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# **VISIONS FOR GLOBAL TOURISM INDUSTRY – CREATING AND SUSTAINING COMPETITIVE STRATEGIES**

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Edited by **Murat Kasimoğlu**

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## **Visions for Global Tourism Industry – Creating and Sustaining Competitive Strategies**

Edited by Murat Kasimoğlu

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## Preface

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Today, it is considered good business practice for tourism industries to support their micro and macro environment by means of strategic perspectives. This is necessary because we cannot contemplate companies existing without their environment. If companies do not involve themselves in such undertakings, they are in danger of isolating themselves from the shareholder. That, in turn, creates a problem for mobilizing new ideas and receiving feedback from their environment. In this respect, the contributions of academics from international level together with the private sector and business managers are eagerly awaited on topics and sub-topics within Strategies for Tourism Industry-Micro and Macro Perspectives.

The books based on three main sections. First section is Tourism Industry: Micro and Macro Topics For Strategy Development has consisted of eight chapters relate with developing strategies from micro and macro approaches. Second section is Tourism Industry: Macro Perspective has consisted of six chapters relate with macro perspective of tourism industry from different approaches. Third section is Tourism Industry: Different Topics for Strategy Development relate with eclectic topic of tourism industry. Each paper has valuable conurbation to understand industry from visionary perspective.

In this book, I am pleased to present many papers from all over the world that discuss the impact of tourism strategies. It is our hope that you will find the opportunity to extend your vision in the light of such scientific discussion.

Editing a book relies on intensive team work and the contribution of various bodies such as companies and NGO's. Firstly, I am always aware of the contribution of my colleagues, whose vision inspired us to commence this project.

Secondly, I would like to express my appreciation for having the chance to work with practitioners whose visions and contribution made me aware of real need of industries...

Thirdly, I am most thankful to the writers of the book. It is a real pleasure to work with you in such an efficient and productive way that I hope we will continue in the future.

Lastly, I owe a great debt to our organizing team who has worked hard to ensure the success of this international book. Without **INTECH publishing** involvement and heart-felt commitment this book would not have come about. In particular, I would like to state my gratitude for the efforts of Maja Kisic and Vana Persen.

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## **Section 1**

### **Tourism Industry – Development Strategy**



# Sustainable Tourism – A Model Approach

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## 1. Introduction

Sustainable tourism, sustainable development through tourism, principles of sustainable development in tourism and tourism development in terms of sustainable tourism, in the literature often treated as names for the same phenomenon, are becoming increasingly interesting for scholars and practitioners of tourism from various countries. It results from the fact that sustainable tourism (at least declaratively – on the institutional level) is considered as the most desirable form of tourism development on particular reception areas, especially those which preserved the most natural and cultural authenticity values.

Simultaneously, it should be noted that the rich scientific literature concerning sustainable tourism focuses attention primarily on descriptive presentation of its various aspects, with particular emphasis on the idea, the origins and the evolution of the phenomenon as well as terminological issues related to it. The authors pay much attention to reveal the relationships between sustainable tourism (as a form of tourism development) and particular types of tourism (as forms of tourist movement). At the same time, it should be marked that there are skeptical voices, which refer especially to the role that sustainable tourism is ascribed – as a remedy for all the problems of contemporary tourism. It also seems that, taking into consideration the hitherto scientific output related to sustainable tourism, the works devoted the theoretical aspects of sustainable tourism are in minority.

Relatively weak theoretical grounds together with the ambiguity and diversity of views on sustainable tourism as well as the descriptive approach, which dominates in the literature, have prompted the author of this article to make an attempt to render the essence of sustainable tourism in a model approach. When creating the theoretical model of sustainable tourism, the author tried to take into consideration all its main features (and interrelations occurring among them) and to simultaneously follow certain main principles, i.e.: of completeness, versatility, explicitness and simplicity of the model itself. The author is aware of the fact that attempts to render sustainable tourism in a model approach had already been made, but it seems that they concerned, in majority, its particular aspects, such as the origins of the phenomenon, its relationships with certain forms of tourist movement or relationships between sustainable development and tourism. However the literature lacked a holistic approach which would take into consideration all most important features of sustainable tourism.

When constructing the theoretical model of sustainable tourism, the author tried to take into consideration the hitherto output of the Polish and international literature, available thanks to the studies of source materials. It enabled the adoption of main model assumptions, and later on, when implementing the deductive method, also the construction of the model itself basing on them. To that end, the author used the form of the mathematical function and notation.

## 2. Sustainable tourism – A review of main ideas

The conception of sustainable tourism refers to the wider conception of sustainable development, which stresses the need of rational management of natural environment resources. The first in the global scale sign of the necessity of change in the general conception of economic development was the report of the Secretary-General of the United Nations U Thant entitled 'Man and His Environment', published in 1969. Significant was also the 1<sup>st</sup> Report of the Club of Rome entitled 'Limits to Growth', published in 1972. The problems of the threat to the natural environment were the main subject of discussion during the UN conference in Stockholm (the so called Stockholm Conference), organised in the same year. At that time, the term 'sustainable development' was introduced. The next milestone in the worldwide discussion on sustainable development was the publication of the report entitled 'Our Common Future', which contained a summary of the activity of the World Commission on Environment and Development (the so called Bruntland Commission). This document adopted the fundamental, still valid, assumption that sustainable development 'seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future'. In 1992 in Rio de Janeiro the United Nations Conference on Environment and Development (the so called 'Earth Summit') took place. During that conference two documents, significant from the point of view of the sustainable development conception, were adopted. These were the so called Rio Declaration, containing 27 principles defining rights and duties of nations in the field of sustainable development, and AGENDA 21, the global action plan referring to the actions necessary in order to achieve sustainable development and high life quality (Kowalczyk, 2010; Niezgoda, 2006).

Conceptions of tourism development referring to the principles of sustainable development began to appear in the international literature on a larger scale in the mid 1980s. It should however be noted that as early as 1965 W. Hetzer formulated the definition of the so called *responsible tourism*, which in fact was very close to these principles [Blamey, 2001, as cited in Kowalczyk, 2010]. It seems, though, that the moment which began the discussion on new ways of developing tourism was when the conception of the so called *alternative tourism*<sup>1</sup> arose. J. Krippendorfer, who published in the *Annals of Tourism Research* in 1986 the article entitled 'Tourism in the system of industrial society', is considered the author of its definition. As the name itself suggests, it arose in opposition to the so called mass tourism, viewed by the proponents of this conception as the so called 'bad option'. Alternative tourism, often identified with small-scale tourism and treated as the 'good option', was meant to oppose the 'bad option' (Clarke, 1997; Lanfant, Graburn, 1992; Weaver, 2001).

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<sup>1</sup> A. Niezgoda [2006] claims that the conception of alternative tourism stems from the so called Hippie contrculture, which arose in the 1960s in the USA and later spread in Europe. In this context, alternative tourism was meant to be the new way of travelling that would not destroy the environment and authentic relations between people.

In the same period various conceptions connected with the so called ecotourism began to appear in the international literature. H. Ceballos-Lescuráin (1987) is considered the author of its first definition. At the same time scholars began to introduce terms similar to *ecotourism* or *alternative tourism* such as *green tourism* (*tourisme vert*, *nature-based*, *naturnäher*), *soft tourism* (*safer Tourismus*), *nature tourism*, *environmental friendly/environmentally sensible tourism*, *responsible tourism* (*angepast*), *discreet tourism*, *appropriate tourism*, *ecoethnotourism* (Boo, 1990, Cater, Lowman, 1994, Krippendorf et al., 1998; Niezgoda, 2006). It should be noted that the authors of these definitions stressed first of all the (desired) way of cultivating tourism, types of values (mainly natural) and the (small) scale of the phenomenon. They often used the evaluating approach which juxtaposed the 'new' forms of tourism with these 'old', often identified with mass tourism.

A broad overview of diverse definitions of sustainable tourism was included in R.W. Butler's paper entitled 'Sustainable tourism: a state-of-the-art review' (1999). This author, who is skeptic towards views that sustainable tourism constitutes a panaceum for contemporary tourism's problems, presents his own view on its essence. He claims that sustainable tourism can be seen in two ways (Butler, 2005). Firstly, from the semantic-dictionary side, taking into consideration its feature of sustainability as a warranty of long-term survival on the market. According to M. Mika (2008) such an approach seems to be closer to the representatives of the economic party, who stress the problem of self-maintenance of tourism development. The second way of understanding sustainable tourism by Butler is much closer to the conception of sustainable development. It suggests treating sustainable tourism as a tool for the development of reception areas without breaking the principles of sustainable development. As one may guess, this attitude is closer to the representatives of the natural sciences and the humanities. Butler's views on ambiguity in understanding the term sustainable tourism are supported by A. Niezgoda (2006), who claims that conception of sustainable tourism occurred as a result of research on interrelations between tourism, environment and development. According to this author sustainable tourism is treated by scholars as a tool for realization of sustainable development or a tool for the development of tourism itself.

Totally different scientific basis of sustainable tourism conception (or sustainable development through tourism) is presented by Bryan H. Farrell and Louise Twinning-Ward (2003). In the article entitled 'Reconceptualizing Tourism', published in 2003 in the *Annals of Tourism Research*, they postulate a total change in the methodological approach towards the studies of tourism, sustainable tourism included. These authors criticize strongly the hitherto, according to them most wide-spread, way of conducting research in the field of tourism, which is based on narrow specialization, linear reductionism as well as determinism assuming predictability of phenomena and presence of cause and effect. They claim that such an approach, due to complexity and unpredictability of behaviour of tourist systems and systems influencing tourism, cannot guarantee satisfactory results. Instead, they propose a new paradigm that is based on the interdisciplinary approach encompassing relatively new fields, such as: ecosystem ecology, ecological economics, global change science and complexity theory. These authors assume that natural and social systems do function in a relatively independent and non-linear way and therefore postulate implementation of the complex adaptive systems theory into the studies of tourism. Simultaneously, they introduce the notions of comprehensive tourism system and complex adaptive tourism systems – CATS.

Apart from the broad and varied in views discussion on the essence of sustainable tourism present in numerous scientific publications, also institutional documents devoted to sustainable tourism that are of declarative, explanatory or quasi-normative character are winning wide renown (Table 1). Among numerous publications of this type one should note i.a. the Charter for Sustainable Tourism (adopted in 1995), whose signatories agreed that development under the influence of tourism should refer to the principles of sustainable tourism, which meant that it should take into consideration the long-term needs of the natural environment, affect positively a given economy and be accepted in terms of ethics and culture by local communities. The same document claims that tourism should contribute to sustainable tourism through strict integration with the natural and the antropogenic environment on reception areas. Also in 1995 World Travel and Tourism Council, United Nations World Tourism Organization and Earth Council adopted the document entitled 'Agenda 21 for the Travel and Tourism Industry: Towards Environmentally Sustainable Development'. This document defines i.a. the priorities of sustainable tourism. In 1999 the United Nations World Tourism Organization published the Global Code of Ethics for Tourism, which took into consideration the postulates of sustainable tourism. In 2004 the same organization defined the principles of sustainable tourism as those which refer to all forms of tourism (mass tourism included). At the same time, it was highlighted that in order to ensure a long-term balance the principles of sustainable development in tourism must concern environmental, economic and socio-cultural issues to the same degree (Sustainable development of tourism. Conceptual definitions, 2004). Finally, in 2008, during the World Conservation Congress, which took place in Barcelona, the document containing Sustainable Tourism Criteria was adopted.

Document	Publishing subject	Year	Place of publication
Charter for Sustainable Tourism	World Conference on Sustainable Tourism	1995	Lanzarote, Canary Islands
Agenda 21 for the Travel and Tourism Industry: Towards Environmentally Sustainable Development	WTTC, UNWTO, Earth Council	1995	Madrid (1996)
Berlin Declaration	International Conference of Environment Ministers on Biodiversity and Tourism	1997	Berlin
Global Codes of Ethics for Tourism	UNWTO	1999	Santiago de Chile
The encyclopedia of ecotourism	Weaver D.B. (ed.) CABI Publishing	2001	Oxon (UK) - New York (USA)
Sustainable development of tourism. Conceptual definitions	UNWTO	2004	Madrid
Global Sustainable Tourism Criteria	World Conservation Congress (Rainforest Alliance, UNEP, UNWTO)	2008	Barcelona

Table 1. Selected documents concerning sustainable tourism

To sum up the deliberation concerning the issue of sustainable development of tourism one should repeat, i.a. after the United Nations World Tourism Organization (2004) that sustainable development should be applicable (as much as possible) to all forms of tourism, including mass tourism. And the principles defining sustainable development in tourism should refer to natural, socio-cultural and economic aspects connected with tourism – by striving to achieve the state of balance between them.

### 3. Selected models of sustainable tourism

As it was mentioned, sustainable tourism is an area of interest of many scholars, activists and practitioners in various countries. It seems, though, that both in the international and in the Polish literature the descriptive method dominates. It puts stress on explaining the conception of sustainable tourism, which is often done from different scientific positions. Apparent is the evolution of views on its essence. In the first period natural aspects were emphasized first of all – in the context of preserving natural environment resources against the threats of tourism. Now, however, we are dealing with the situation in which economic and socio-cultural aspects are seen as well. To a large extent it is thanks to i.a. the publications of the United Nations World Tourism Organization, which emphasized the necessity of striving for balance in fulfilling needs of all tourism stakeholders functioning within natural and socio-economic environment. The change in the approach towards sustainable tourism during past few decades is also expressed in the abandonment of evaluation of various tourism forms according to these criteria. Nowadays, it is stressed that the principles of sustainable tourism should be taken into consideration in all kinds of tourism, including so unpopular among the 'orthodox activists' mass tourism. This evolution, with the consideration of relations between alternative tourism, ecotourism and mass tourism and their relation to sustainable tourism, is presented i.a. by A. Niezgoda (2006). In a simpler form it can be presented graphically as in the Figure 1.

Model relationships between sustainable tourism and unsustainable tourism (often identified with mass tourism) are an area of interest of other authors as well. Among them are, i.a., D.A. Fennel (1999) and D.B. Weaver (1999), who claim that there is no way to designate a clear boundary between sustainable and unsustainable forms of tourism. The former introduces, in relation to various aspects of tourism (attractions, transportation, accommodation, product), kind of degrees (stages) of sustainable tourism. The latter, in turn, claims that mass tourism (closer to unsustainable tourism) constitutes a kind of continuum of alternative tourism (closer to sustainable tourism), so they cannot be treated as separate, opposing categories. These authors' opinions can lead to two kinds of conclusions. On one hand, it is postulated that the principles of sustainable development should be taken into consideration as much as possible in all forms of tourism (Figure 1). In such a case we deal with the desired direction of change from unsustainable tourism to sustainable tourism. On the other hand, assuming D.B. Weaver's point of view on mass tourism (more unsustainable) as a continuum of alternative tourism (more sustainable), one can see a more undesirable direction of change from sustainable tourism to unsustainable tourism. Both situations are illustrated by bilaterally oriented arrows in Figure 2.

A similar conclusion concerning possibilities of occurrence of undesirable direction of change can be drawn after the analysis of three theoretical models of tourism: 1) of tourist area life cycle (TALC) by R.W. Butler (1980); 2) of tourist space by S. Liszewski (1995), and 3) of changes in the natural environment under the influence of tourism by D. Zaręba (2010).

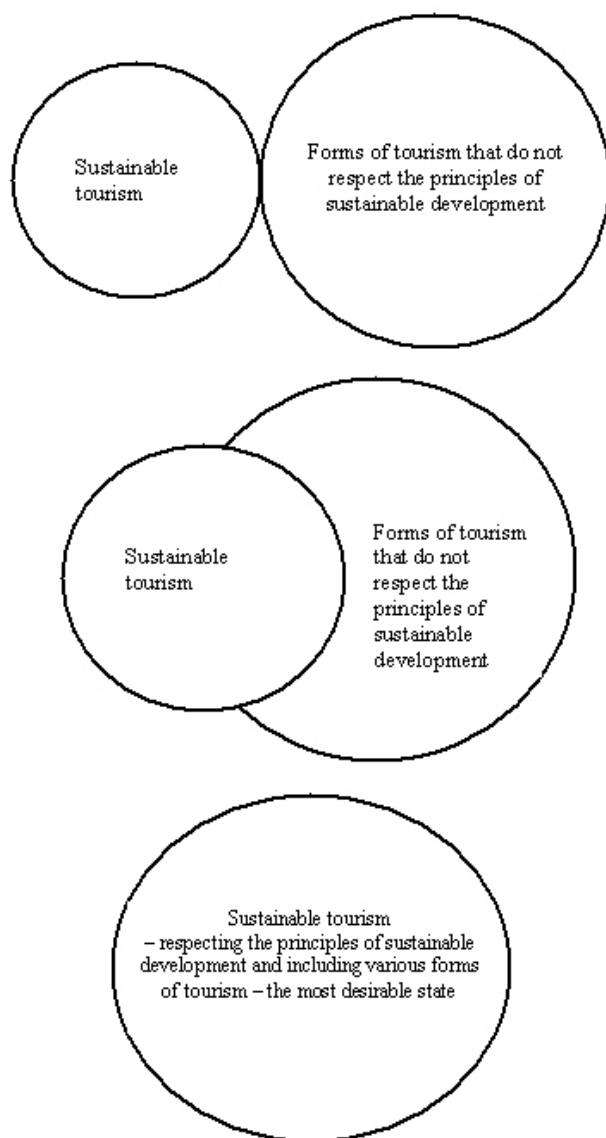


Fig. 1. Sustainable tourism and various forms of tourism – the evolution of approach

The curve of dependences occurring between the number of tourists on a given reception area and the time (Butler), the level of tourist space transformation (Liszewski), and the level of the environment devastation (Zaręba) is very similar. After the analysis of the curve in each model (after simplification) one can distinguish 4 stages of changes in the direction from the state of the original balance to the state of a new balance – in transformed, i.e. naturally devastated, environment (Figure 3).



