sporting services and amusement and recreation services

Source: INE

## Annex B - The adjustment at 85 products

<b>P85</b>	<i><b>Products</b></i>
	<i><b><u>Primary</u></b></i>
<b>01</b>	Products of agriculture, hunting and related services
<b>02</b>	Products of forestry, logging and related services
<b>03</b>	Fish and other fishing products; aquaculture products; support services to fishing
	<i><b><u>Extractive</u></b></i>
<b>05</b>	Coal (includes anthracite) and lignite
<b>061</b>	Crude Oil
<b>062</b>	Natural gas produced
<b>07+08+09</b>	Other Extractive
	<i><b><u>Industry</u></b></i>
<b>10_12</b>	Food products, beverages and tobacco products
<b>13_15</b>	Textiles, wearing apparel and leather products
<b>16</b>	Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials
<b>17</b>	Paper and paper products
<b>18</b>	Printing and recording services
<b>19</b>	Coke and refined petroleum products
<b>20</b>	Chemicals and chemical products
<b>21</b>	Basic pharmaceutical products and pharmaceutical preparations
<b>22</b>	Rubber and plastics products
<b>23</b>	Other non-metallic mineral products
<b>24</b>	Basic metals
<b>25</b>	Fabricated metal products, except machinery and equipment
<b>26</b>	Computer, electronic and optical products
<b>27</b>	Electrical equipment
<b>28</b>	Machinery and equipment n.e.c.
<b>29</b>	Motor vehicles, trailers and semi-trailers
<b>30</b>	Other transport equipment
<b>31</b>	Furniture
<b>32</b>	Other manufactured goods

Annex B - The adjustment at 85 products (Cont.)

P85	<u>Products</u>
	<u>Energy</u>
351+353	Electricity, steam and hot and cold water and cold air
352	Natural gas distributed
	<u>Construction</u>
41	Construction of buildings
42	Civil engineering works
43	Specialized construction works
	<u>Trade</u>
45	Wholesale and retail trade and repair services of motor vehicles and motorcycles
46	Wholesale trade services, except of motor vehicles and motorcycles
47	Retail trade services, except of motor vehicles and motorcycles
	<u>Transport</u>
49	Land transport services and transport services via pipelines
52	Warehousing and support services for transportation
53	Postal and courier services
58	Publishing services
59	Motion picture, video and television programme production services, sound recording and music publishing
60	Programming and broadcasting services
61	Telecommunications services
62	Computer programming, consultancy and related services
63	Information services
	<u>Private services</u>
33	Repair and installation services of machinery and equipment
64	Financial services, except insurance and pension funding
65	Insurance, reinsurance and pension funding services, except compulsory social security
66	Services auxiliary to financial services and insurance services
6801+6802	Real estate services excluding imputed rents on owner-occupied housing
6803	Imputed rentals for owner-occupied housing

## Annex B - The adjustment at 85 products (Cont.)

<b>P85</b>	<i><b>Products</b></i>
<b>69</b>	Legal and accounting services
<b>70</b>	Serv. head offices; management consulting services
<b>71</b>	Architectural and engineering services; technical testing and analysis services
<b>72</b>	Scientific research and development services
<b>73</b>	Advertising and market research services
<b>74</b>	Other professional, scientific and technical services
<b>75</b>	Veterinary services
<b>78</b>	Employment services
<b>80</b>	Security and investigation services
<b>81</b>	Services to buildings and landscape
<b>82</b>	Office administrative, office support and other business support services
<b>95</b>	Repair services of computers and personal and household goods
<b>96</b>	Other personal services
<b>97</b>	Services of households as employers; undifferentiated goods and services produced by households for own use
	<i><b><u>Public services</u></b></i>
<b>36</b>	Natural water; water treatment and supply services
<b>37_39</b>	Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services
<b>84</b>	Public administration and defence services; compulsory social security services
<b>85</b>	Education services
<b>86</b>	Human health services
<b>87</b>	Social support services with accommodation
<b>88</b>	Social support services without accommodation
<b>94</b>	Services furnished by membership organisations
<b>U</b>	Services provided by extraterritorial organisations and bodies

## Annex B - The adjustment at 85 products (Cont.)

P85	<u>Products</u>
	<u>Other services activities disaggregated</u>
50	Water transport services
51	Air transport services
55	Accommodation services
56	Restaurants and similar
77	Rental and leasing services
79	Travel agency, tour operator and other reservation services and related services
	<u>Other tourism services</u>
90	Creative, arts and entertainment services
91	Library, archive, museum and other cultural services
92	Gambling and betting services
93	Sporting services and amusement and recreation services

Source: INE

## Annex C – Intermediate flows matrix 16x16 sectors (Un.: 10<sup>6</sup> Euros)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Primary	797,88	0,00	3346,17	0,00	0,21	46,45	1,30	79,83	69,19	0,00	0,00	17,38	190,86	0,04	0,07	0,74
2. Extractive	0,40	144,73	495,06	0,37	166,17	3,34	2,61	3,05	15,70	0,00	0,00	0,18	0,90	0,00	0,00	0,88
3. Industry	1544,23	155,60	13214,22	344,95	5299,12	1595,42	1524,99	1209,67	1260,16	29,32	456,62	215,07	1739,67	41,07	125,85	68,38
4. Energy	105,82	24,23	2008,34	7780,74	69,86	453,57	244,62	318,13	616,82	1,45	4,74	191,29	265,57	8,85	11,18	42,69
5. Construction	83,82	28,88	574,77	187,13	9985,79	748,67	510,42	910,65	592,96	10,94	4,59	42,69	38,54	144,44	45,01	100,72
6. Trade	448,40	84,90	3980,75	98,77	1064,47	1425,83	770,45	621,75	935,61	18,08	86,89	131,57	1140,02	63,83	20,63	41,25
7. Transport	129,66	53,51	2124,99	257,85	199,40	2019,14	4611,01	2455,75	1332,00	92,69	431,72	101,87	90,22	49,49	29,90	58,63
8. Private services	241,84	66,05	3877,40	641,16	1287,72	6163,61	3337,72	12918,56	3032,32	42,48	145,77	401,27	291,12	359,65	166,30	478,59
9. Public services	31,56	2,72	672,03	40,60	55,17	158,57	146,24	310,07	2582,55	7,52	8,99	43,53	45,08	7,05	2,75	54,12
10. Water transport	2,00	0,04	45,50	0,07	2,39	10,96	1,83	0,61	5,50	71,54	0,00	0,02	0,94	0,01	1,28	0,02
11. Air transport	2,41	0,68	38,38	0,63	20,74	58,87	24,63	63,51	66,07	0,10	22,57	5,77	2,01	1,58	48,80	3,81
12. Accommodation	2,42	0,74	38,79	0,69	23,93	57,20	23,15	83,93	18,50	0,12	1,09	8,95	2,10	1,67	6,58	4,89
13. Restaurants	5,73	1,25	56,91	4,60	12,44	161,73	47,35	53,65	629,22	1,31	11,08	19,16	25,56	1,22	3,32	24,20
14. Rental services	3,43	1,41	223,91	28,70	53,35	437,69	287,91	376,03	106,18	50,25	22,81	38,98	37,50	177,05	20,66	42,93
15. Travel agency	0,77	0,36	21,06	0,34	3,13	31,85	15,17	49,48	13,56	0,06	140,53	1,03	0,41	1,11	47,14	18,55
16. Other tourism services	0,10	0,05	2,38	0,08	1,35	2,83	60,86	57,70	195,29	0,00	0,00	6,18	2,16	0,00	0,79	149,25