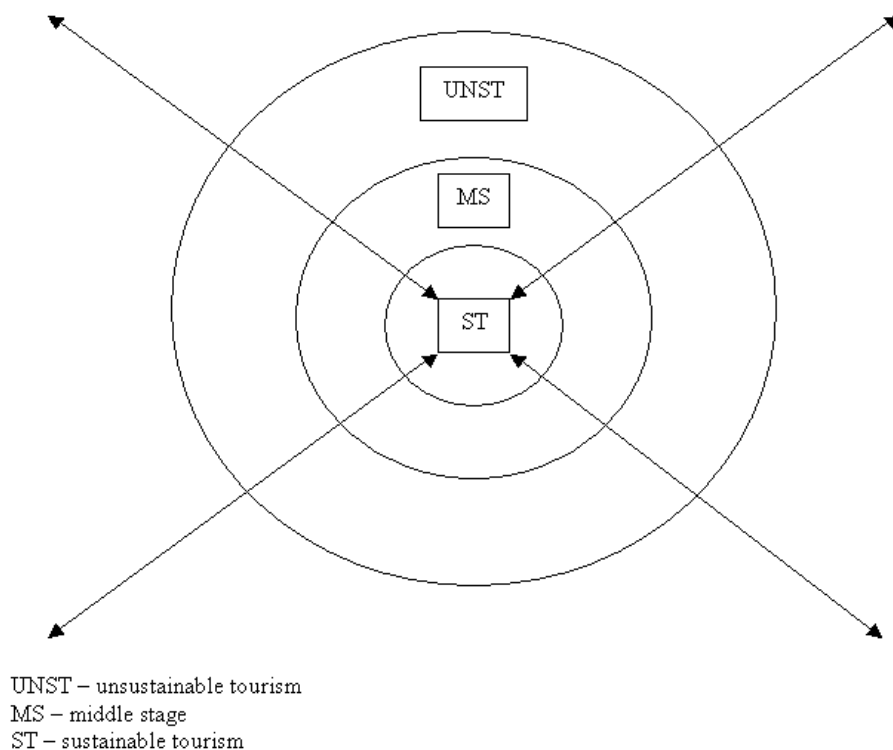


Fig. 2. Sustainable and unsustainable tourism as a continuum of bi-directional changes

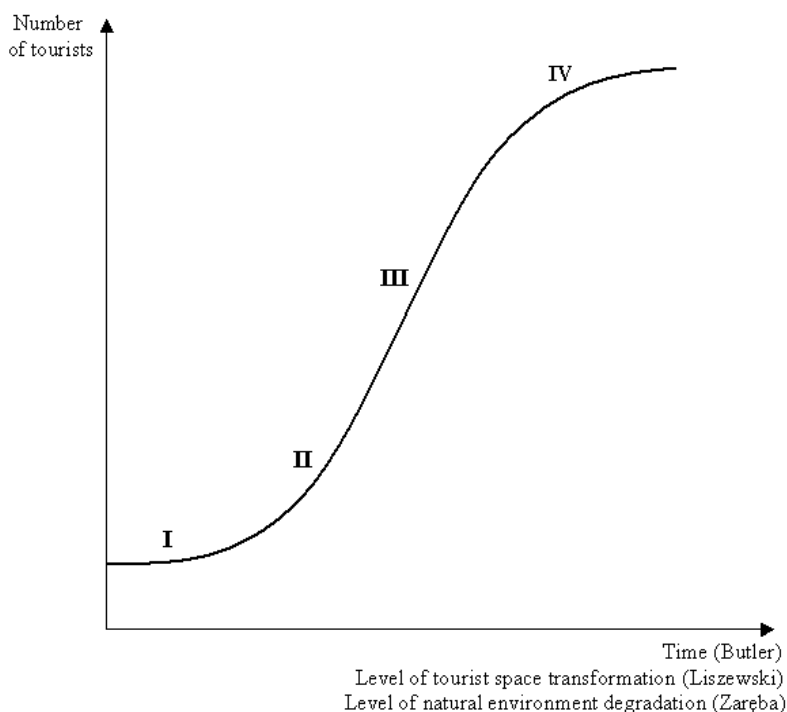
A model conception of diverse degrees (stages) of development (functioning) of sustainable tourism, in relation to different (in terms of environment and socio-economics) reception areas was proposed also by C. Hunter (1997, as cited in Mika, 2008). This author, after a contrastive analysis of the position of tourism and the position of sustainable development within diverse areas, distinguished four variants of functioning of tourism within sustainable development. This conception can be graphically illustrated with a graph of decreasing function that indicates relationships between tourism and sustainable development (Figure 4). Controversy in Hunter's model lies in the fact that it excludes the possibility of a wide-scale tourism development that would take into account the principles of sustainable development. Therefore, this model undermines the idea of sustainable tourism as the one that takes into account the principles of sustainable development.

Polish scholars also made an attempt to present the essence of sustainable tourism in a model form. These were M. Durydiwka, A. Kowalczyk & S. Kulczyk (2010). These authors assumed that the conception of sustainable tourism (ST) concerns mainly three types of tourism, i.e.: 1) related to the natural environment values (ST<sub>natural</sub>); 2) related to the cultural environment values (ST<sub>cultural</sub>); 3) requiring from tourists certain skills (ST<sub>qualifying</sub>). Taking into account these types of tourism they presented the idea of sustainable tourism as the following formula:

$$ST = ST_{\text{natural}} + ST_{\text{cultural}} + ST_{\text{qualifying}} + (ST_{\text{natural}} / k \times ST_{\text{cultural}} / k \times ST_{\text{qualifying}} / k) \quad (1)$$

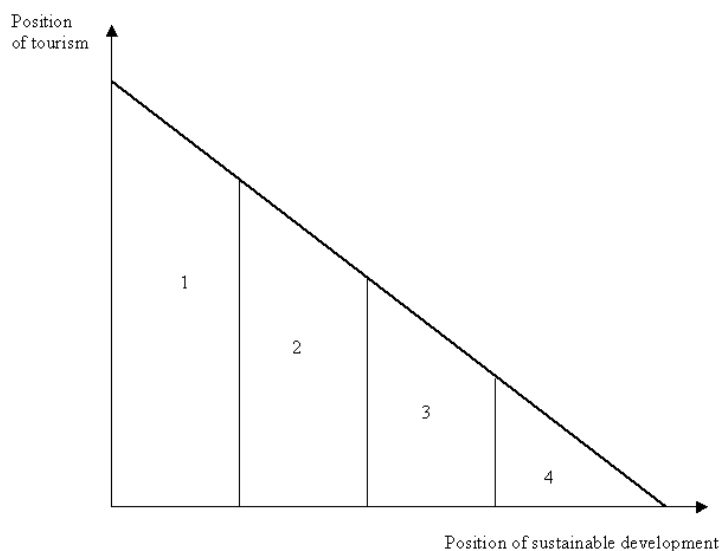
k – the correction factor.

According to its authors, this formula refers to the holistic conception of sustainable tourism, which means that it should be understood as a combination of various forms of tourism, complemented by common objectives, such as: care for the natural environment, limiting the negative effects for local population, bringing economic benefits to reception areas and meeting the needs of tourists.



Conception Stage	Tourist area life cycle by R. Butler (1980)	Changes in the natural environment (based on: D. Zaręba, 2010)	Types of tourist space by S. Liszewski (1995)
I	Exploration	Original balance	Exploration
II	Introduction	Threat	Penetration
III	Development	Degradation	Colonization
IV	Consolidation and stagnation	New balance	Urbanization

Fig. 3. Tourism in the function of time, spatial changes, and environmental changes



Variant	Position of tourism	Position of sustainable development
1	Domination (imperative) of tourism	Very weak
2	Tourism determined by product	Weak
3	Tourism determined by environmental issues	Strong
4	Minimalised tourism	Very strong

Fig. 4. Variants of functioning of tourism in sustainable development

#### 4. Theoretical, short-term model of sustainable tourism

The model is presented in the graphic (Figure 5) and descriptive form, through a presentation of: purposes and conditions of its construction, main assumptions that the model is based on, adopted variables, model factors of balance and its disturbance (notation), factors affecting variables, and possibilities and restrictions on using the model.

##### 4.1 Purposes and conditions of the model's construction

The purpose of the sustainable tourism model construction is to present in a complete, explicit and as simple as possible form the essence of sustainable tourism in the short-term perspective. The author intended the proposed model, designed as a theoretical construct, to render in the most complete way the ideas of sustainable tourism, and at the same time to be appropriate for teaching and guiding purposes as well as to constitute a theoretical basis for detailed application models. The model is intended to be versatile, i.e. to be applicable in all conditions, on every reception area, for every type of tourism. Another condition, which was required in order to meet all the other criteria, was the necessity to use mathematical function dependencies and notation (explicitness of the model). The simplicity of the form, facilitating understanding of the model, is ensured through minimization of the number of variables and by the graphic illustration of the model. An additional intention of the author was to take into

consideration the possibility of occurrence of change of independent variables and their influence on dependent variables (the dynamic factor). It allows to observe, and especially to project the effects of these changes, in the context of their consequence for sustainable tourism.

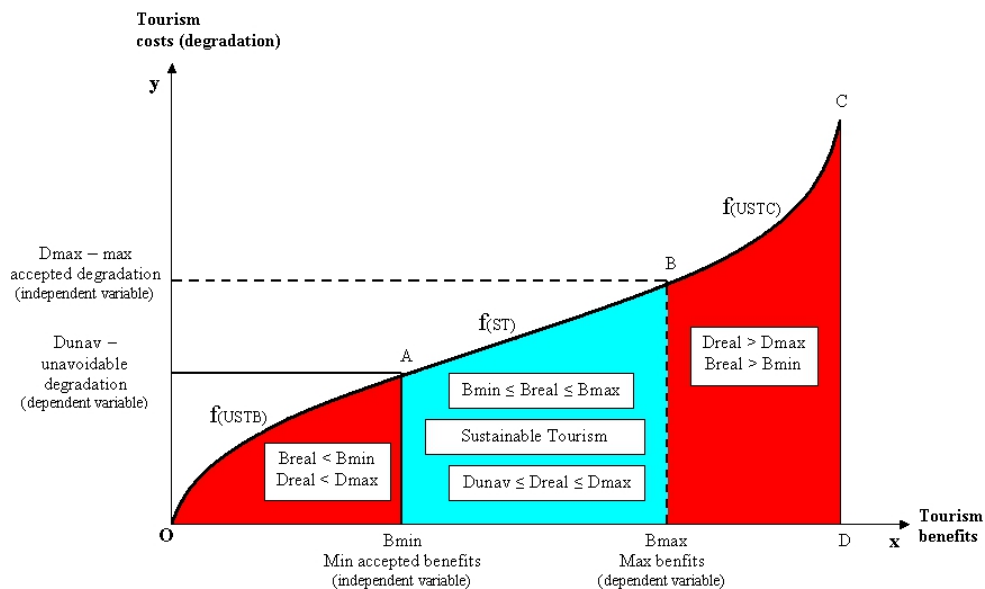


Fig. 5. Theoretical (short-term) model of sustainable tourism

#### 4.2 Assumptions for the sustainable tourism model construction

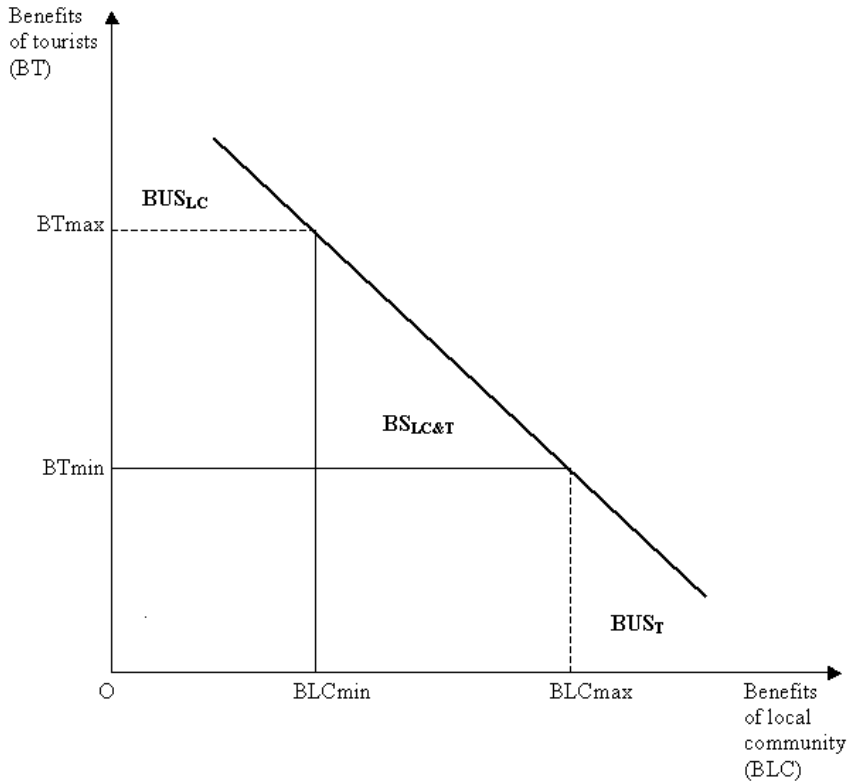
1. The assumed objective of sustainable tourism on a given tourist reception area has been the striving for the state of balance in fulfilling needs (reaping benefits) of two main groups of stakeholders, i.e.:
  - tourists – who visit the tourist reception area in order to fulfil their tourist needs (to reap benefits);
  - community inhabiting or working in favour of tourism on the reception area (local population, transactors operating tourists, public authorities) – which agrees on or acts in favour of tourism development, because it acknowledges a chance to fulfil its needs (to reap benefits).

At the same time, the accepted level of the degradation of the natural and socio-cultural environments, which includes tourist resources of a given reception area (in the wide sense of tourist potential), cannot be exceeded.

2. It has also been assumed that the increase in (short-term) benefits reapt by tourists and the inhabitants of the areas that they visit – related to developing tourism – results in (in principle) the increase in the level of the degradation of the natural and socio-cultural environments. In this context, the degradation can be treated as a kind of an unavoidable environmental cost that must be borne in connection with developing tourism. This assumption indicates the short-term perspective of functioning of the

model. For, it is obvious that in a long-term perspective, after exceeding the accepted level of degradation it will not be possible to reap further benefits, at the expense of already devastated environment.

3. The author has also assumed an auxiliary assumption concerning the possibility of occurrence of reverse dependency between the benefits reapt by tourists and the benefits reapt by the local community (presented in the graph as a decreasing function), which in sustainable tourism results in the necessity to seek an 'area' of balance in fulfilling the needs of both groups of stakeholders (auxiliary model – Figure 6).



$$f(x): y = ax + b; a < 0, x > 0, y > 0$$

where:

BLCmin – minimal benefits of the local community (independent variable)

BTmin – minimal benefits of tourists (independent variable)

BLCmax – maximal benefits of the local community (dependent variable)

BTmax – maximal benefits of tourists (dependent variable)

BS<sub>LC&T</sub> – sustainability between the benefits of the local community and the benefits of tourists

BUS<sub>LC</sub> – unsustainability of the benefits of the local community

BUS<sub>T</sub> – unsustainability of the benefits of tourists

Fig. 6. Auxiliary model – the benefits of tourists and the benefits of the local community in sustainable tourism

### 4.3 Explanations for the main model

1. Benefits from tourism – benefits reapt by tourists visiting a given reception area and benefits of the local population (including transactors, public authorities and other organizations), resulting from development of tourism:
  - min accepted benefits (Bmin): denotes the minimal accepted level of fulfilling needs of tourists and local population, beneath which the reapt benefits will be evaluated as insufficient; its size is measured with the numerical value of the Bmin point on the Ox axis of the model graph;
  - max benefits (Bmax): denotes the maximal accepted (in sustainable tourism conditions) level of fulfilling needs of both tourists and local population; its size is measured with the numerical value of the Bmax point in the Ox axis of the model graph;
  - real benefits (Breal): the real level of benefits reapt by tourists and local community in relation to tourism developing on a given area.
- 1a. In the component of benefits there are two basic groups of participants (tourists, local community), which can have opposing interests. In order to take into account the level of balance (sustainability) between the benefits of tourists and the benefits of the local community, as an element of general balance (sustainability), the author has produced an auxiliary model of partitive balance (sustainability) in the benefit component (Figure 6). The assumptions of this model have been transferred to the Ox axis of the main model.
2. Costs of tourism development – degradation of the natural and antropogenic (social, cultural, economic) environments on a tourist reception area, resulting from developing tourism:
  - max accepted degradation (Dmax): denotes the highest accepted in sustainable tourism (i.e. not resulting in irreversible changes) level of degradation of both environments; its size is measured with the numerical value of the Dmax point on the Oy axis of the model graph;
  - unavoidable degradation (Dunav): denotes the level of unavoidable degradation of both environments resulting from developing tourism; its size is measured with the numerical value of the Dunav point on the Oy axis of the model graph;
  - real degradation (Dreal): the real level of degradation of the natural and antropogenic environments occurring on a reception area in relation to tourism developing there.

### 4.4 Independent and dependent variables used in the model

In the model there are two pairs of interrelated independent and dependent variables.

Independent variables	Dependent variables
Min accepted benefits (Bmin)	Unavoidable degradation (Dunav)
Max accepted degradation (Dmax)	Max benefits (Bmax)

Table 2. Independent and dependent variables in the model of the sustainable tourism

1. Min accepted benefits (Bmin – independent variable) reapt by tourists and the community that hosts them; they result in certain unavoidable level of degradation (Dunav – dependent variable) of the natural and antropogenic environments on an analysed tourist reception area.

2. Max accepted degradation ( $D_{\max}$  – independent variable) of both environments denotes the max level of benefits ( $B_{\max}$  – dependent variable) which can be reapt by tourists and the local population in sustainable tourism, i.e. without causing irreversible environmental changes.

#### 4.5 Conditions for sustainable tourism

Sustainable tourism	General conditions	
	Component of environment	Component of benefits
Sustainable tourism by components	$ D_{\max}  -  D_{unav}  \geq 0$	$ B_{\max}  -  B_{\min}  \geq 0$
	$ D_{unav}  \leq  D_{real}  \leq  D_{\max} $	$ B_{\min}  \leq  B_{real}  \leq  B_{\max} $
	Minimal conditions	
	Component of environment	Component of benefits
	$ D_{\max}  -  D_{unav}  = 0;$ but: $ D_{\max}  > 0 \wedge  D_{unav}  > 0$	$ B_{\max}  -  B_{\min}  = 0;$ but: $ B_{\max}  > 0 \wedge  B_{\min}  > 0$
	$ D_{unav}  =  D_{real}  =  D_{\max} $	$ B_{\min}  =  B_{real}  =  B_{\max} $
Function $f_{(ST)}$ – describing the existence of sustainable tourism for both components	General condition	
	$f_{(ST)} = \{x: x \in [ B_{\min} ,  B_{\max} ];  B_{\max}  -  B_{\min}  \geq 0\}$	
	Minimal condition	
	$f_{(ST)} = \{x: x =  B_{\min} ;  B_{\max}  -  B_{\min}  = 0\}$	

Table 3. Model conditions for sustainable tourism

#### 4.6 Model disruption of sustainability

Type of disruption	Condition	Description
Lack of balance (unsustainability) in the component of benefits, balance (sustainability) in the component of environment.	$ B_{real}  <  B_{\min} ;$ $ D_{real}  <  D_{\max} $	It occurs when the real benefits ( $B_{real}$ ) are smaller than the minimal benefits ( $B_{\min}$ ). At the same time the level of real degradation ( $D_{real}$ ) is lower than the level of accepted degradation ( $D_{\max}$ ).
Function $f_{(USTB)}$ – describing the lack of balance (unsustainability) in the component of benefits while maintaining balance (sustainability) in the component of environment.	$f_{(USTB)} = \{x: x \in [0,  B_{\min} ]\}$	

Type of disruption	Condition	Description
Lack of balance (unsustainability) in the component of environment while maintaining of balance (sustainability) in the component of benefits.	$ D_{real}  >  D_{max} ,  B_{real}  >  B_{min} $	It occurs when the real degradation ( $D_{real}$ ) is bigger than the accepted degradation ( $D_{max}$ ). At the same time the real benefits ( $B_{real}$ ) are bigger than the minimal benefits ( $B_{min}$ ).
Function $f_{(USTC)}$ – describing the lack of balance (unsustainability) in the component of environment while maintaining balance (sustainability) in the component of benefits.	$f_{(USTC)} = \{x: x \in [ B_{max} ,  D ]\}$	

Table 4. Model disruption of sustainability

#### 4.7 Factors affecting independent variables, as determinants of sustainable tourism

1. The accepted level of degradation (understood as the highest accepted in sustainable tourism, i.e. not causing irreversible changes, level of degradation of the natural and antropogenic environments) depends on the type of ecosystem and features of the social environment occurring on a tourist reception area. In the natural component low level of accepted degradation is characteristic for natural and close to natural ecosystems that are very vulnerable to external stimuli. In turn, higher level of accepted degradation is characteristic for significantly transformed ecosystems which are not carriers of special natural values. In the antropogenic component, the most vulnerable to degradation will be close, traditional communities that do not maintain lively contacts with the outer world. In such a case, in order to fulfil the sustainable tourism condition, the accepted degradation level should be as low as possible.
2. The expected minimal level of benefits (taking into account the assumptions of the auxiliary model – Figure 6) that both groups of tourism stakeholders (tourists and local population) expect to reap on a given reception area depends on their expectations of tourism. Although, the lowest accepted level of benefits reaped by permanent residents will depend on the features of that community, such as: age structure, education level, environmental and cultural awareness, system of values, self-esteem, hitherto quality of life, professional activity, expectations of development of local tourist economy, local authorities and elite activity. As far as tourists are considered, the case is similar. The level of minimal benefits that they expect will depend on socio-cultural features of that collectivity. They will constitute the basis for the tourists' subjective assessment of the local tourist product (including, i.e. values, tourist management, prices). This product will have to meet the needs of tourists enough for the tourists to think that for the price they are ready to pay they will get the minimal accepted level of benefits related to tourist trip to that location.
3. Taking into account the above-mentioned model assumptions, the sustainable tourism area – presented on the graph as:



$$\int_{B_{\max}}^{B_{\min}} f \, dx$$

will depend on: 1) the resistance of the natural and antropogenic environments to the negative influence of tourism, denoted with the location of the Dmax point on the Oy axis of the model graph (independent variable); and 2) the minimal accepted level of benefits that local population and tourists expect to reap, denoted with the location of the Bmin point on the Ox axis of the graph (independent variable). The model tourism sustainable area will depend on one hand on the willingness of both groups of stakeholders to resign from the short-term benefits that they want to reap from tourism (possibly small numerical value of the Bmin point on the Ox axis), on the other hand on the features of the environment that determine its vulnerability to degradation by tourism (possibly high numerical value of the Dmax point on the Oy axis).