Source: INE

## Annex D – Intermediate input coefficients matrix 16x16 sectors

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Primary	0,1225	0,0000	0,0671	0,0000	0,0000	0,0014	0,0001	0,0012	0,0016	0,0000	0,0000	0,0065	0,0201	0,0000	0,0001	0,0003
2. Extractive	0,0001	0,1294	0,0099	0,0000	0,0058	0,0001	0,0001	0,0000	0,0004	0,0000	0,0000	0,0001	0,0001	0,0000	0,0000	0,0004
3. Industry	0,2371	0,1391	0,2651	0,0282	0,1836	0,0488	0,0646	0,0176	0,0294	0,0647	0,2372	0,0803	0,1834	0,0175	0,1596	0,0309
4. Energy	0,0163	0,0217	0,0403	0,6360	0,0024	0,0139	0,0104	0,0046	0,0144	0,0032	0,0025	0,0714	0,0280	0,0038	0,0142	0,0193
5. Construction	0,0129	0,0258	0,0115	0,0153	0,3459	0,0229	0,0216	0,0133	0,0138	0,0242	0,0024	0,0159	0,0041	0,0614	0,0571	0,0456
6. Trade	0,0689	0,0759	0,0799	0,0081	0,0369	0,0436	0,0326	0,0091	0,0218	0,0399	0,0451	0,0491	0,1202	0,0271	0,0262	0,0187
7. Transport	0,0199	0,0478	0,0426	0,0211	0,0069	0,0617	0,1952	0,0358	0,0310	0,2047	0,2242	0,0380	0,0095	0,0211	0,0379	0,0265
8. Private services	0,0371	0,0591	0,0778	0,0524	0,0446	0,1884	0,1413	0,1883	0,0706	0,0938	0,0757	0,1498	0,0307	0,1530	0,2110	0,2166
9. Public services	0,0048	0,0024	0,0135	0,0033	0,0019	0,0048	0,0062	0,0045	0,0602	0,0166	0,0047	0,0162	0,0048	0,0030	0,0035	0,0245
10. Water transport	0,0003	0,0000	0,0009	0,0000	0,0001	0,0003	0,0001	0,0000	0,0001	0,1580	0,0000	0,0000	0,0001	0,0000	0,0016	0,0000
11. Air transport	0,0004	0,0006	0,0008	0,0001	0,0007	0,0018	0,0010	0,0009	0,0015	0,0002	0,0117	0,0022	0,0002	0,0007	0,0619	0,0017
12. Accommodation	0,0004	0,0007	0,0008	0,0001	0,0008	0,0017	0,0010	0,0012	0,0004	0,0003	0,0006	0,0033	0,0002	0,0007	0,0083	0,0022
13. Restaurants	0,0009	0,0011	0,0011	0,0004	0,0004	0,0049	0,0020	0,0008	0,0147	0,0029	0,0058	0,0072	0,0027	0,0005	0,0042	0,0110
14. Rental services	0,0005	0,0013	0,0045	0,0023	0,0018	0,0134	0,0122	0,0055	0,0025	0,1110	0,0118	0,0145	0,0040	0,0753	0,0262	0,0194
15. Travel agency	0,0001	0,0003	0,0004	0,0000	0,0001	0,0010	0,0006	0,0007	0,0003	0,0001	0,0730	0,0004	0,0000	0,0005	0,0598	0,0084
16. Other tourism services	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0026	0,0008	0,0045	0,0000	0,0000	0,0023	0,0002	0,0000	0,0010	0,0675
Value added at basic prices	0,4778	0,4947	0,3836	0,2327	0,3680	0,5911	0,5084	0,5991	0,7328	0,2803	0,3053	0,5428	0,5917	0,6355	0,3274	0,5069