#### 4.8 Implementation of the model – Possibilities and limitations

1. The implementation of the model for the scientific-educational (explanatory) purposes – the model can be used in order to explain the essence and the principles of sustainable tourism, and especially to determine the interrelations occurring between all the stakeholders of tourism and the natural and antropogenic environments in which tourism is being developed. The construction of the model enables analyses of these interrelations in dynamic hold, which reveals consequences for all the tourism stakeholders induced by a change of independent variables used in the model. Another advantage of the model is its versatility, i.e. the fact that it is applicable in relation to all types of tourism (tourist movement) and reception areas. For, in every situation the same factors (determinants), occurring in the model as independent variables determining framework for the development of sustainable tourism, are taken into account. Also, in all analysed cases the assumed model conditions must be fulfilled. Versatility and explicitness of the model manifest themselves also in the utilization of the graphic way of presenting function dependencies and notation that together define the main assumptions, interrelations and conditions included in the model.
2. The implementation of the model for the purposes of application – the model can be used in order to find out to what extent will the development of various types of tourism on a given reception area fulfil the principles of sustainable tourism. Particular types of tourism should be analysed both in terms of demand, as a form of tourist movement, and in terms of supply, as corresponding types of tourist products (in the widest sense of this term). Practically, one should make an attempt to construct individual models for each type of tourism. This will be possible after choosing appropriate measures (indices) determining the values of particular variables. After building individual model graphs one will be able to compare the obtained ranges (size) of sustainable tourism, characteristic for particular types of tourism. Results of such an analysis may be especially useful in order to determine the types of tourism preferable for a given area – taking into account the conditions of sustainable tourism.

It seems that the main barrier affecting negatively the application type of implementation of the proposed model of sustainable tourism can be difficulties related to the quantification of the adopted variables in detailed models. It would be easiest to express time in financial

values, but this may not always be possible and appropriate. It is also possible to use other indices published i.a. in the publications of the United Nations World Tourism Organization and other organizations (programmes), such as 'Making Tourism More Sustainable' (2005 as cited in Kowalczyk, 2010; *The VISIT initiative*, 2004). When selecting indices one should make sure that they fulfil the criteria for the ideal index of sustainable development as much as possible. These criteria are: 1) simplicity of identification and measurement, 2) natural and/or social, cultural, economic, political significance, 3) stability, 4) simplicity and low cost of measurement, 5) sensitivity and quickness of reaction to changes, 6) intelligibility and explicitness (based on Hughes, 2002, as cited in Kowalczyk, 2010).

At the same time, one should not forget that the variables used in the main model are internally diverse. One group includes netto benefits reapt by both tourists and local population (including transactors), while the other concerns total environmental costs manifesting themselves in the degradation of the natural and antropological environments. In order to determine values of these variables one should consider each of their elements individually and assume an appropriate breakpoint (e.g. according to the assumptions made in the auxiliary model concerning the component of benefits – Figure 6.) One can also consider the solution of application simplification of the entire model. In such a case only one (breakpoint) component of a given variable would be taken to quantification. E.g. for the independent variable 'required benefits' such an operation would include defining the minimal accepted level of benefits reapt by local population and then treating it as the assumed breakpoint level (with the underlying assumption that sole appearance of tourists on a given area testifies of the fact that tourists reap their accepted level of benefits.) The same operation can be used while dealing with the other variable, making the choice of its component dependent of the type of reception area (for sure, for the areas naturally valuable it should be the maximal, accepted for given ecosystems, level of natural environment degradation.)

Another significant problem in the practical implementation of the model is to find the appropriate functional interrelation between assumed variables (costs vs. benefits) in the detailed models, both for breakpoint and for intermediate values, which will decide what the function of sustainable tourism for a given type of tourism on a given reception area will look like. In the main model only the general rule of interrelation between costs and tourist benefits (presented in the graph as an increasing function) was taken into account. It is the ability to determine the shape of the curve through defining the values of variables (breakpoint and intermediate) for various types of tourist movement on a given reception area that will allow the use of the assumptions of the main model on a wider scale for the purpose of application.

Both above-mentioned problems (quantification of variables and finding functional interrelations between them) are important in terms of the application use of the presented model, since they directly affect the ability to define the model size of sustainable tourism.

## 5. Summary

Because of the fact that the sustainable tourism literature is dominated by the descriptive style and because it is multidirectional, which leads to ambiguities in defining the phenomenon, the author has made an attempt to construct a theoretical model of sustainable tourism which would render both its essence and main features.

The article presents the theoretical, short-term model of sustainable tourism. It has been designed basing on the adopted assumptions that define the essence of sustainable tourism. They concern striving for the state of balance between the needs of tourists and the needs of local community, while maintaining the values of the natural and socio-cultural environments that occur on reception areas. In other words, the article means that kind of tourism which is satisfactory for tourists and the local population (including transactors working in favour of tourism) and which does not cause irreversible degradation of the natural and antropogenic environments.

The model is intended to fulfil the criteria of completeness, versatility, explicitness and simplicity. To that and, the author has used the graphic form of mathematical function and notation. The model constructed in this way can be implemented for explanatory-educational purposes as well as application purposes (after selecting appropriate indices). The author hopes that the theoretical model of sustainable tourism presented in this article will constitute a complement to the output of the studies of sustainable development in tourism, especially in their theoretical aspects.

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# Knowledge-Based Decisions in Tourism

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## 1. Introduction

“The world faces mounting changes and challenges which call for innovative strategies and policies. Governments, business and civil society need to devote attention to knowledge management in tourism, to better understand and act upon the forces shaping today’s world, especially on the critical issues of development, climate change and governance” said UNWTO Secretary-General, Taleb Rifai.

In the past century, economic sciences have known an explosive evolution, passing from an intuitive, fact-based analysis to an abstract one, based on multi-disciplinary and complex theoretic constructions. It is the era of applying scientific mathematical methods as instruments of argumentation and decision, passing from intuitive axioms to more formalized ones.

In a competitive economy, the success of an organization depends decisively on the quality of their managerial decisions. Alongside the development of business information systems, the decision making process implies a large volume of data and a complex process of analysis and synthesis. This information gathering, processing and analyzing capability needed for the decisional process exceeds human capacity by a great margin.

In tourism, modern organizations are confronted by an ever increasing pressure to find new ways to compete effectively in a dynamic global market. Many are turning to e-commerce and virtual structures, such as virtual organizations and virtual team structures, to improve organizational agility and expand into the global market (Baggio&Caporello, 2005). Others adopted knowledge-based tourism business-to-business (B2B) communities solutions, requiring the adoption of a multidimensional, multilevel perspective on system design that incorporates knowledge creation and transformation processes and takes organizational stages of effective technology use into consideration (Gretzel&Fesenmaier, 2004). A recent paper proposes a model of a Knowledge-based System that makes it possible to evaluate an organization at a Knowledge Management Capability Assessment Maturity Level (Andrade, et al., 2010). Contemporary Information and Communication Technologies (ICT) increase efficiency, reduce costs, and improve customer care.

Among the great variety of applications developed for the tourism sector, Decision Support Systems (DSS) can play a fundamental role for their capacity to give organizations the

possibility to base all the decisions concerning policies, infrastructure development and stakeholder's progress on sound and rational bases (Baggio&Caporello, 2005).

We noticed time and effort are wasted when information is not at hand. The decisional factor could use some help in making decision based on what-if predictions. Hybrid support systems are systems that result from integrating decision support systems (DSS) with other tools and technologies in order to maximize efficiency of the decisional process. Our proposal is a hybrid system which comprises a combination of a model oriented decision support system (spreadsheet based flexible systems, used in what-if predictions) and knowledge-oriented decision support systems (software modules based on knowledge manipulation) to reach these goals.

One of the main elements in building a knowledge-based system is the representation of knowledge, the quality of cognitive systems being essential to the proper function of a decision support system. Steps have been taken in order to transcend the natural language and achieve a symbolic axiomatic language. We believe that the main direction in reconstructing the economic theory is by using logic and semiotic tools (Târnavăanu, 2010b). The decision modelling system built by us uses the intelligence of a decision support system of an invariant nature. We proposed a formalized axiomatic system, using semantic decision trees. To build a generally valid system (a formalized one) it is necessary to create an interconnected system of variables. We divided this complex system into several trees and used production rules theory. We implemented it in Microsoft Excel 2007, using Visual Basic Application - a powerful tool that uses procedures in order to control Excel's objects behaviour.

We believe we found an original way of representing knowledge with mathematical tools (logic and axioms) in order to elaborate the axiomatic formalized system, using methods such as decision trees and transposing them into production rules, as well as building a decision support system capable of intelligent informing. One of the biggest advantages is the systems' flexibility through its invariant nature. The negative aspects are determined by the fixed form of the interconnected system of variables and the lack of implementing it using a web-based solution. We believe this could be a fertile ground for future research.

## **2. Knowledge and competitive advantage**

Modern organizations worldwide are slowly discovering that controlling knowledge is a major component of strategic growth and creating a competitive organization. In the second part of the last century, tourism has become one of the most important economic activities in the world (Baggio&Caporello, 2005). UNWTO expects international arrivals to grow by 4% in 2011, slightly above the long-term average. Information and communication technologies have profound implications for the tourism industry. Organizations use knowledge-driven applications in order to respond quickly to continuously changing market conditions and customer needs.

Knowledge based organizations are intelligent, complex and adaptive systems constituted by networked people, knowledge workers and intelligent agents that together are able to combine knowledge and solve problems, creating business value and adapting the function

of that organization, adapting to changing environments and increasing the competence of the organization (Niculescu, 2009, Scorta, 2009, as cited in Muntean&Tărnăveanu, 2009b).

The study and practice of knowledge management has grown rapidly since the 90's, driven by social, economic, and technological trends. Tourism has been slow in adopting this approach due to not only a lack of gearing between researchers and tourism, but also to a "hostile" knowledge adoption environment (Cooper, 2006). The acquisition of this approach would close the gap and also provide both insights and potential applications for tourism.

## 2.1 Data, information, knowledge

**Epistemology** (knowledge theory) is a part of Gnosticism and studies the human knowledge in different sciences; it is a theory of scientific knowledge. Its purpose is the study of knowledge nature, structure and origin, whereas cognotics identifies the cognitive structures and the processes that influence human performance and their embedment in intelligent systems.

**Knowledge** is the basic concept in knowledge management. To better understand the concept of knowledge we will present the concepts of data and information, both of which are often confused with knowledge.

**Data** can be considered rough facts than can be processed in different types of information. The most important problems are related to the volume and the nature of information. Without **logic** and **reasoning**, data can be completely useless. Therefore quantity is not a determining factor, even if without data an organization can't exist. Most often data is obtained by measuring and observing the system's variables. Processing of data implies organizing, sorting, recording and classifying the data in order to perform calculations and make decisions.

**Information** is data with meaning, usually processed and formatted. Unlike data, information makes understanding relationships possible. They have meaning, purpose and relevance and can be organized and analyzed from a statistical point of view so that the documents, reports and messages make sense. It is important to notice that information has a semantic content that is not dependant on the physical support through which it is transmitted.

**Knowledge** represents a group of information, processes and experiences focused on a particular subject. Knowledge refers to the way people understand a specialized activity domain acquired through study and experience. They are based on learning, thinking and familiarizing with a domain inside a department, division or organizations in general. Knowledge derives from information much like the way information derives from data, including aptitudes, training, perception, experience and common sense. Knowledge implies people interacting with reality and confers intelligence to objects that incorporate it, most of the time reducing their size and making them easier to handle.

Concluding on the differences between data, information and knowledge, we can underline the following:

- **data** is an objective and static resource;

- **information** is an ensemble of meaningful data and has a value related to the purpose;
- **knowledge** is subjective, dynamic, created in the context of the social interaction between an individual and the organization, connected to the context and is relative (being derived from the creative capacity of the individual);
- **information** differs from **knowledge** through size, nature and intelligence;
- **information** is smaller than **knowledge**, being a component of knowledge (like pieces of puzzle);
- **knowledge** always contains **expertise**, elements that generate solutions, with economic substance;
- **knowledge** has a longer life than **information**, sometimes unlimited.

**Meta-knowledge (wisdom)** represents the highest level of abstraction, encompassing vision and the ability to see beyond the horizon. It is the accumulation of a person's professional experience in an activity domain. Some authors refer to meta-knowledge as being synonym with wisdom.

## 2.2 Knowledge management

**Knowledge management** is a new organizational model, constantly improving itself, interdisciplinary and based on knowledge [Dănăiață et al., 2006]. It is the sum of all activities that have the purpose of discovering, coding, storing, disseminating, improving and using of knowledge inside an organization. Any organization, regardless of the size or activity profile, can increase its success rate if it uses the intellectual resources of its member adequately. Knowledge management exploits human resources in order to fulfil the objectives of the organization. It involves three factors: human resources, technology (IT infrastructure) and organization's processes.

**Globalisation** takes place in the context of the information society and offers the partakers involved in the business environment vast opportunities. Under these conditions, organizations should develop new business models to stay competitive. Therefore, adopting a knowledge management solution in an organization requires different types of software, intelligent and conventional, systems, tools and the usage of adequate techniques. Knowledge management will become the basic activity on all levels of organizations. An important aspect will be that of **moral** usage of knowledge at the global level, so that we will develop a conscious society.

Romania's chance is in developing technologies based on multidisciplinary scientific knowledge. Some of the European Union's objectives are collaboration, attraction of new resources, forming human resources, promotion of technology transfer on regional level among other such milestones. The competitive advantage in the knowledge based economy will be determined by the continuing capacity of acquiring new abilities (for members of the organization and therefore for the organization itself) and the promptness in effectively exploiting the top knowledge acquired.

In the future economy, an economy based on knowledge, intelligent decision support systems will experience an exponential growth. Technological and organizational knowledge will become as important as scientific knowledge. The first direction is developing programs that assist the economic specialist in choosing the most plausible



decisional alternative from many possible ones. These programs are called **Decision Support Systems (DSS)** and their results are precise if all hypotheses are well grounded. The second direction is simulating the thought process of the specialist with the help of a **Knowledge Based Systems (KBS)**. An evolved KBS should incorporate knowledge pieces capable of explaining the economic phenomenon in all its complexity. The evolution of DSS and KBS depends on the evolution of knowledge representation. In the near future, the problem of unconscious knowledge based on intuition and imagination will be of great importance.

### 2.3 Knowledge representation

Researchers concentrated their efforts in finding techniques of representing knowledge as a way to formulate a problem so that it is easy to solve, and the ways to search for the solutions so that the results could be displayed in real-time.

The fundamental problem of artificial intelligence is not identifying some efficient techniques, but discovering methods to represent vast quantities of knowledge in a form that allows its efficient usage (Goldstein&Peper as cited in Zaharia, 2003). The techniques of knowledge representation imply specialized manipulation routines that allow intelligent **inference**. Inference mechanisms refer to the most adequate processing of knowledge with the purpose of deriving new knowledge pieces which are most relevant to solving the problem. **Representing knowledge** implies designing a class of data structures to store the information and developing procedures that allow their intelligent manipulation in order to perform inferences. But a data structure is not knowledge, in the same way that an encyclopaedia does not mean knowledge. We can say that a book is a resource full of knowledge, but without a reader to understand it, it is just ink on paper (Tacu et al., 1998).

Most researchers in the artificial intelligence domain start by assuming that **what is needed to be represented is known**, so the programmer's job is to figure out **how to code the information and the procedures to follow**.

The ability of the system to provide useful information depends on the quality and the volume of knowledge that is owned and can be used in reasoning processes.

There are many knowledge representation methods; they have been developed over time and they use problem specific aspects. They all have two common characteristics:

- they permit usage of many programming languages or expert system generators, and the result is stored;
- the results obtained can be used in reasoning mechanisms.

#### 2.3.1 Binary trees

In order to study economic phenomena and processes, they have to be organized within a logical structure. This organization could be done with the help of trees (Băileşteanu, 2005).

A **binary tree** is a data structure in which each node has, at most, two child nodes, usually distinguished as "left" and "right". Nodes with children are parent nodes, and child nodes



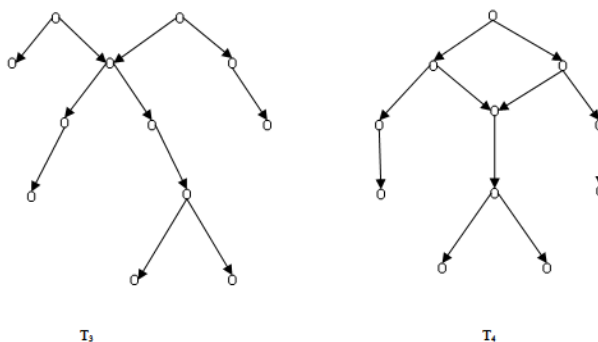


Fig. 3. Semantic trees  $T_3$  and  $T_4$

$T_1$  and  $T_2$  are binary trees. The branches of these trees are oriented downwards.  $T_3$  is not a binary tree because it has two roots, and there is a node with two predecessors.  $T_4$  is not a binary tree either, because it has a node with two predecessor nodes.

The **semantic tree method** is an automatic method of semantic analysis, which consists of determining the logical values of sub formulas of the given formula. It reduces complexity through the elimination of logical constants (truth-functional connectives and quantifiers) and places sub formulas of a considered formula on branches of a binary tree. The semantic tree method is a very interesting and universal method. It forms an important part of the mechanization of reasoning (Bondecka-Krzykowska, 2005).

### 2.3.2 Production rules

One of the most efficient of the representation methods is called **production rules**. The idea behind this method is to separate the common calculation components with the purpose of correctly and efficiently handling the processes in which they are involved.

In 1943, E. Post suggested what he called **rewriting rules**, derived from formal languages. Production rules were built based on those rules. Knowledge is based on three fundamental concepts: **facts**, which is the primary information that describes the elements of the considered domain, **rules**, which describe the how facts can be used and **reasoning strategies** or heuristic methods that express the way in which rules can be used.

A **production rule** has two parts: establishing the condition (IF) and the action (THEN). Sometimes an implication symbol ( $\rightarrow$ ) is used to describe a production rule as an equivalent of IF-THEN.

The general form of a production rule is:

$$\text{IF condition (premise) THEN action (conclusion)} \quad (1)$$

or

$$\text{Condition (premise)} \rightarrow \text{action (conclusion)} \quad (2)$$

where both conditions and actions are facts.

A production rule can be interpreted as: if the premise is true (the facts that compose the premise are confirmed or verified by the facts database), then the fact (or facts) from conclusion are also true and can be added to the facts database.

A more general **production rule** can be written as:

$$\begin{array}{ll}
 \text{IF} & \\
 & \text{Condition 1 } \diamond \\
 & \text{Condition 2 } \diamond \\
 & \dots \\
 & \text{THEN} \\
 & \text{Action 1 } \diamond \\
 & (3) \\
 & \text{Action 2 } \diamond \\
 & \dots \\
 & \text{ELSE} \\
 & \text{Action 1' } \diamond \\
 & \text{Action 2' } \diamond \\
 & \dots
 \end{array} \tag{3}$$

where:

- condition 1, condition 2, ... are the premises (the hypotheses);
- action 1, action 2, ... are the conclusions (the consequences);
- $\diamond$  represents the logic connector (AND, OR, NOT et al.);
- action 1', action 2', ... are the conclusions (the consequences) when the premises (the hypotheses) are false (Andone&Tugui, 1999).

As in the definition of information, rules are usually deduced from other rules, so that the action (conclusion) from one rule can be found in the premise of another rule. In this case, the final action will imply rule linking based on reasoning. Splitting knowledge in fragments or knowledge pieces makes the knowledge database to be organized in a modular way, so it can be **easily updated**.

One of the largest **disadvantages** is that while the system accumulates knowledge, its performance diminishes, and the response time grows exponentially (because of the large number of rules accumulated).

Most times, when solving a problem, an expert will use knowledge that supervises the process in obtaining the solution. This is a superior knowledge and makes use of the problem solving domain in order to determine the best way to solve the problem. Its name is meta-knowledge. Meta-knowledge is represented with the help of **meta-rules**. So a meta-rule represents a rule that describes how other rules can be used. It determines strategies of usage of specific rules within an applicative domain and it does not establish any conclusions.

A very important issue is the one of the ratio between **relevance** and **precision**. From the general system theory we know that a system divided into a smaller number of sub-systems has greater relevance but lacks precision; whereas adversely, relevance is diminished and precision grows.

We consider that the area of production rules should to be extended in order to create axioms for economic sciences. This fact was suggested by experience when we observed that the production rule sphere is much more extended than what we found in the available literature. From our point of view, even the calculation of an indicator is a production rule. We consider that when axiomatic research focuses on a problem, all the necessary rules for solving the problem should be presented. In this chapter we present a system of production rules that we consider the principal core that exists in all axiomatic systems (Băileşteanu&Târnăveanu, 2006).

### 3. Decision support systems in tourism

The decision and the context of decision making are two key aspects that characterize the utility of the decision models. Data, information and knowledge are used in the decision making process, corroborated with the manifestation of reasoning based on the intelligence and experience of the decisional factor.

Starting with the five managerial functions; crowning decision as the umbrella above all other managerial functions, we will detail different types of decisions and the utility and importance of each of these decisions.

In the managerial practice of an organization, in the context of intense and comprehensive computerization, decisions and decisional processes are conceived and performed more often with a systemic vision. One of the most important characteristics of a successful manager is its ability to make **quality decisions**.

#### 3.1 Decision

**Decision** can be defined as a line of action, consciously chosen from multiple possible alternatives, in view of an objective (Dănăiaţă et al., 2006).

We can outline the following characteristics: it is a volitional act that always has an ending (its purpose is the fulfilment of an objective); it is a conscious thinking process based on evaluation criteria made by an individual or by a software program, but which requires specific knowledge; it is referring to a future state, even if it is based on information from present or past; is the object of all managers, from superior hierarchical organisms to the ones situated at the bottom of the organizational pyramid; it is the mechanism that turns the organization around and assures integration of all efforts in order to fulfil the objectives.

Lately decision is observed as a passing from methods and procedures based on experience, intuition and empiric methods to methods based on science.

**Managerial decision** can be defined as the decision that has direct consequences on decisions and actions of at least another person. It is different from the personal decision in that: managerial decision implies at least two persons: the manager that decides and one or more employees that apply in practice the decision; managerial decision has influences at the group level, does not affect the action of just one employee; managerial action determines effects at least at the level of an organization department.

To be **useful**, the decision has to fulfil some requirements:

- to be **scientifically postulated**, to take into account the actual conditions and the environment to which it refers to, to follow the tendencies of economic systems and their laws, to pay attention to the particularities of the organization in which it will be implemented, and all the internal and external information referring to the decisional problem;
- to be **empowered** – the decider should be that entity (individual or collective) who has the legal right or at least the necessary authority. Best decisions are taken by the people closest to the place of action. Only in extreme cases, when necessary information is required or the gravity of the problem surpasses the competence of the decider, managers from a superior hierarchical level should step in;
- to be well **delimited** to avoid misinterpretation;
- **correlated** with the previous decisions regarding the same issue – so it will not create confusion and contravene to prior decisions, to integrate with the strategies and policies of the organization;
- to be **well-timed**– to be taken exactly when the situation imposes its necessity. Managers should solve multiple managerial problems in a very short time due to the rhythm of the organizational changes. Finding a quick solution to the organization problem doesn't imply that the decision is timely. By decisions' **opportunity** we mean obtaining the results in useful time;
- to be presented in a clear and concise form, easy to understand for the person who will perform it.

Decision is a result of information and knowledge processing made by a person or a group of persons that constitute a decisional organism. They have the necessary authority and are in charge of the efficient use of resources in certain situations and are called **deciders** (Filip, 2007). They need information that is supplied in an efficient and pertinent way by the information system.

### 3.2 Information systems

Information systems play three fundamental roles in assuring the success of an organization:

- support the organization's activity and operational processes;
- decision support systems (for employees and their managers);
- support for strategies related to competitive advantage.

In any moment, information systems designed to support the organization's activity and operational processes send and/or receive data from decision support systems or support for strategies related to competitive advantage systems (Figure 4).

Therefore, organizations take constant care of integration of all their information systems, allowing information to travel freely from one system to another, assuring a greater flexibility and a better support than any individual role.

The concept of Information System is used frequently in the day-to-day speech because of the expansion of using calculation systems in economic and social organization activities.

A modern manager has to make decisions based on a large volume of information, so the Information System is used for storing, processing and generating the information necessary in order to sustain decisions.

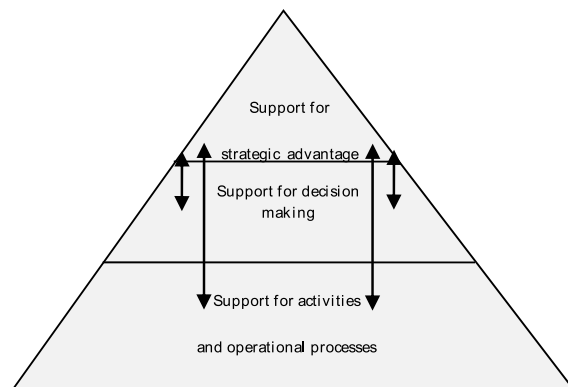


Fig. 4. The three fundamental roles of information systems (Dănăiață, et. al., 2007)

In the middle of the 1950's, **Electronic Data Processing** systems appeared, especially in accounting (because it uses large volumes of data). Their main objective was processing information from a specific area. Data, once stored, started to be processed in order to fulfill managerial demands, adding a new role to the Information System. **Management Information Systems** were born – being oriented to giving information to tactical leadership, in the form of reports and other predefined situations (at the beginning of 1970's). Later, they tried to ease the decisional process, taking over a part of the decisional factor's effort, being obvious that predetermined information products didn't properly respond to all of management's needs. So **Decision Support Systems** appeared. The new role of the Information System is to give managers a prompt and interactive support in their processes of decision making. This help was adapted to decisions and decisional styles of managers and to respond to practical problems in the real world. The 9<sup>th</sup> decade marks an important progress in developing and applying Artificial Intelligence techniques an in **Business Information Systems**. So, in the middle on the 1980's, **Expert Systems** become popular, from which developed at the end of the century **Knowledge Based Systems**, processing human knowledge. Recent systems include intelligent software agents that can be programmed in order to act when the user desires and functions that adapt to his needs, virtual reality application, advanced robotics, natural language processing and a lot of other applications where artificial intelligence eliminates the need of human intervention, allowing personnel to fulfill more complex tasks. These systems can overtake some of the activities from the older systems, being consultants for users and offering professional advice (with a high level of expertise) in some practical areas. In the middle of the 1990's **Enterprise Resource Planning** appeared. This is a strategic information system adapted to an organization that integrates all the aspects of its activity, including planning, production, sales, resource management, customer relationships, financial management, human resources, marketing – in theory, every function of the organization. ERP's main advantage is the common interface for all the computerized organization functions, their full integration and data sharing necessary for a flexible strategic decisional process. Lastly, the Internet, extranet and the booming development of other interconnected networks , have further determined another change in the role of Information Systems. Therefore, Web-ready Organizations, based on Internet and Trading Global Systems and E-business are the common denominator of operations and modern organization management.

### 3.3 Decision support systems

The concept of Decision Support Systems (DSS) was defined at the end of the 60's, when everybody used computers without the help of specialists. It defines any information technology focused on supporting the decision process (Tărnăveanu, 2010b).

Herbert Simon considered that the main problem in management is organizing the decision making systems on different levels and decisional cores, acknowledging that organizational problems depend on the quality of the relationship between cores, of the pertinence of the established objectives, on the transmitted information and the strong convergence of the behaviours (as cited in Harmon&King, 1992).

Developing support information systems for leaders was determined and favoured by the conjugated action of many influential factors (Filip, 2007): changes in the decision-making environment, acknowledgement of the limits of human deciders, the shape of the behaviour of decisional assistants, the developing of a set of tools specific to decision support and the transposing of these tools into commercial computer products, the evolution of the concept of design for management information systems, information technology and progress in communication, specially the extended use of the Internet and the experience gained from using Information Systems created for decision support.

#### 3.3.1 Characteristics and requirements

At the organizational level, the impact of new information technology affected the most important area of managerial activity: the decision-making process.

**A Decision Support System** is an information system based on a set of procedures for data processing and reasoning, with the objective of helping the manager in the process of decision-making, coupling intellectual individual resources with computer capabilities. The **objective** of a DSS is to support decisions for all management areas: strategic planning, managerial control, operational control, etc. Its aim is to decrease the effect of the limits and restrictions of the decider through computerized implementations of some of the decision support functions.

We will present the ideal model, defined by a set of characteristics and requirements (Turban as cited in Shahua&Salvolainen, 1994):

- to solve manager's problems when dealing with weakly structured or unstructured data;
- to offer support by combining reasoning and human judgment with computer processing;
- to assist all the managerial levels within an organization;
- to support individual and group decisions;
- to be adaptable and flexible;
- to combine modules and analytical techniques with traditional functions;
- to have a user-friendly interface, interactive communication with user;
- to facilitate learning processes- offering new ways to interpret information;
- to be prompt, accurate, clear and to reduce organization's costs;
- to assure total control for the human factor;



- to constantly accumulate new knowledge necessary for developing, analysing and perfecting itself;
- to embed both information and models.

For 30 years, researchers and IT specialists have studied and built a great variety of systems that offer decisional support. Lately, new concepts have emerged, such as business intelligence, on-line analytical processing, knowledge management and technologies such as Cloud Computing, taking the theory of decision support system to a new level.

### **3.3.2 Benefits and limitations**

From the advantages of using a Decision Support System we underline:

- the quality of decisions (the solution is a result of deep analysis, based on analytical models, considering a large number of alternatives in a short period of time);
- improvement of individual decisional abilities: learning new concepts and methods, deeper understanding of the phenomenon, the transfer of knowledge from costly or unavailable deciders (experts);
- cost reduction;
- improved communications;
- objectivity and impartiality;
- better productivity based on better time-management (the period of time in which a decision is made is shortened);
- better client and employee satisfaction.

From the limitation, we took into account:

- the lack of human qualities such as: creativity, intuition, imagination, sense of responsibility, self-preservation instincts;
- depending on the cost allocations, the hardware resources can be limited or of insufficient quality;
- can't solve randomly generated problems – it has a specific purpose, with a restricted domain and solves a well-defined and delimited range of problems;
- compatibility issues can appear when integrating it in the global informatics system;
- confusion and differences can appear in the significance of some terms due to cultural differences;
- insufficient or badly structured documentation.

### **3.4 Decision support systems in tourism**

The perception of Romania as a tourist destination is unclear; it does not enjoy a good reputation as an alluring trusting destination for occasional tourists. The re-launching of tourism in Romania as a tourist destination and the attraction of a larger number of foreign tourists could bring supplementary benefits, but would require many necessary changes, in the tourism manager's opinion (Cândea et al, 2009).

We found a good example in a paper that presents the main capabilities of a Customer Relationships Management software developed and applied for the customers' portfolio of a Romanian hotel. The multidimensional analysis of the sales applied to the information

about customers stored in the software's database using OLAP (On-Line Analytical Processing) technique provides a real support for the marketing managers' decision making process. By testing the functions of that software, they revealed the possibility to create a personalized CRM strategy, to determine customers' profitability and to determine the best offer positioning, taking into account the distribution of sales according to the most important segmentation criteria, using OLAP (Micu et al., 2009).

Information and communication technologies have profound implications for the tourism industry. They are being used extensively in a great variety of functions and account for innumerable applications. Among these, Decision Support Systems can play a fundamental role for their capacity to give organizations and people managing tourist destinations the possibility to base all of the decisions concerning policies, infrastructure development and stakeholders' progress on sound and rational bases. We found a paper that presents an overview of DSS usage in tourism management organizations and portrays a general framework for the design of an effective practical implementation (Baggio&Caporarello, 2004).

Another project (SFIDA) –funded by the European Commission within LIFE – Environment Programme and co-financed by DG Environmental Quality of Regione Lombardia (Italy) has as a main objective to develop a Decision Support System suited to integrate environmental concerns into the definition of a plan for sustainable tourism for three municipalities located close to Lake Garda. The DSS is used to generate information and stimulate participation, making the decision transparent, repeatable and participatory. The components of the DSS support several phases of the planning process, including the environmental and socio-economic analysis, the definition of the plan procedure, the impact representation, the evaluation and comparison of the alternatives, and the management of the conflict among decision-makers (Laniado, et.al, 2004).

One of the articles presents the Illinois Tourism Network (ITN) as an example of inter-organizational, knowledge-based tourism information system/community that successfully integrated the management of information and knowledge flows in a way that appeals to tourism organizations in different stages of effective technology use and fosters capacity building among community members (Gretzel&Fesenmaier, 2004).

Another paper presents a Fuzzy based decision support system for E-Tourism investment risk analysis. In general terms, E-tourism is the use of information and communication technology (ICT) in tourism which may allow operating tourism in least variable cost, least time and increasing work efficiency. To demonstrate the effectiveness of the system, factors like investment, human IT skills, E-tourism infrastructure and stability of the regions are considered. (Paudel&Hossain).

Cause and effect analysis influences the effectiveness of decision-making and the consumer behaviour. The complex relationship between cause and effect as well as the fuzzy nature of human life make the cause and effect analysis difficult. This research applies to fuzzy DEMATEL method for group decision-making to gather group ideas and analyze the cause and effect relationship of complex problems in a fuzzy environment. An empirical study applies to the fuzzy DEMATEL method in the service quality of Taiwanese leisure farms. This study used purpose sampling, a total of 215 valid instruments collected from Beijing tourists' perception on service quality (Lin et al., 2009).

A marketing decision support system (MDSS) can be of particular importance as it supports organizations in collecting, storing, processing, and disseminating information and the decision-making process by providing forecasts and decision models. Insights into a successful implementation of a MDSS in tourism can be found in the literature (Wöber, 2003). He created TourMIS, an on-line accessible decision support tool for tourism and hospitality management which has been successfully used by more than 1000 users for three years.

From another point of view, the acquisition of knowledge management level may imply a considerable amount of audits. Another article proposes a Knowledge-Based System that makes it possible to evaluate an organization at a Knowledge Management Capability Assessment maturity level. It is very interesting to minimize the cost by paying only for the truly indispensable authors (Andrade et.al, 2010).

Operators in tourism management, compared to other management sectors, are confronted with a vast field of complex aims, requiring different plans of action. The major reason for the poor application of management science is insufficient education of practitioners and the inadequacy of problem solving features of standard software solutions. We consider the development of simple, affordable programs, downloadable for every tourism manager, is the first step in a new era of dialog between research and practice. We noticed different approaches in the literature, all having their benefits and some disadvantages.

### **3.5 An example of a decision support system implementation in tourism**

It is crucial to design and implement Decision Support Systems to assist the manager because of the large quantities of diverse data stored in an organization. For a manager, informatics and the use of information technologies always means formalizing routine activities, those laws of existence and manifestation that can be described. The “casualty” fact is transformed into one that is “standardized”, elaborating behavioural conducts possible to use depending of the specificity of the situation occurred. The importance of interpretation is vital, from the information dimension to the strategic one. Information technologies are applied, separately and together, in management and decision modelling. They offer modelling instruments being able to automate the processes. The use of the decision and the context of decision making are two key aspects that characterise the utility of the decision models. In the decision making process are used data, information and knowledge corroborated with the manifestation of reasoning stated by the intelligence and experience of the decisional factor. Artificial intelligence proved its applicability using specific technologies such as expert systems (capable of offering expertise in a specific knowledge domain) and decision support systems (a system that brings together the intellectual resources of a person with the capabilities of a computerized system in order to improve the quality of the decisions).

We will present an implementation of decision support systems. Based on the knowledge provided of the expert and some historical data, we used binary trees in order to build a formalized axiomatic system. The axioms were transposed into production rules, as modules of the decision support system.