Source: INE

## Annex E - Inverse Leontief matrix sectors

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Primary	1,1719	0,0212	0,1113	0,0119	0,0327	0,0107	0,0118	0,0056	0,0081	0,0147	0,0327	0,0204	0,0462	0,0060	0,0260	0,0090
2. Extractive	0,0052	1,1522	0,0169	0,0024	0,0151	0,0018	0,0022	0,0009	0,0015	0,0027	0,0051	0,0023	0,0037	0,0016	0,0046	0,0023
3. Industry	0,4149	0,2696	1,4461	0,1494	0,4212	0,1103	0,1463	0,0497	0,0718	0,1823	0,4176	0,1607	0,2973	0,0717	0,3265	0,1008
4. Energy	0,1088	0,1108	0,1794	2,7737	0,0682	0,0621	0,0608	0,0256	0,0573	0,0522	0,0772	0,2268	0,1227	0,0272	0,0952	0,0808
5. Construction	0,0441	0,0657	0,0475	0,0788	1,5493	0,0527	0,0566	0,0313	0,0323	0,0837	0,0436	0,0467	0,0267	0,1124	0,1210	0,0937
6. Trade	0,1270	0,1252	0,1409	0,0465	0,1036	1,0665	0,0635	0,0210	0,0384	0,0898	0,1063	0,0781	0,1604	0,0463	0,0779	0,0438
7. Transport	0,0724	0,1053	0,1084	0,0967	0,0562	0,1050	1,2715	0,0626	0,0569	0,3393	0,3343	0,0831	0,0517	0,0491	0,1168	0,0662
8. Private services	0,1488	0,1721	0,2166	0,2301	0,1701	0,2901	0,2650	1,2598	0,1282	0,2758	0,2553	0,2594	0,1281	0,2404	0,3797	0,3408
9. Public services	0,0144	0,0097	0,0247	0,0142	0,0115	0,0097	0,0127	0,0076	1,0668	0,0287	0,0161	0,0231	0,0119	0,0066	0,0131	0,0325
10. Water transport	0,0009	0,0004	0,0017	0,0002	0,0007	0,0006	0,0003	0,0001	0,0003	1,1879	0,0007	0,0002	0,0005	0,0001	0,0025	0,0002
11. Air transport	0,0013	0,0016	0,0019	0,0008	0,0020	0,0026	0,0020	0,0014	0,0021	0,0015	1,0181	0,0030	0,0010	0,0013	0,0681	0,0032
12. Accommodation	0,0013	0,0016	0,0019	0,0008	0,0021	0,0025	0,0019	0,0017	0,0009	0,0015	0,0025	1,0041	0,0010	0,0014	0,0101	0,0032
13. Restaurants	0,0027	0,0028	0,0034	0,0021	0,0022	0,0061	0,0036	0,0015	0,0163	0,0056	0,0085	0,0087	1,0043	0,0014	0,0066	0,0132
14. Rental services	0,0070	0,0077	0,0128	0,0114	0,0088	0,0196	0,0205	0,0091	0,0058	0,1514	0,0253	0,0213	0,0101	1,0849	0,0388	0,0275
15. Travel agency	0,0008	0,0010	0,0012	0,0005	0,0008	0,0017	0,0014	0,0012	0,0008	0,0010	0,0798	0,0011	0,0006	0,0010	1,0695	0,0103
16. Other tourism services	0,0005	0,0006	0,0007	0,0006	0,0005	0,0007	0,0038	0,0014	0,0055	0,0014	0,0014	0,0031	0,0006	0,0004	0,0019	1,0731

Source: INE

Annex F – Allocation of TSA items to Input-Output Matrix sectors

<b>Tourism expenditure items</b>	<b>16x16 Input-Output Matrix</b>	
	1	Primary
	2	Extractive
Goods (Connected and Non-specific products)	3	Industry
	4	Energy
	5	Construction
Distribution margins (Connected and Non-specific products)	6	Trade
3.1 Interurban railway transport	7	Transport
3.2 Long distance road transport		
3.5 Transport supporting services		
3.7 Maintenance and repair of transportation equipment		
Services (Connected and Non-specific products)	8	Private services
	9	Public services
3.3 Water transport	10	Water transport
3.4 Air transport	11	Air Transport
1. Accommodation services	12	Accommodation
2. Restaurants and similar	13	Restaurants
3.6 Transport equipment rental services	14	Rental services
4. Travel agencies and other reservation services	15	Travel agency
5. Cultural Services	16	Other tourism services
6. Sports and recreational services		
7. Other tourism services		