### 3.5.1 Premises

Information and knowledge technologies are two essential tools for the modelling and developing of interactive solutions. Therefore, we focused on identifying their use in decision modelling. We created an intelligent decision making system with the main purpose of providing intelligent informing. Hybrid support systems are systems that result from integrating decision support systems with other tools and technologies in order to maximize efficiency of the decision processes in an organization. Our proposal is a hybrid system, a combination of a decision support system model oriented (flexible systems that use spreadsheets, used in what-if analysis) and decision support systems knowledge oriented (software modules based on artificial intelligence).

We noticed that time and effort are wasted when the information is not at hand, therefore managers could use a little help in making decisions based on what-if predictions. We designed an application to help them simulate a real business situation and see the results immediately. We chose a hotel situated in the western part of Romania, in a beautiful resort called Băile Felix (<http://www.bailefelix.net/>). The manager wanted to invest and was open to new ideas and to implementing an information system that could help him deal with economic indicators and predict what could happen in the future. The system doesn't take into consideration some indicators like inflation, but we consider it is a good starting point. Also, we want to expand it in the future, so we could apply it to the entire complex of hotels in Băile Felix.

### 3.5.2 The system of variables

To build a generally valid system (a formalized one) it is necessary to create an interconnected system of indicators, the advantage being that if the value of one indicator is changing, all the other values of the indicators depending on it will also be changed automatically.

The system sets the targets for three main variables: the income generated from the hotel activities, restaurant and treatment ( $V_{rht}$ ); the expenditure for 1000 lei income ( $C/1000v$ ); the total assets ( $A_{totale}$ ). Circulating assets capitalization ( $rAC$ ) and total asset capitalization ( $rAT$ ) are the desired indicators, but they depend on these three main indicators.

For those main variables we used the semantic trees presented earlier in order to obtain the axioms which were translated into production rules, then into subroutines. The other variables change their value depending on these main variables.

The relationship between all the variables can be seen in figure 5, where:  $V_{rht}$  = income generated from the hotel, restaurant and treatment,  $NZT$  = number of tourist days,  $V_{mzt}$  = average income on a tourist day,  $K_f$  = using capacity,  $G_o$  = occupying level,  $K_c$  = touristic built capacity,  $C_{pf}$  = putting to function coefficient,  $C_f/1000v$  = fixed expenditures for 1000 lei income,  $C_v/1000v$  = variable expenditures for 1000 lei income,  $aC_f/1000v$  = fixed expenditures 1000 lei income, other than amortization,  $Cam/1000v$  = amortization expenditure for 1000 lei income,  $C_s/1000v$  = wages expenditures for 1000 lei income,  $C_{fa}/1000v$  = other expenditures for 1000 lei income,  $A_{fixe}$  = fixed assets,  $A_{circulante}$  = circulating assets,  $N$  = average number of personnel,  $q_{zf}$  =  $A_f/N$  = degree of endowment with fixed assets  $A_f/N$ ,  $p_{af}/A$  =  $A_f/A_{totale}$  = weight of fixed assets in total assets,  $q_{za}$  =

$A/N$  = degree of endowment with total assets,  $Vagr$  = income from leisure,  $Valte$  = income from other activities,  $Vexpl$  = operating income,  $Vfin$  = financial income,  $VT$  = total income,  $WT$  = work productivity,  $rAC$  = circulating assets capitalization,  $P$  = profit,  $m = P/V_{totale}$  = weighted profit,  $rAT = P/Atotale$  = total assets capitalization.

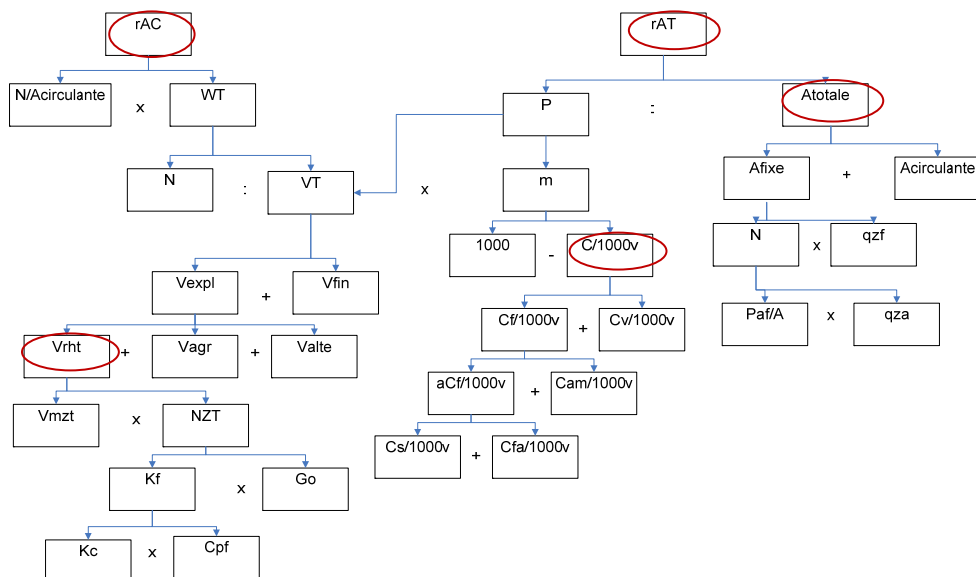


Fig. 5. The system of variables

As a reasoning method we used deduction (begun at the bottom level, if we change the value of building capacity, how that change affect all the variables until it reaches circulating asset capitalization) and induction (e.g. – setting a target for total asset capitalization, the system will determine the values for all the other variables in order to sustain that target).

One important feature is that the system behaves in a dynamic way.

### 3.5.3 The formalized axiomatic system

An axiomatic system is a system of propositions based on the distinctions between axioms (primary propositions) and theorems (derived propositions). The transition from the primary terms to derived ones assumes the existence of definition and deduction rules. When the interpretation of the symbols is not used, the system is called formalized axiomatic system. An axiom is an obvious proposition that requires no demonstration. Theorems are propositions obtained from axioms or other proposition, obtained using inference rules. Through deduction we understand applying to axioms or propositions initially considered true inference rules for a finite number of times.

The organization that we studied can be modelled using semantic trees. We used a left-decomposed semantic tree, as can be seen in figure 6.

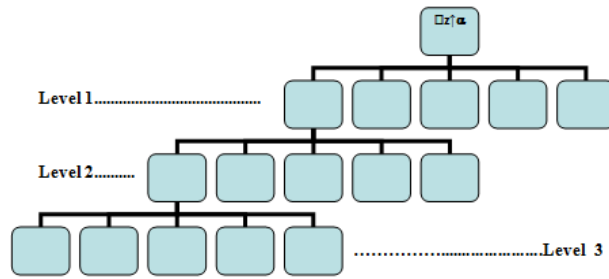


Fig. 6. A left decomposed semantic tree

The symbol  $\square$  represents “must”,  $\uparrow$  represents growth, and  $\alpha$  the growth coefficient.

Two basic observations can be outlined: if the number of alternatives is reduced, the complexity of the system is also reduced, but the interpretation is easier; the right part of the semantic tree can be also interpreted, so the generality of the system is not reduced.

We chose to represent a product system  $\times(\times(x_{11}, x_{12}, x_1), x_2, x), y, z)$  where  $z$  is a very well determined target:  $z = f(x_{11}, x_{12}, x_2, y)$  – figure 7.

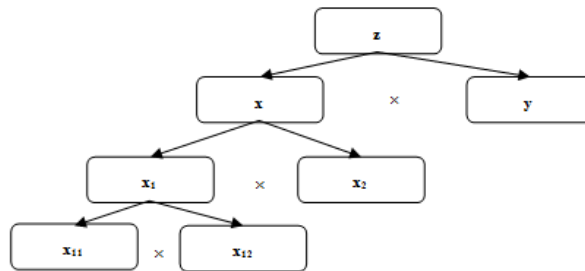


Fig. 7. Product system

A number of observations can be outlined:

- if the number of alternatives is reduced, the complexity of the system is also reduced, but the interpretation is easier;
- the right part of the semantic tree can be also interpreted, so the generality of the system is not reduced.

Using the formalized symbols we describe all the possible growth alternatives depicted in the following figure:

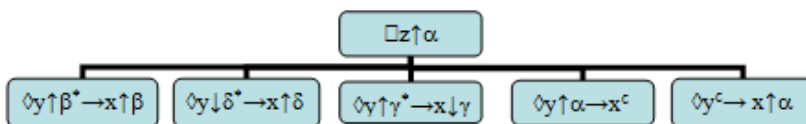


Fig. 8. The first level of the semantic tree

$$\Box z \uparrow \alpha \rightarrow \Diamond ((y \uparrow \beta^* \rightarrow x \uparrow \beta) \vee (y \downarrow \delta^* \rightarrow x \uparrow \delta) \vee (y \uparrow \gamma^* \rightarrow x \downarrow \gamma) \vee (y \uparrow \alpha \rightarrow x^c) \vee (y^c \rightarrow x \uparrow \alpha)) \quad (4)$$

where  $\alpha > 1$ ,  $\beta > 1$ ,  $\beta^* = \frac{\alpha}{\beta}$ ,  $\beta^* > 1$ ,  $\delta > 1$ ,  $\delta^* = \frac{\alpha}{\beta}$ ,  $\delta^* < 1$ ,  $\gamma < 1$ ,  $\gamma \neq 0$ ,  $\gamma^* = \frac{\alpha}{\beta}$ ,  $\gamma^* > 1$ ,  $\Diamond$  represents possibility,  $\downarrow$  means decrease,  $\vee$  stands for “or” (multiple choices), and the Latin letters are the change coefficients for each variable.

Going down on the left side of the semantic tree, we can depict Figure 9, and relation (5) can be obtained.

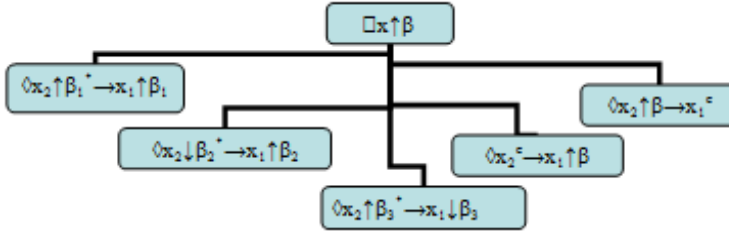


Fig. 9. Second level of the semantic tree

$$\Box x \uparrow \beta \rightarrow \Diamond ((x_2 \uparrow \beta_1^* \rightarrow x_1 \uparrow \beta_1) \vee (x_2 \downarrow \beta_2^* \rightarrow x_1 \uparrow \beta_2) \vee (x_2 \uparrow \beta_3^* \rightarrow x_1 \downarrow \beta_3) \vee (x_2 \uparrow \beta \rightarrow x_1^c) \vee (x_2^c \rightarrow x_1 \uparrow \beta)) \quad (5)$$

where  $\alpha > 1$ ,  $\beta > 1$ ,  $\frac{\alpha}{\beta} > 1$ ,  $\beta_1 > 1$ ,  $\beta_2 > 1$ ,  $\beta_3 \neq 0$ ,  $\beta_3 < 1$ ,  $\beta_1^* = \frac{\beta}{\beta_1}$ ,  $\beta_1^* > 1$ ,  $\beta_2^* = \frac{\beta}{\beta_2}$ ,  $\beta_2^* < 1$ ,  $\beta_3^* = \frac{\beta}{\beta_3}$ ,  $\beta_3^* > 1$ .

Using the same method on the left side, we obtain relation (3):

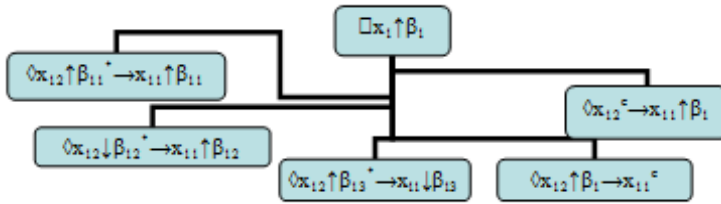


Fig. 10. The last level of the semantic tree

$$\Box x_1 \uparrow \beta_1 \rightarrow \Diamond ((x_{12} \uparrow \beta_{11}^* \rightarrow x_{11} \uparrow \beta_{11}) \vee (x_{12} \downarrow \beta_{12}^* \rightarrow x_{11} \uparrow \beta_{12}) \vee (x_{12} \uparrow \beta_{13}^* \rightarrow x_{11} \downarrow \beta_{13}) \vee (x_{12} \uparrow \beta_1 \rightarrow x_{11}^c) \vee (x_{12}^c \rightarrow x_{11} \uparrow \beta_1)) \quad (6)$$

where  $\alpha > 1$ ,  $\beta_1 > 1$ ,  $\beta_{11} > 1$ ,  $\beta_{11}^* = \frac{\beta_1}{\beta_{11}}$ ,  $\beta_{11}^* > 1$ ,  $\beta_{12} > 1$ ,  $\beta_{12}^* = \frac{\beta_1}{\beta_{12}}$ ,  $\beta_{12}^* < 1$ ,  $\beta_{13} < 1$ ,  $\beta_{13} \neq 0$ ,  $\beta_{13}^* = \frac{\beta_1}{\beta_{13}}$ ,  $\beta_{13}^* > 1$ .

Five theorems can be obtained from relation (1), (2) and (3) using the method of polysyllogism:

$$\Box z \uparrow \alpha \rightarrow \Diamond (x_{11} \uparrow \beta_{11} \& x_{12} \uparrow \beta_{11}^* \& x_{21} \uparrow \beta_{11}^* \& y \uparrow \beta^*) \quad (7)$$

where  $\alpha > 1$ ,  $\beta > 1$ ,  $\beta^* = \frac{\alpha}{\beta}$ ,  $\beta^* > 1$ ,  $\beta_{11} > 1$ ,  $\beta_{11}^* = \frac{\beta}{\beta_{11}}$ ,  $\beta_{11}^* > 1$ ,  $\beta_{11} > 1$ ,  $\beta_{11}^* = \frac{\beta_{11}}{\beta_{11}}$ ,  $\beta_{11}^* > 1$

$$\Box z \uparrow \alpha \rightarrow \Diamond (x_{11} \uparrow \beta_{12} \& x_{12} \downarrow \beta_{12}^* \& x_{21} \uparrow \beta_{12}^* \& y \uparrow \beta^*) \quad (8)$$

where  $\alpha > 1$ ,  $\beta > 1$ ,  $\beta^* = \frac{\alpha}{\beta}$ ,  $\beta^* > 1$ ,  $\beta_{12} > 1$ ,  $\beta_{12}^* = \frac{\beta}{\beta_{12}}$ ,  $\beta_{12}^* > 1$ ,  $\beta_{12} > 1$ ,  $\beta_{12}^* = \frac{\beta_{12}}{\beta_{12}}$ ,  $\beta_{12}^* < 1$

$$\Box z \uparrow \alpha \rightarrow \Diamond (x_{11} \downarrow \beta_{13} \& x_{12} \uparrow \beta_{13}^* \& x_{21} \uparrow \beta_{13}^* \& y \uparrow \beta^*) \quad (9)$$

where  $\alpha > 1$ ,  $\beta > 1$ ,  $\beta^* = \frac{\alpha}{\beta}$ ,  $\beta^* > 1$ ,  $\beta_{13} > 1$ ,  $\beta_{13}^* = \frac{\beta}{\beta_{13}}$ ,  $\beta_{13}^* > 1$ ,  $\beta_{13} < 1$ ,  $\beta_{13} \neq 0$ ,  $\beta_{13}^* = \frac{\beta_{13}}{\beta_{13}}$ ,  $\beta_{13}^* > 1$

$$\Box z \uparrow \alpha \rightarrow \Diamond (x_{11} c \& x_{12} \uparrow \beta_1 \& x_{21} \uparrow \beta_1^* \& y \uparrow \beta^*) \quad (10)$$

where  $\alpha > 1$ ,  $\beta > 1$ ,  $\beta^* = \frac{\alpha}{\beta}$ ,  $\beta^* > 1$ ,  $\beta_1 > 1$ ,  $\beta_1^* = \frac{\beta}{\beta_1}$ ,  $\beta_1^* > 1$

$$\Box z \uparrow \alpha \rightarrow \Diamond (x_{11} \uparrow \beta_1 \& x_{12} c \& x_{21} \uparrow \beta_1^* \& y \uparrow \beta^*) \quad (11)$$

where  $\alpha > 1$ ,  $\beta > 1$ ,  $\beta^* = \frac{\alpha}{\beta}$ ,  $\beta^* > 1$ ,  $\beta_1 > 1$ ,  $\beta_1^* = \frac{\beta}{\beta_1}$ ,  $\beta_1^* > 1$ .

Through the same method a total number of 105 theorems can be obtained and grouped into one meta-theorem that contains all the possible cases for the growth of  $z$  if the operator between the variable is product.

Using meta-theorems deduced in this way, we built a decision support system.

### 3.5.4 The decision support system

The model was created based on semantic trees. We divided this complex system into several trees and built rules for each type of tree, based on the operators between the variables. For each of the three sub-modules, the application permits choosing between the following alternatives: we can set the target or we can see the history of the variables (the last three years) and follow the expert opinion. During each interval the user can correct the choice or the expert opinion, based on some external information.

A big advantage is the formalization of the system. That means that instead of income we can use any other variable or indicator, but the operators between the variable must remain the same.

We implemented these concepts in Microsoft Excel 2007, using Visual Basic Application – a powerful tool that uses procedures in order to control the behaviour of Excel objects.

The main advantage of the application is that the user can change the value of each variable, regardless of the moment or the position in the main system of indicators. The results are automatically being re-calculated and displayed right away.



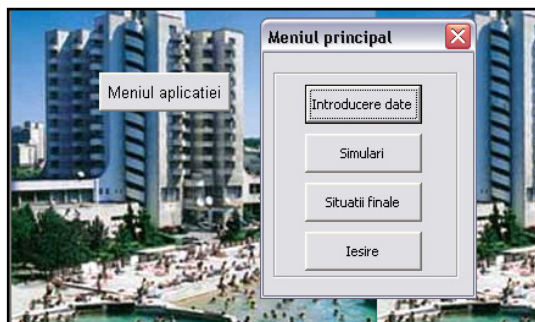


Fig. 11. The DSS' menu

The application contains 9 sheets and 25 user forms, the interface being a Graphical User Interface (GUI). The DSS is divided into four modules that permit: gathering data, simulations, printing the results and exiting the application – Figure 11.

The first module is called “Introducere date” and permits gathering information or updating data about the last three years and the initial values of variables for the simulation.

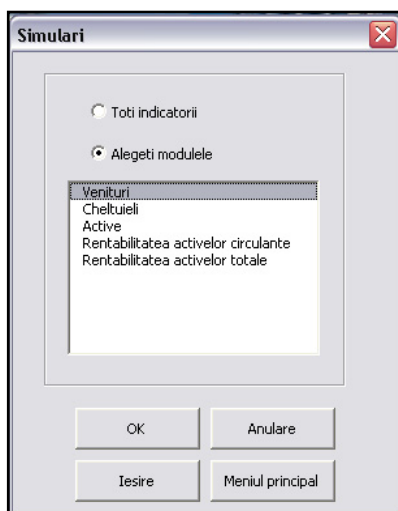


Fig. 12. Choosing which module to run in order to simulate a real situation

The second option from the menu is called “Simulare”, where we used the rules obtained previously in order to generate a possible solution. The form Simulare allows executing the entire algorithm or just one or more modules.

The last module allows displaying or printing the results obtained when running the decision support system. The last button exits the information system.

We will present the construction of one of the main modules, the one that starts with the form **Income** – figure 13.

Fig. 13. Income form in design mode – choosing the growth coefficient for the income

On the right-hand side we can see the initial values, modifiable data that can be changed to reflect alternate initial conditions. The system calculates the related variables based on the values of the variable it already has, maintaining the economic relationship between the indicators.

This form allows data validations – the initial data must verify the relations (in our case, the economic relations) between the variables.

The user can follow the expert opinion or can insert a value based on his own opinion (C – inserting a value, I – be guided by the expert opinion, based on the firm's history); based on the history and some hypothesis introduced in the system by the expert, the application provides three scenarios: an optimistic one, a pessimistic one and the most probable one, suggesting the option to the user – figure 14;

Fig. 14. The history for the Income variable

The user has to choose a growing coefficient for the income ( $>1$ ). We present a part of the algorithm, the choosing of the growth coefficient for the Income resulting from hotel activities, restaurant and treatment in Figure 15.

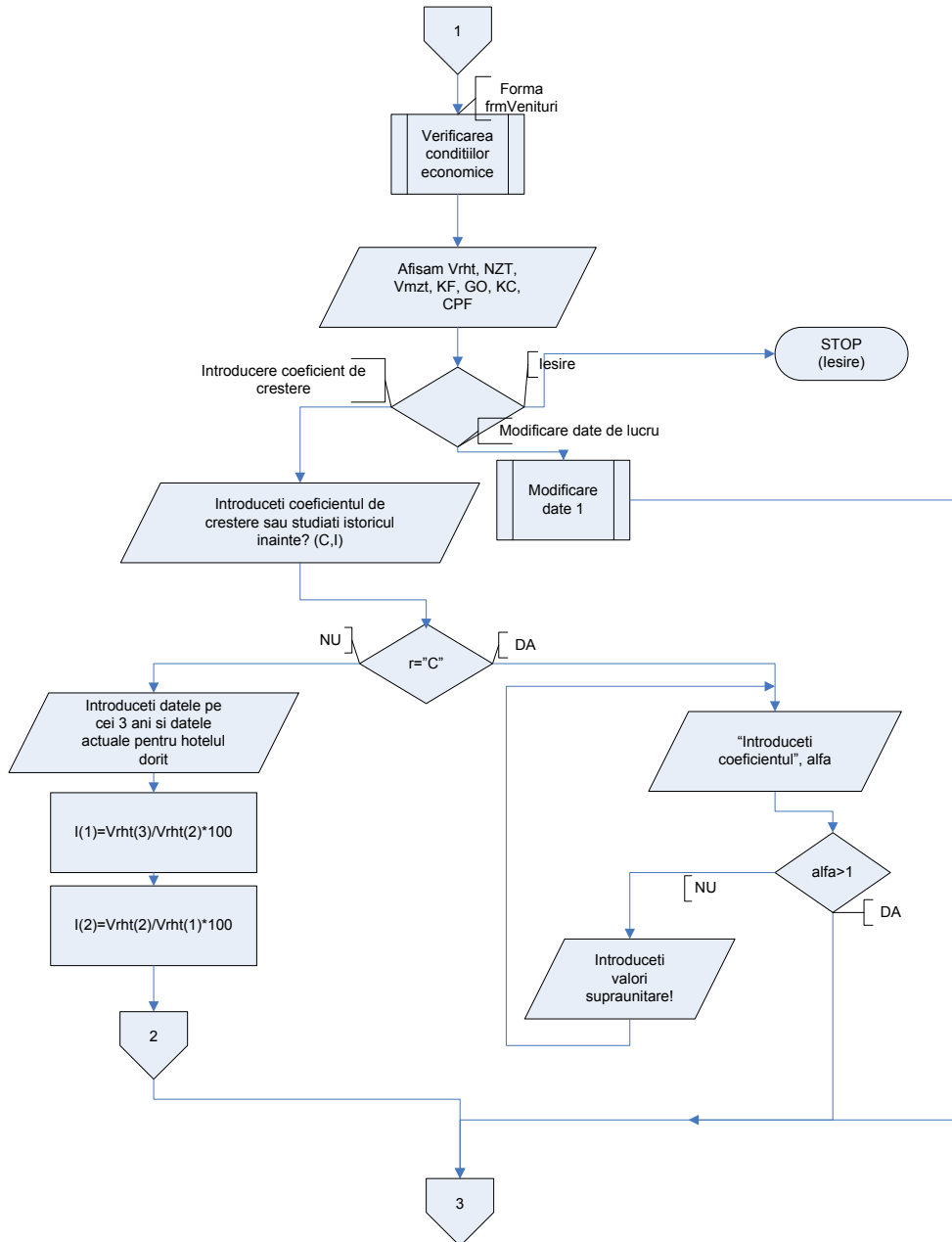


Fig. 15. Logical design of the process

Input of the desired value is validated pushing the Ok button, so the system displays the next form - Figure 16. For each variable we also have a history, like in the case of the

Income: e.g. a raise in the income from hotel activities, restaurant and treatment can be sustained only by either number of tourist days (numarul de zile turist), average income (venitul mediu) on a tourist day or both.

Fig. 16. All the possible alternative for this particular case

This form allows going back to the first form to pick another value for Income RHT by checking “Alegerea unui alt coeficient de creștere pentru veniturile RHT” check-box, or using the rules (7), (8), (9), (10), (11) – we can choose one the five options or the last one, inserting a different coefficient, with no help from the expert.

If one of the five options that change the number of tourist days is picked, the system uses the rules built based on axioms and provides the user with an interval in which the value should be placed, so that the specific case selected will be valid. If this indication is not followed, the input is denied.

Finally – taking into account the organization specificity and the management point of view we chose six possible alternatives presented in Figure 17.

	A	B	C	D	E	F	G	H
1								
2		UM	2008	2009	2010	V1	V4	V6
3	Venit din activitati hoteliere, restaurant, tratament (Vrht)	Lei	30.372.043,63	32.476.003,04	37.280.294,54	35.307.928,47	32.567.571,00	36.627.485,00
4	Numar zile turist (Nzt)	Lei	458.652,00	447.957,00	441.295,00	396.718,30	397.165,50	441.295,00
5	Venit mediu pe zi turist (Vmnt)	Lei	66,22	72,50	84,48	89,00	82,00	83,00
6	Capacitatea de folosinta (Kf)	x	30.242,89	27.645,67	26.054,73	24.593,99	31.265,67	26.054,73
7	Gradul de ocupare % (Go)	%	49,86%	53,27%	55,68%	53,03%	41,76%	55,68%
8	Capacitatea construita (Kc)	x	37.656,00	37.656,00	36.888,00	36.478,00	31.354,80	36.888,00
9	Coeficientul de punere in functiune % (Cpf)	%	80,31%	73,42%	70,63%	67,42%	99,72%	70,63%
10	Cheptuilei la 1000 lei (C1000v)	Lei	904,87	817,20	829,79	825,31	699,21	555,64
11	Cheptuilei fixe la 1000 lei (Cf1000v)	Lei	549,86	561,90	551,36	547,90	421,79	386,34
12	Cheptuilei variabile la 1000 lei (Cv1000v)	Lei	255,01	255,30	277,42	277,42	277,42	169,30
13	Alte Cheptuilei fixe la 1000 lei (aCf1000v)	Lei	482,14	498,12	469,82	513,23	410,34	371,56
14	Cheptuilei cu amortizarea la 1000 lei (Cam1000v)	Lei	67,72	63,78	81,54	34,67	11,45	14,78
15	Cheptuilei cu salarii la 1000 lei (Cs1000v)	Lei	308,26	324,60	319,00	478,56	399,89	356,78
16	Cheptuilei fixe ramase la 1000 lei (Cfa1000v)	Lei	173,89	173,52	150,82	84,05	43,51	34,01
17	Active totale (AT)	Lei	92.929.393,00	177.156.309,00	181.457.027,00	1.224.102.842,17	181.578.817,14	411.700.864,97
18	Active fixe (Af)	Lei	77.198.070,00	152.456.601,00	169.480.220,00	1.212.128.035,17	170.483.061,54	368.403.867,57
19	Active circulante (Ac)	Lei	15.731.322,00	24.699.708,00	11.976.807,00	11.976.807,00	11.095.755,60	43.296.997,40
20	Grad de inzestrare cu active fixe (qzf)	Lei	92.452,78	182.010,83	200.569,31	1.286.758,00	200.569,31	449.273,01
21	Numar mediu personal (N)	Nr	835	794	845	842	850	820
22	Pondere activelor fixe in activ total (patfA)	%	83,07%	86,06%	93,40%	104,61%	93,40%	93,40%
23	Grad de inzestrare cu active totale (qza)	x	111.292,69	223.118,78	214.742,04	1.230.080,76	214.742,04	481.022,18
24	Venituri din activitati de agrement (Vagr)	Lei	2.024.365,87	2.523.431,73	3.306.312,77	13.225.251,08	13.225.251,08	13.225.251,08
25	Venituri din alte activitati (Valte)	Lei	3.616.581,99	4.868.620,98	4.291.235,25	9.440.717,55	9.440.717,55	9.440.717,55
26	Venituri din exploatare (Vexp)	Lei	36.012.991,49	39.668.055,75	44.877.842,56	57.973.997,10	55.233.539,63	59.293.453,63
27	Venituri financiare (Vfin)	Lei	322.342,36	624.735,08	3.040.274,90	3.504.586,36	3.504.586,36	3.504.586,36
28	Venituri totale (VT)	Lei	36.335.333,87	40.292.790,83	47.918.117,46	61.478.483,46	58.738.125,99	62.798.039,99
29	Productivitatea muncii (WT)	Lei/salarial	43.515,37	50.748,59	56.707,83	85.263,78	69.103,68	76.582,98
30	Rentabilitatea activelor circulante (rAC)	Lei/profitiei active	2,31	1,63	4,00	11	8,29	1,45
31	Marja de profit (m)	%	19,51%	18,28%	17,12%	17,47%	30,08%	44,44%
32	Profit (P)	Lei	7.090.116,97	7.365.471,80	8.204.226,21	10.739.061,49	17.667.840,92	27.904.937,05
33	Rentabilitatea activelor totale (rAT)	Lei/profitiei active	0,08	0,04	0,05	0,01	0,10	0,07

Fig. 17. Possible alternatives – predictions for 2013

Our application is universally valid regardless of the considered variables. The only condition is that the relation between variables be one of sum, product, difference or division. The user can make any predictions for growth or decrease coefficients associated to the variables.

Sometimes we can come across a situation in which variable expenditure for 1000 lei income is negative, occupying level to be more than 100%, etc. Therefore, before making a selection of the alternatives to be considered, we have to apply the validation estimation, which includes among other rules: income, number of tourist days can't be negative, occupying level has to be more than zero and less or equal to 100, etc. If from these resulted alternatives this situation occurs, we consider them, from an economical point of view, unfeasable, and consequently we do not take them into consideration.

Because we consider that tourism managers could benefit from access to the Internet, we are considering an on-line implementation of the decision support system.

#### **4. Conclusions**

An evolution in tourism marketing systems is critical in meeting the increasing needs for accurate, reliable and up-to-date information and in supporting knowledge creation and learning process within the tourism industry (Gretzel&Fesenmaier, 2004).

Information systems studies are the confluence of many domains – information technology, management, marketing, accounting and organizational culture. They can be applied in different domains, one of them being tourism. Tourism has become an extremely dynamic system. In the last years, globalization enabled by technology development and by less expensive travel costs has greatly increased competition (Baggio&Caporarello, 2004). In the future economy, a knowledge-based economy, Decision Support Systems brings together the intellectual resources of experts with computer capabilities in order to improve the quality of the decisions taken (Târnavăanu, 2010a). Our goal was to present innovative concepts and techniques that can help us face mounting changes and challenges in the context of the new economy based on knowledge. Modern companies use knowledge-driven applications in order to respond rapidly to changing market conditions and customer needs. In recognition of the need to use information technology in order to implement Knowledge Management Systems and to transform their organization into a modern one, many organizations developed knowledge portals (Muntean&Târnavăanu, 2009a). This could be a direction to be followed.

In the future economy, a knowledge-based economy, decision support systems (DDS) are very rigorous and precise if the hypotheses are well grounded. An important direction of research is simulation of specialist thinking based on a Knowledge Based Systems (KBS). The evolution of DDS and KBS depends on the evolution of knowledge representation. Even though the research in economic knowledge representation is in progress, the cases in which theory is put into practice are very rare, and of limited complexity. An evolved KBS must incorporate knowledge pieces capable of explaining the economic phenomenon in all its complexity. In the near future not only the problem of rational, conscious knowledge will be an issue, but the one of unconscious knowledge based on intuition and imagination will join the ranks of issues to be resolved.

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# Introduction to Input-Output Framework for Analysis of Tourism as an Industry

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## 1. Introduction

Input-Output (I-O) is an economic framework which was awarded two Nobel Prizes in Economics, one in 1973 to Dr. Wassily Leontief and the other for its extended Social Accounting Matrix (SAM) to Sir Richard Stone in 1984. The I-O/SAM framework remains as a core component for Computable General Equilibrium (CGE), which cannot function without the data of I-O/SAM. Applications of I-O family have been published not only in the broader social science fields including but not limited to economics, regional science, international development, but also in the tourism field. I-O framework is the foundation of System of National Accounts (SNA), which has been used by all the national governments in the world to measure important data such as gross domestic product (GDP), capital formation etc. Need for studying I-O has been increased significantly for tourism researchers because of a simple fact that a global common recording system to measure economic activities of tourism, officially endorsed by United Nations, World Bank, International Monetary Fund, Organization for Economic Cooperation and Development, to name a few, is based on I-O.

There are, however, two serious problems for researchers and students of tourism to study the I-O. First, majority, if not all, of applied tourism researchers have never took formal training of how the I-O works, instead they only carry secondary perception that I-O framework is outdated and offers little value to the tourism field. Second, because of the first challenges, they do not have enough formal opportunities to learn about this extremely important framework, without which you cannot “understand” how the I-O and its extended family, such as SAM, CGE and TSA work. This chapter offers the shortest way to learn the minimum required knowledge of I-O framework for hospitality and tourism researchers and students. Technical explanations followed descriptions by Hara (2008).

### 1.1 Brief history

Dr. Wassily Leontief succeeded in materializing the concept of “Tableau Economique” presented by the French Economist Francois Quesnay, in 1758. Dr. Leontief published the

U.S. Input-Output table of 1919 and 1929, in 1936 (Leontief, 1951), followed by a series of publications, resulting in the 1973 award of the Nobel Prize in Economics "For the development of the input-output method and for its application to important economic problems."

Dr. Walter Isard started to focus on regional economic impact analysis in the 1940s and initiated a new academic field entitled "Regional Science", which is roughly explained as "Applied Geographical Economics." Regional Science Association International (RSAI) was founded by Dr. Isard in 1954, and many researchers have expanded the depth and width of applied research using quantitative methods to address issues of regional economic analyses. Scholars in this field have contributed a lot towards the development and application of the I-O models, in order to help solve the problems in the world.

Input-Output modeling, "has failed to maintain the interest of academic theorists". (Duchin 1998) While the popularity of stochastic modeling has been high, the Input-Output modeling did not capture the main-stream momentum due to the perception of researchers regarding the absence of stochastic elements. Knowledge on Input-Output modelling became necessary as prerequisite to understand Tourism Satellite Accounts, which is based on the System of National Accounts (SNA), the product of the Input-Output framework to measure activities of the national economy.

## **2. Concept of simple input-output modeling**

Let's assume that we want to learn about our society, and let's assume that our society consists of three industrial sectors only, namely agriculture, manufacturing and services sectors. Model is a simplified version of the complex society.

### **[Understanding Intermediate Goods and Final Consumption]**

Assume that you want to purchase an apple juice in a plastic bottle to quench your thirst. Here is the first important question. What does the apple juice bottle consist of? Is it a manufactured product, or an agricultural product? While the plastic bottle is the manufactured product, namely a product made by the manufacturing sector, one important ingredient came from the agricultural sector, the apples. The manufacturing sector purchased the output - namely, the apples - from the agricultural sector, not to be consumed, but to be used as intermediate goods for producing the final product - the apple juice in the plastic bottles. If the manufacturer is the food processing company, they must have bought the empty bottles from another manufacturing sector, thus the manufacturing sector is selling plastic bottles to the other firms within the same manufacturing sector. When a sector purchases required input from other sectors, in order to produce their own goods, the former are called "intermediate goods" and this type of transaction is called "inter-industry transactions". This is in clear contrast with the purchase of the apple juice bottle for your own consumption. Your purchase, unless you try to purchase a bulk to sell to your friends for profit, is deemed as "final consumption", and your purchase is considered as "final demand".

### **[Understanding Intermediate Transactions, Final Demands and Total Output]**

Imagine now that you are an apple farmer, and that you sell your apples (=output) to two kind of purchasers, only. First of all, you sell some apples (=output) to the manufacturing

sector, who make apple juice. They purchase your apples (=output) as “intermediate goods” in the inter-industry transactions (agricultural output sold to the manufacturing sector). As for the remaining apples, you decide to take them to the Farmer’s Market, where people can directly purchase them for their own consumption, to satisfy their “final demand”.

To put these sentences in a simple equation, we can say that

$$\text{Intermediate Goods} + \text{Final Demand} = \text{Total Output} \quad (1)$$

(Apples sold to other industries) + (Apples sold for final demand) = (All the apples produced)

Since this is one of the key concepts, let’s look at some examples. Imagine you own the Michelin tire factory. Some sales go to Nissan Motors as intermediate goods - so that Nissan Motor can sell their new cars with tires - and some sales go directly to consumers who want to purchase tires for their car, i.e. as a final demand.

Now imagine you are a farmer who grows tomatoes. If Peter, a restaurant owner, wants to purchase fresh tomatoes for his restaurant, the purchase is considered as a purchase of intermediate goods, since Peter will not be consuming these tomatoes but will be using them as a necessary ingredient in preparing his final products - tomato salads, tomato pizzas, spaghetti with tomato sauce, etc. When you sell your tomatoes to Nina who purchases the same tomatoes for her own enjoyment, this transaction fulfils her final demand, because she is purchasing tomatoes to satisfy her own final demand to consume fresh, tasty tomatoes.

What about hard-disk manufacturers? They sell some hard-disks to Dell so that it can create a personal computer for you, while they can also sell a hard-disk directly to you, so that you can upgrade the current 20GB disk to, for example, 1TB.

Does this apply to a hotel environment? If you are the general manager of a 800-room hotel with full occupancy on a given night, all the 800 rooms are sold. Does this mean that all 800 rooms are sold to fulfill the final demand? It is indeed possible that all rooms are sold to fulfill final demands of at least 800 people, but there could also be some rooms which are sold as intermediate goods. If a travel agency purchases a block of rooms for the purpose of selling them as a part of package tour to individuals, the rooms sold to the travel agency are sales of intermediate goods, while the final demand would be satisfied as people purchase an all-inclusive package tour from the travel agent, which includes a hotel room. Also online intermediaries (companies which sell hotel rooms and other travel-related commodities through online transactions with customers), purchase hotel rooms as intermediate inputs and sell them to consumers’ final demands. (In the United States, hotel industry’s intermediate sales account for more than 1/3 to 2/5 of the total sales, so you can imagine this concept is highly relevant to understand the current commerce of hotel rooms.)