Source: INE

## Annex G – Structure of tourism expenditure

16x16 Input-output Matrix		TSA in relative terms		
		Tourism on the economic territory	Inbound tourism	Domestic tourism
1	Primary	0,0000	0,0000	0,0000
2	Extractive	0,0000	0,0000	0,0000
3	Industry	0,1043	0,1506	0,0376
4	Energy	0,0000	0,0000	0,0000
5	Construction	0,0000	0,0000	0,0000
6	Trade	0,0475	0,0663	0,0204
7	Transport	0,0536	0,0498	0,0592
8	Private services	0,0190	0,0182	0,0201
9	Public services	0,0000	0,0000	0,0000
10	Water transport	0,0019	0,0002	0,0044
11	Air transport	0,1706	0,1594	0,1869
12	Accommodation	0,2044	0,2382	0,1556
13	Restaurants	0,2520	0,2520	0,2521
14	Rental services	0,0295	0,0322	0,0255
15	Travel agency	0,0408	0,0072	0,0893
16	Other tourism services	0,0763	0,0259	0,1490

Source: INE

Annex H – Tourism economic effects (Un: In relative terms)

<b>16x16 Input-Output Matrix</b>		<b>Gross output</b>	<b>Income</b>	<b>Employment</b>	<b>Imports</b>
1	Primary	0,0362	0,0113	1,9696	0,0038
2	Extractive	0,0047	0,0014	0,0570	0,0003
3	Industry	0,3674	0,0733	3,7408	0,1322
4	Energy	0,1268	0,0133	0,0873	0,0220
5	Construction	0,0504	0,0147	0,7529	0,0042
6	Trade	0,1518	0,0719	3,2543	0,0108
7	Transport	0,1846	0,0598	1,6552	0,0158
8	Private services	0,2525	0,0972	3,4538	0,0109
9	Public services	0,0176	0,0103	0,3924	0,0009
10	Water transport	0,0029	0,0003	0,0143	0,0003
11	Air Transport	0,1781	0,0199	0,5391	0,0658
12	Accommodation	0,2071	0,0819	3,4547	0,0154
13	Restaurants	0,2585	0,1310	6,0143	0,0209
14	Rental services	0,0507	0,0132	0,3516	0,0017
15	Travel agency	0,0588	0,0147	0,6372	0,0033
16	Other tourism services	0,0833	0,0274	1,3659	0,0054
	<b>Total</b>	<b>2,0314</b>	<b>0,6418</b>	<b>27,7403</b>	<b>0,3138</b>

Source: INE

Annex I – Direct coefficients

<b>16x16 Input-Output Matrix</b>		<b>Income</b>	<b>Employment</b>	<b>Imports</b>
1	Primary	0,310529551	0,054354196	0,105226321
2	Extractive	0,30059295	0,012186397	0,065541575
3	Industry	0,199523553	0,01018084	0,359922392
4	Energy	0,104701994	0,000688377	0,173649694
5	Construction	0,292578006	0,014951357	0,083516498
6	Trade	0,473898647	0,021441504	0,070829331
7	Transport	0,323992708	0,008964369	0,085447296
8	Private services	0,385178656	0,013680218	0,043299262
9	Public services	0,584912581	0,022284234	0,051193342
10	Water transport	0,118204732	0,004843409	0,107029154
11	Air Transport	0,111478979	0,003026922	0,369429109
12	Accommodation	0,395705622	0,01668326	0,074400209
13	Restaurants	0,506616415	0,023264161	0,080823906
14	Rental services	0,261073997	0,006935779	0,033680896
15	Travel agency	0,250525982	0,010845002	0,056455767
16	Other tourism services	0,329166857	0,01639816	0,064550827