Now we can look at them in a table format in the next section.

## 2.1 Introduction to basic structure of input-output transaction table

The Input-Output table is displayed in a two-dimensional matrix format, with rows and columns. Rows show the output for each sector, and columns show the input for each sector. It is time that we read tables with examples shown in proper sequences.

Table 1 is a simplified basic structure of the Input-Output framework. Table 2 is the same framework with some numbers. While both the MS-Excel sheet and the explanation of the whole tables in this chapter, I will explain the agricultural sector's numbers both in the row (1st row from top to bottom) and in the column (1st column from left to right), to show you how to read the numbers in Table 2.

	AG	MNF	Serv	FD	Total Output
Agriculture					
Manufacturing					
Services					
Value Added					
Total Input					

Table 1. Input-Output Transaction Table

	AG	MNF	Serv	FD	Total Output
Agriculture	1	2	1	6	10
Manufacturing	1	3	2	4	10
Services	2	2	4	12	20
Value Added	6	3	13		
Total Input	10	10	20		

Table 2. Input-Output Transactions Table with Numbers

### [Interpretations of a Row in Transaction Table]

As you can see, the agricultural sector's row in Table 3-2 runs as follows:

[1      2      1      6      10]

This means that in the course of that year, the agricultural sector's sales within the same sector were 1, its sales to the manufacturing sector were 2, its sales to the service sector were 1, and its sales to Final Demand (FD) were 6, which amounts to a total output of 10. To put the number in equation,

$$(1 + 2 + 1) + 6 = 10$$

$$\text{Intermediate goods} + \text{Final Demand} = \text{Total Output}$$

Intermediate goods are sold to the industrial sector as necessary ingredients, or as input for this sector. By looking at the row of the agricultural sector, you can see the destination of this sector's output. In this case, a total of 4 agricultural goods provided the industrial sectors with intermediate goods and the total of 6 went to final demands. This table is called a "transaction table" as it captured actual amount of transactions between sectors. Each industrial sector may have different methods to record their sales volumes, such as numbers of bushels, cars, barrels, or numbers of visitors, attendees, but in the transaction table, it is more convenient to use common monetary values that reflect the exchange of goods and money. Thus, we use common units such as US\$ million or € million.

**[Interpretation of a Column in Transaction Table]**

We see that the agricultural sector's column in Table 2 has

$$\begin{bmatrix} 1 \\ 1 \\ 2 \\ 6 \\ 10 \end{bmatrix}$$

This can be interpreted as follows: the internal purchases of the agricultural sector were 1, its purchases from the manufacturing sector were 1, its purchases from the service sector were 2, and its purchases from Value Added were 6, thus making the total agricultural sector's purchases of 10. Value Added consists of labor, capital and imports etc, which we will examine later. This column shows something very useful in order to understand the structure of each industrial sector, because the numbers that you see in the column depict all the required input, with the bottom number showing the total input for the sector, in the course of one year.

For hospitality students, there is an easier way to understand what the column means: it can be regarded as a list of all the required ingredients for a recipe. Yes, consider it as a recipe! For the agricultural sector, it required 1 ingredient (goods and/or services) from the same sector, 1 ingredient (goods and/or services) from the manufacturing sector, 2 ingredients (goods and/or services) from the service sector, and 6 from value added, which refers to other required "ingredients" such as labor, capital, and imported goods. This amounts to 10 required ingredients within a year.

It is great if you noticed that the total output amount equals the total input amount. In this case, the total output of 10, shown in the far right column, equals the total input of 10, shown in the bottom row. In order to produce a total output of 10, the agricultural sector required a total input of 10 (total output = total input) which consists of a total of 4 intermediate goods from the industrial sectors and 6 from value added.

**2.2 Necessary steps from transaction table to leontief inverse matrix**

A review of some basic mathematics involving matrix notations and algebra will make things easier at a later stage. The mathematics component has been reduced to a minimum, albeit essential for hospitality and tourism students, who may even find some of it enjoyable. There follow the inserts of these reviews.

**2.2.1 Minimum knowledge required for matrix operations for I-O modeling**

At a glance, matrix notations may look threatening to students in hospitality and tourism. However, a minimum level of knowledge is required to conduct series of matrix operations. In order to simplify my explanation, let's use 2 x 2 matrices. This section also follows the explanation made in the Hara (2008).

**[Matrix addition]**

We assume that there are two matrices whose numbers of rows and columns are the same. In our case, we have two matrices of B and C, both of which are square matrices of 2 x 2. You can add or subtract the matrices when the numbers of rows and columns are identical.

$$B = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, C = \begin{bmatrix} e & f \\ g & h \end{bmatrix}$$

Then, B + C simply amounts to adding the corresponding elements together.

$$B + C = \begin{bmatrix} a + e & b + f \\ c + g & d + h \end{bmatrix}$$

**[Matrix Subtraction]**

What about B - C? Similarly to the addition, corresponding elements of C are subtracted from the elements of B.

$$B - C = \begin{bmatrix} a - e & b - f \\ c - g & d - h \end{bmatrix}$$

So far, matrix operations only look scary but it is not that bad.

**[Matrix Multiplication]**

Multiplication operation is not as easy as the previous operations. As a basic rule, one can only multiply a matrix when the number of columns of the matrix to be multiplied is the same as the number of rows in the multiplying matrix. The result of the multiplication yields a matrix whose number of rows equals the number of rows of the multiplied matrix, and whose number of columns equals the number of columns of the multiplying matrix. There follow a few examples.

If B is a 3 x 3 square matrix, which of the following matrix can be used with it?

$$D = \begin{bmatrix} h & i & j \end{bmatrix}, E = \begin{bmatrix} k \\ l \\ m \end{bmatrix}, F = \begin{bmatrix} n & o \\ p & q \end{bmatrix}, G = \begin{bmatrix} r & s & t \\ u & v & w \\ x & y & z \end{bmatrix} ?$$

The answer can be obtained when you identify the numbers of rows and columns of each matrix. D = (1 x 3), E = (3 x 1), F = (2 x 2) and G = (3 x 3).

In other words:

B and D would be (3 x 3) x (1 x 3) ◇ Unsuitable

B and E would be (3 x 3) x (3 x 1) ◇ Suitable (conformable)

B and F would be (3 x 3) x (2 x 2) ◇ Unsuitable

B and G would be (3 x 3) x (3 x 3) ◇ Suitable (conformable)

And the result would be

B and E would be  $(3 \times 3) \times (3 \times 1) \diamond$  a matrix of  $(3 \times 1)$

B and G would be  $(3 \times 3) \times (3 \times 3) \diamond$  a matrix of  $(3 \times 3)$

If you understand that the outcome of  $(n \times n) \times (n \times 1)$  would yield a matrix of  $(n \times 1)$ , you are in good shape to proceed with minimum knowledge.

Let us go back to  $2 \times 2$  matrices, in order to learn the minimum required level of the matrix operations of multiplication.

$$B = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, C = \begin{bmatrix} e & f \\ g & h \end{bmatrix}$$

How do we calculate  $B \times C$ ? Unfortunately, it is not as straightforward as in the case of addition or subtraction.

$$B \times C = \begin{bmatrix} a \times e + b \times g & a \times f + b \times h \\ c \times e + d \times g & c \times f + d \times h \end{bmatrix} \text{ (2 x 2 square matrix)}$$

I would recommend that you pick up a pencil and paper to follow the sequence of calculations, so that you may detect some pattern in the sequences. Let's try the following multiplication of B ( $2 \times 2$  square matrix) by D ( $2 \times 1$  column vector), where

$$B = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, D = \begin{bmatrix} e \\ f \end{bmatrix}$$

$$B \times D = \begin{bmatrix} a \times e + b \times f \\ c \times e + d \times f \end{bmatrix} \text{ (2 x 1 column vector)}$$

In the Input-Output modeling, you can get through the basic level by remembering how to calculate the multiplication matrix of  $[n \times n \text{ square matrix}]$  by  $[n \times 1 \text{ column vector}]$ , which yields  $[n \times 1 \text{ column vector}]$ . There reason for this will appear later on in this chapter.

### [Inverse of a matrix]

What is an inverse? Which inverse do we have to know, in order to understand Input-Output modeling? The multiplicative inverse of  $x$  is a certain number which yields 1 when multiplied by  $x$ . Inverse of 2 is  $1/2$ , as  $2 \times 1/2 = 1$ .

Now, we have to review some algebra on exponentiation. How much is 2 squared? How much is 2 cubed?

$$2^2 = 2 \times 2 = 4$$

$$2^3 = 2 \times 2 \times 2 = 8$$

What about  $2^{-1}$ ? This can be rewritten as  $\frac{1}{2^1} = \frac{1}{2} = 0.5$

If 2 is multiplied by its inverse 0.5,  $2 \times 0.5 = 1$

In the same manner, in a matrix notation, we can say that a square matrix A multiplied by its inverse  $1/A$  or should yield an "Identity Matrix", which is the equivalent of 1 in matrix operations.

The actual calculation of an inverse matrix looks more scary than the multiplication.

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, \text{ then, } A^{-1} = \frac{1}{a \times d - b \times c} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

As you can see, a square matrix is not invertible if  $ad - bc = 0$ . In other words, when  $(a \times d)$  minus  $(b \times c)$  equals zero, you cannot calculate the inverse. So, you may want to make sure that  $ad - bc \neq 0$  before proceeding with other calculations.

Let's look at one example. If we assume that:

$$A = \begin{bmatrix} 1 & 4 \\ 1 & 3 \end{bmatrix},$$

what is A-inverse?

$$A^{-1} = \frac{1}{a \times d - b \times c} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} = \frac{1}{1 \times 3 - 4 \times 1} \begin{bmatrix} 3 & -4 \\ -1 & 1 \end{bmatrix} = \frac{1}{3-4} \begin{bmatrix} 3 & -4 \\ -1 & 1 \end{bmatrix} = \begin{bmatrix} -3 & 4 \\ 1 & -1 \end{bmatrix}$$

$ad - bc = -1$ . In other words, it is possible to calculate the inverse of the A matrix.

By definition,  $A \times A$ -inverse should yield an Identified Matrix (I-Matrix), which works like 1 in normal algebra, similar to the case where  $2 \times 1/2 = 1$  (If a number is multiplied by its multiplicative inverse, the result will be 1). I-matrix is the matrix whose elements are all zeros, except those along the diagonal line from top left to bottom right. Let us verify this by multiplying A by A-inverse while you still recall how to multiply matrices.

$$A \times A^{-1} = \begin{bmatrix} 1 & 4 \\ 1 & 3 \end{bmatrix} \times \begin{bmatrix} -3 & 4 \\ 1 & -1 \end{bmatrix} = \begin{bmatrix} 1 \times -3 + 4 \times 1 & 1 \times 4 + 4 \times -1 \\ 1 \times -3 + 3 \times 1 & 1 \times 4 + 3 \times -1 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

When you calculate everything right with your pen and paper, you feel as if you had pulled out a beautiful pigeon (an I-Matrix) out of a hat. This also tells you that an I-Matrix is just like 1 in algebra. You are now ready for learning the I-O modeling. If you are not certain about what we did, please take the time to review the above section, as it is considered an absolute minimum, in order to understand I-O modeling.

### 2.2.2 Steps alternatively shown in matrix notations

Based on what we have learned so far, let us put down the process in simple matrix notations.

First of all, we will put down some notations. We use X to represent the total output. Total Output (X) consists of intermediate goods (AX: where  $0 < A < 1$ ), and Final Demand (Y). The equation (1) can be expressed as



$$AX + Y = X \dots\dots (2)$$

(Intermediate goods + Final Demands = Total Output)

AX is the portion of Total Output which is traded within the industrial sector as intermediate goods; thus A is greater than 0 but smaller than 1. It is important that you still remember what we discussed doing equation 3.1 conceptually, in order to proceed.

When we move the AX to the right side of the equation, the sign before AX changes from plus to minus.

$$Y = X - AX \dots\dots (3)$$

(Final Demands = Total Output - Intermediate Goods)

Since we have a common X on the right side of the equation, we pull common X out to make it as follows. As you saw earlier, you may consider the I-matrix as 1 in normal algebra.

$$Y = (I - A) X \dots\dots (4)$$

(Final Demand = Leftover portion of the Total Output used for the Intermediate Goods)

We divide both sides of the equation by the same  $(I - A)$ , since the equation will hold as long as both sides are divided by the same thing.

$$\frac{Y}{(I - A)} = \frac{(I - A)X}{(I - A)} \dots\dots (5)$$

Erase  $(I - A)$  from both numerator and denominator of the fraction on the right side of the equation.

$$\frac{Y}{(I - A)} = X \dots\dots (6)$$

(Final Demand divided by the portion representing leftover used for Intermediate Goods  
= Total Output)

We recall a rule in algebra regarding inverse notations: , and apply it to equation 6.

$$(I - A)^{-1} Y = X \dots\dots (7)$$

(If an inverse of the portion representing leftover used for Intermediate Goods is multiplied by Final Demand, it would equal Total Output)

We will add two final details to this equation. First of all, we will simply add  $\Delta$  ("delta"), which can be read as  $\Delta$  = "change in", so that we can make this equation more relevant to Input-Output based economic impact analysis. Secondly, the  $(I - A)^{-1}$  part can be read as "the Leontief Inverse Matrix", so that...

$$(I - A)^{-1} \Delta Y = \Delta X \dots\dots (8)$$

(Leontief Inverse Matrix multiplied by a change in Final Demand yields a change in Total Output)

These are the steps that we would take to reach the famous Leontief Inverse Matrix and subsequent impact analyses.

Recall that the  $A$  is ( $0 < A < 1$ ) and that  $I$  is like number 1. So the Leontief Inverse part would be something bigger than 1. Now look at how the model can be applied to a tourism setting.

If  $\Delta Y$  is the growing amount of tourism expenditures in your region, then due to inter-industrial transactions expressed as a Leontief Inverse Matrix, the Total Output of each industrial sector would increase more than the increase in the amount of tourist expenditures. For example, if tourists book hotel rooms, more linen, shampoos, soaps, water, electricity must be purchased by the hotel. Does a tourist spend money only for a hotel room? Tourists use transport services, which means that more gas, oil, and tires will be used, together with gifts, refreshments, and meals. They consume more apple juice, which means that more apples and new empty bottles are required to meet the increased level of Final Demand for various output generated by tourist expenditures.

### 2.2.3 Simple examples of matrix operations for I-O modeling

Now that we have covered the conceptual and mathematical parts of the Input-Output modeling, we can resume the matrix presentations of the tables. From the transaction table, we will move step by step towards the Leontief Inverse Matrix, which will enable you to calculate series of multipliers.

Important Concept of “Endogenous versus Exogenous”

First of all, we should learn some concepts related to being inside the model and being outside the model. The word “endogenous” means being inside the model, and the word “exogenous” means being outside of the model. In the input-output modeling, we will retain the inter-industry transactions parts as endogenous, and will leave the Final Demand and Total Output columns aside, as exogenous from further processes, as shown in Table 3.

	AG	MNF	Serv
Agriculture	1	2	1
Manufacturing	1	3	2
Services	2	2	4
Value Added	6	3	13
Total Input	10	10	20

Table 3. Transactions Table with Inter-Industry Columns only

We now have inter-industry columns only, having taken out the Final Demand and Total Output columns from Table 2. In the sample of Table 3, the matrix has 5 rows and 3 columns (i.e. a  $5 \times 3$  matrix). In other words, we have an inter-industry square matrix (which means

that the numbers of rows and columns are the same, such as a matrix of  $3 \times 3$ ), the Value Added row (labor, capital and others such as imports) and the Total Input rows which consist of the sum of each column.

### i. Standardization process

This process is rather simple. You take each required input in each column to be divided by the column total (= Total Input).

For example, let's take the agricultural sector's column, the first column from the left. The relative input from the agricultural sector within the same sector would be calculated as 1 divided by 10 =  $1/10 = 0.1$ ; the relative input from the manufacturing sector to the agricultural sector would be calculated as 1 divided by 10 =  $1/10 = 0.1$ ; and the relative input from the service sector to the agricultural sector would be calculated as 2 divided by 10 =  $2/10 = 0.2$ . The relative input from the value added (=labor, capital, imports and others) to the agricultural sector would be calculated as 6 divided by 10 =  $6/10 = 0.6$ . Now, repeat this process for the manufacturing sector column and the service sector column.

Once the calculations are complete, you can see all the transaction amounts converted into relative input for each sector's total input. What you see is each sector's relative input to the total input, in relative terms. After the standardization, the table should look like Table 4.

Standardized	AG	MNF	Serv
Agriculture	0.1	0.2	0.05
Manufacturing	0.1	0.3	0.1
Services	0.2	0.2	0.2
Value Added	0.6	0.3	0.65
Total Input	1	1	1

Table 4. Standardized Transactions Matrix with Inter-industry Columns only

### ii. Creating a standardized A-matrix from transaction table

Now, you select the inter-industry part of the matrix only, in order to get a square matrix (i.e. a matrix in which the number of rows equals the number of columns - in our case,  $3 \times 3$ ). This standardized square matrix is called an A-matrix. It was obtained by standardizing each transaction amount as required input, in terms of total input, and only leaving the part with elements of the inter-industry square matrix. The A-matrix is shown in Table 5.

Standardized	AG	MNF	Serv
Agriculture	0.1	0.2	0.05
Manufacturing	0.1	0.3	0.1
Services	0.2	0.2	0.2

Table 5. A-Matrix

### iii. Reviewing notation for matrix elements

Although we try to minimize the use of mathematical formulas, allow me to introduce a few which may make our life easier. As you saw in the explanation of the standardization, indicating the intersection between the agricultural sector row and the manufacturing sector column, i.e. of 3rd row and 1st column, takes up a lot of space. We can use the small subscript to be suffixed at the bottom, to display the relevant location in the matrix in the order of rows and columns. Ideally,  $r$  and  $c$  as “ $rc$ ” can be used but it is already common to use “ $ij$ ” to represent relative locations in row and column. By using the notation, the processes of standardization can be expressed as

$$a_{ij} = \frac{z_{ij}}{X_j} \quad (9)$$

This indicates that each standardized element in the A-matrix  $a_{ij}$  is calculated by having the corresponding elements in the transaction matrix  $z_{ij}$  divided by the column sum (= total input) of the corresponding column  $X_j$ .  $z_{ij}$  represents each element in the transactions table, i.e. the actual amount of transactions recorded in the transaction table, as shown in table 3-2. For example, the cell where the service sector row intersects with the agricultural sector column in the transaction table, or the element at the 3rd row, 1st column, can be expressed simply as  $z_{31}$ , which is 2, and the  $a_{31}$  can be calculated by taking the ( $= 2$ ) divided by the sum of the 1st column, which is the Total Input of the agricultural sector  $X_1$  ( $=10$ ), which is 0.2. Transaction tables are thus sometimes called Z-matrices.

### iv. Creating an I-matrix (Identity matrix)

The I-Matrix is the square matrix which works like 1 (one), as we know from algebra, such as  $1 \times 2 = 2$ ,  $0.5 \times 2 = 1$ ,  $1 - 0.5 = 0.5$ . Although the I-matrix works like 1, it looks different from 1, as it is a matrix. The I-matrix looks like a square matrix whose elements are all zeros, except for the diagonal elements from top left to bottom right, which has 1s. It is a square matrix where  $= 0$  except when  $i = j$  then  $= 1$ . Table 6 shows a  $3 \times 3$  I-matrix.

I-Matrix	AG	MNF	Serv
Agriculture	1	0	0
Manufacturing	0	1	0
Services	0	0	1

Table 6. I-Matrix table ( $3 \times 3$ )

### v. Subtracting the A-matrix from an I-matrix

By subtracting a square A-matrix from a square I-Matrix, we will have a  $(I - A)$  matrix. In our example, let's subtract the A-Matrix shown in Table 5 from the I-Matrix shown in Table 6. For example, if you look at the first row, first column, the I matrix has 1 and the A matrix has 0.1. Thus, the first row, first column of the  $(I - A)$  matrix will have  $(1 - 0.1) = 0.9$ . Complete the subtraction work for all the elements. The completed Matrix should look like one shown in Table 7.

Since this part is quite dense, even for a relatively small matrix ( $3 \times 3$ ), you are recommended to refer to step 7 in the example shown in Figure 2, where you will learn how to calculate the inverse matrix in MS-Excel. What you will be calculating here is the famous Leontief Inverse Matrix, as shown in Table 8. For those who still wish to calculate the inverse matrix of  $3 \times 3$  by hand, or who did not suffer too much going through point 3.4.1, the process can be found in any matrix algebra textbook, linear algebra textbook, or through online resources such as Google, Yahoo etc. I will also post one possible calculation process of  $3 \times 3$  matrix inverse at the end of this chapter, as an appendix.

(I-A)	AG	MNF	Serv
Agriculture	0.9	-0.2	-0.1
Manufacturing	-0.1	0.7	-0.1
Services	-0.2	-0.2	0.8

Table 7. (I - A)-Matrix

**vi. Calculating an inverse of the (I - A) matrix to create Leontief inverse matrix**

(I-A) <sup>-1</sup>	AG	MNF	Serv
Agriculture	1.18	0.37	0.12
Manufacturing	0.22	1.55	0.21
Services	0.35	0.48	1.33

Table 8. Inverse of the (I - A) Matrix (Leontief Inverse Matrix)

**vii. Using the Leontief Inverse Matrix: Simple Output Multiplier Analyses**

Let's put the Leontief Inverse Matrix into action. Recall the multiplication rule in matrix algebra that when you have a ( $n \times n$ ) square matrix: it can only be multiplied by a suitable matrix, i.e. one whose number of rows equals  $n$ . Also recall equation 3.8, according to which a Leontief Inverse Matrix multiplied by a change in Final Demand yields a change in Total Output. We can put the combined knowledge into action, as follows:

$$(I - A)^{-1} \Delta Y = \Delta X \quad (10)$$

$$(3 \times 3) \times (3 \times 1) = (3 \times 1)$$

$$(\text{Leontief Inverse Matrix} \times \text{Change in Final Demand} = \text{Change in Total Output})$$

By introducing the concept of incremental change, we can feed the model with the change in final demand, to see how the economy responds with its total output. The change in final demand is also called a shock, an initial shock, a direct shock, direct effect or direct impact.

Using the same industrial sectors in a row as in the Leontief Inverse Matrix, you have a ( $3 \times 1$ ) matrix. Since there is only one column, we can call this matrix as "a column-vector" or, more specifically, "a final demand column vector".

Let's conduct three cases in which we give a positive increase of 1 to each of the three industrial sectors, one by one. In this case, the final demand column vector (numbers will be shown as a column) would be as follows:

$$\text{Case 1 } \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} = \quad \text{Case 2 } \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} = \quad \text{Case 3 } \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} =;$$

In Case 1, we assume that the final demand for the agricultural sector's output is increased by 1 (if you prefer to put some meaning, say US\$ 1 million, assuming the I-O transaction table was shown in US\$ million units). In Case 2, we assume that the final demand for the manufacturing sector's output is increased by 1, and in Case 3, we assume that the final demand for the services sector's output is increased by 1.

Following this process, you can calculate the Leontief Inverse Matrix, and the last calculation in which you multiply the Leontief Inverse Matrix by a certain change in final demand, expressed in the column vector, will give you the change in total output.

Figure 1 Output Multipliers Calculations (Type-I)

We will learn how to interpret the results.

$$(I - A)^{-1} \Delta Y = \Delta X \quad (11)$$

$$(3 \times 3) \times (3 \times 1) = (3 \times 1)$$

(Leontief Inverse Matrix x change in Final Demand = change in Total Output)

The correct calculations would show the result as if you had just extracted each column of the three sectors, one by one. There was a special reason for using the positive 1 as change in Final Demand. Now, take the total output column vectors of each sector and sum up the numbers in the columns. The agricultural sector has 1.75, which means that a change in total output of the industrial sector will be of 1.75, if there is an increase in final demand for the agricultural sector for 1, thanks to your mastery of the required minimum level of matrix operations and series of rigorous calculations. You have an Output Multiplier of 1.75 for the agricultural sector. Repeat the same calculations for the manufacturing sector and the service sector, and you will have 2.40 and 1.66 respectively.

#### viii. Utilization of MS-Excel

All the process we conducted in this section can be reconstructed by using a spreadsheet program, such as MS-Excel.

I have two recommendations to make in order to turn your newly acquired knowledge into useful skills. First of all, practice basic sets of matrix operations in MS-Excel sheet called "Minimum Knowledge of Matrix Operations for Tourism Industry Analysis" which I have been using for the last 8 years in the classroom. The sheet is shown as Figure 1, but it is important that you work with these sheets on your PC.

Remember, what you read here is like a recipe book, in that the sense that reading it will not turn you into a good chef. The spread-sheets have been prepared in a way that you can concentrate on the actual calculations of what you have read.

Minimum Knowledge of Matrix Operations  
For Tourism Industry Analysis

Tad Hara, PhD

1 MATRIX

column

row

1242

326

247

1

(Row by Column) Matrix

11

24

35

43

57

63

71

(--often referred as "column vector")

123

1453

(--often referred as "row vector")

When R and C are the same, the matrix is called "Square Matrix"

Ex: 2 x 2, 3 x 3, 9 x 9, n x n ...

2. MATRIX ADDITION

If two matrices A and B are of the same order, we can define a new matrix C as A + B. Matrix addition simply add corresponding elements in the two matrices A and B to obtain the elements of C.

Let's use 2 x 2 matrices as examples.

A =

24

5-3

(2 x 2)

B =

-36

42

(2 x 2)

then, C =

(2 x 2)

3. MATRIX SUBTRACTION

25

34

(2 x 2)

2-3

-14

(2 x 2)

(2 x 2)

Fig. 1. Minimum Knowledge of Matrix Operations for Tourism Industry Analysis

#### 4. MATRIX MULTIPLICATION

A= 

1	3
2	0

 (2 x 2)      B= 

2	4
1	3

 (2 x 2)

(1x2)+(3x1)      (1x4)+(3x3)  
(2x2)+(0x1)      (2x4)+(0x3)

Use Excel


 (2x2)

- 1 Highlight the target matrix space
- 2 type formula [=mmult()], and move the cursor within the ( ).
- 3 click "array1" in the formula, highlight the first matrix, and type ",".
- 4 then click "array2" in the formula, highlight the second matrix.
- 5 **WAIT!** before hitting enter, HOLD DOWN "CTRL" & "SHIFT" KEYS TOGETHER, then hit the "ENTER" KEY.

Try with 3x3 square matrices!

Excel helps you greatly!

A= 

4	2	-4
0	1	3
1	-1	2

 (3x3)

B= 

1	3	2
-2	-2	2
1	2	-1

 (3 x 3)

How about A x B ?  
(follow the procedures above)

C = AxB= 


 (3 x 3)

One Rule: Matrix A is conformable to another matrix B only when the number of columns of A is equal to the number of rows of B. Then the product AB has the same number of rows as A and the same number of columns as B.

How about this way?→ (m x n) (n x p) are conformable (you can multiply them) when n = n. Then the target matrix will be (m x p)

Ex: (3 x 3), (3 x 1) matrices→ yes they are conformable, and the answer will be (3 x 1)

(27 x 1) (1 x 3) matrices → yes they are conformable, and the answer will be (27 x 3)

How about some examples?

A = 

2	4	2
1	2	1
2	5	1

 (3 x 3)

Fig. 1. Minimum Knowledge of Matrix Operations for Tourism Industry Analysis (continued)



B =  $\begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$  (3 x 1) C = AB = ? (3 x 3) (3 x 1) → conformable, and the answer should be (3 x 1)

Again, let Excel help us.

**5. BASIC ALGEBRA REVIEW**

"2 power by 2 = 4", "2 power by 3 = 8". In Excel we write them as "2^2 = 4", "2^3 = 8"  
You can actually let Excel calculate it by typing that way.

2^2  $\begin{bmatrix} 4 \end{bmatrix}$   
2^3  $\begin{bmatrix} 8 \end{bmatrix}$

How about this? "2^-1"  $2^{-1} = \frac{1}{2^1} = 0.5$

2 powered by minus 1 (-1) creates "inverse" of 2, which is 0.5.....

What is inverse?  $2 \times 0.5 = 1$  So inverse of something makes the something back to 1.

What is the inverse of 10?  $\begin{bmatrix} 0.1 \end{bmatrix}$  0.1 10 1

So  $2 \times 0.5 = 1$ ,  $10 \times 0.1 = 1$ ,  $Y \times Y^{-1} = 1$  ("Y times Y-inverse equals one")

Does matrix has an equivalent of an Inverse and number ONE in normal algebra?

YES. Let's start from an equivalent of number 1.

It is called "Identity Matrix", which is often denoted by capital letter "I"

**6. IDENTITY MATRIX**

I =  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$  (3 x 3)

Identity matrix can be a square matrix of any size.  
(2 x 2), (3 x 3), (500 x 500) etc.  
It has zeros all over except upper-left to lower-right diagonal where you find 1s.

**7. INVERSE MATRIX**

How about we create an inverse matrix by Excel, because calculation by hand can be overwhelming?

A =  $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 3 \\ 1 & 2 & 4 \end{bmatrix}$  (3 x 3) This is a good old 3 x 3 matrix

A^-1 =  $\begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$  (3 x 3)

- 1 Highlight the target matrix space
- 2 type formula [=minverse()], and move your cursor within the ( ).
- 3 click "array" in the formula, highlight the base matrix
- 4 **WAIT!**, before hitting enter, HOLD DOWN "CTRL" & "SHIFT" KEYS TOGETHER, then hit the "ENTER" KEY.

Let's check if A-inverse matrix is truly the inverse of A-matrix by  $A \times A^{-1}$  calculation.  
Just like  $2 \times 0.5$  becomes 1,  $A \times A^{-1}$  should give us an Identity matrix.

$A \times A^{-1} = I$

$\begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$  (3 x 3)

- 1 Highlight the target matrix space
- 2 type formula [=mmult()] and move the cursor within the ( ).
- 3 click "array1" in the formula, highlight the first matrix, and type ",".
- 4 then click "array2" in the formula, highlight the second matrix.
- 5 **WAIT!**, before hitting enter, HOLD DOWN "CTRL" & "SHIFT" KEYS TOGETHER, then hit the "ENTER" KEY.

If you get a beautiful identity matrix just above here, the pain is over.

Fig. 1. Minimum Knowledge of Matrix Operations for Tourism Industry Analysis (continued)

## 2.4 Multiplier calculations in the I-O framework

While the popularity of an economic impact study and the proliferation of its jargon seems to require no further marketing, there are by far fewer people who can actually calculate the necessary process of impact studies than people who talk about them. It would benefit you to understand the process of calculations in order to become a better consumer. In the future, you may work for a tourism organization which outsources such studies to outside consultants; however, if you are familiar with the process, you are likely to ask the right questions on various assumptions hidden behind fancy reports, based on your knowledge of I-O modeling.

### 2.4.1 Multiplier calculations

You may have heard of the word “multiplier”. However, this calls for a word of caution, as there are various types of multipliers. Unless you calculate them by yourself, or know precisely which multiplier is being discussed, a mere comparison of extracted multipliers across results of different impact studies carried out by different researchers will be misleading. In this section we look at some of the various multipliers.

#### i. Type I multiplier: Direct impacts and indirect impacts

Changes in final demand drive the whole economic system. Changes in final demand, as you saw, can be caused by changes in domestic residents’, firms’, or government’s consumer patterns, or by the export of goods and services. In the impact studies environment, the change in final demand can be called direct impact, direct shock, direct effect or initial impact because this is the exogenous shock that stimulates the entire economic system. When the shock is caused by a change in the final demand, the economy responds to it by producing a new level of total output through inter-industry transactions in the regional economy.

In our case, we gave a positive change of 1 in the final demand for agricultural goods, and found the resulting change in total output to be a positive 1.75. The net additional increase was only of 0.75, if we define the net increase as the difference between the initial change in final demand and the resulting change in total output. The simple concept of output multiplier is shown as the change in total output to the change in final demand.

$$\begin{aligned}\text{Output Multiplier} &= \frac{\Delta X}{\Delta Y} = \text{change in total output} / \text{change in final demand} \\ &= (\text{direct impact} + \text{indirect impact}) / \text{direct impact}\end{aligned}$$

The combined effect of Direct impacts and Indirect impacts can be put in relative terms by standardizing the direct (= initial) impact as 1 so that we can view the size of the resulting Total Output in perspective. How large the resulting impact would be in response to the initial impact relatively, is the concept of the multiplier. In our case, a direct impact of 1.00 given to the agricultural sector generates additional indirect impact of 0.75, so that the total impact becomes 1.75. Because the initial impact was 1, the size of the total impact was 1.75 times larger than the direct (initial) impact. In Figure 2, you will see complete MS-Excel worksheet with explanations on how you can do the work in Ms-Excel.

Introduction to "Input-Output Model" for Tourism Industry Analysis						
		AG	MNF	Serv	FD	Total Output
1	Agriculture					
	Manufacturing					
	Services					
	Value Added					
	Total Input					
		AG	MNF	Serv	FD	Total Output
2	Agriculture	1	2	1	6	10
	Manufacturing	1	3	2	4	10
	Services	2	2	4	12	20
	Value Added	6	3	13		
	Total Input	10	10	20		
		AG	MNF	Serv		
3	Agriculture	1	2	1		
	Manufacturing	1	3	2		
	Services	2	2	4		
	Value Added	6	3	13		
	Total Input	10	10	20		
	Standardized	AG	MNF	Serv		
4	Agriculture	0.1	0.2	0.05		
	Manufacturing	0.1	0.3	0.1		
	Services	0.2	0.2	0.2		
	Value Added	0.6	0.3	0.65		
	Total Input	1	1	1		
	Standardized	AG	MNF	Serv		
5	Agriculture	0.1	0.2	0.05		
	Manufacturing	0.1	0.3	0.1		
	Services	0.2	0.2	0.2		
	I-Matrix	AG	MNF	Serv		
6	Agriculture	1	0	0		
	Manufacturing	0	1	0		
	Services	0	0	1		
	(I-A)	AG	MNF	Serv		
7	Agriculture	0.9	-0.2	-0.1		
	Manufacturing	-0.1	0.7	-0.1		
	Services	-0.2	-0.2	0.8		

1. This is the basic structure of I-O.

2. We fill in the data based on the macro economic data. Often the statistics office of the regional/ state/ national government publish these data, even the I-O itself.

3. Here, we pick up the whole column under industry columns. Now you see 3 x 3 inter-industry matrix, and below it, Value-added (labor, capital & others) and the Total Input. At this stage, you may forget about Value Added. (We will study them when we move to SAM)

4. Here, look at the table above. You take each entry within the inter-industry matrix and divide them by the column sum. Repeat for all cells in the inter-industry matrix. Then the calculation will look like this.

$$a_{ij} = \frac{z_{ij}}{X_j}$$

=A-Matrix

5. Take out the Inter-Industry matrix. This is called "A-matrix". You are now ready to start your magic step by step!

6. This matrix, with all zeros except along the upper-left~lower-right diagonal line with 1s, is called "I-matrix" (sounds "eye"-matrix). Do not worry, this matrix has the same role as 1 (one) in normal algebra.

=I-matrix

7. Follow the formula and let's work on (I-A). Simply subtract A-matrix from our newly created I-matrix.

=(I-A)

Fig. 2. MS-Excel Practice Sheet for I-O Modeling

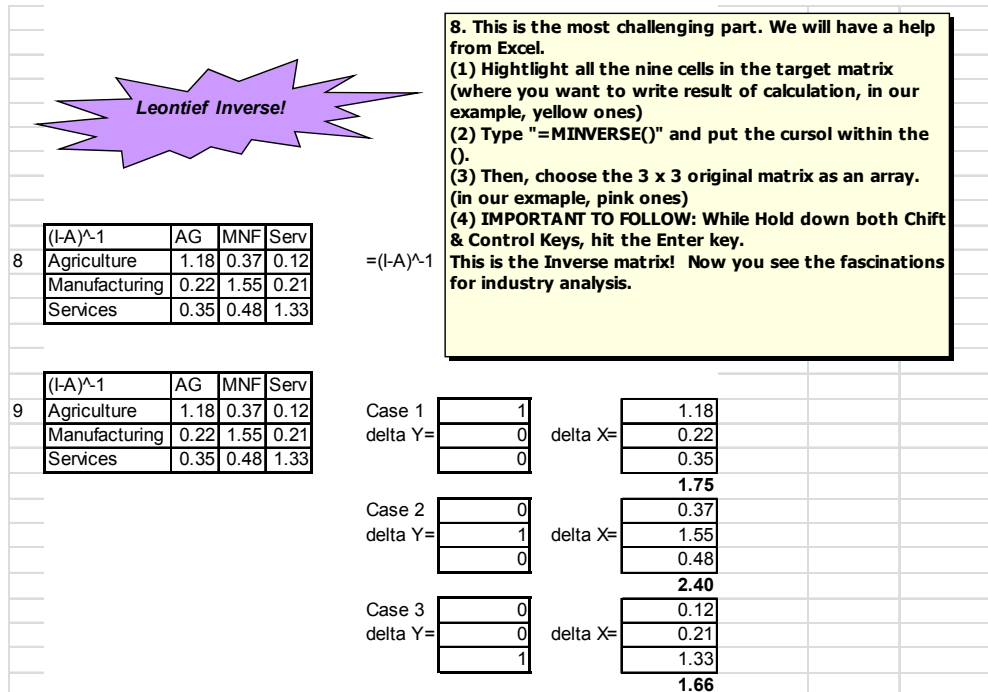


Fig. 2. MS-Excel Practice Sheet for I-O Modeling (continued)

The combined effect of Direct impacts and Indirect impacts can be called a Type I (one) Multiplier, which reflects the impact caused by the interdependency within the industrial sectors only. You will soon understand why I say "only".

You may have heard of other multiplier-associated words, such as induced impacts, induced shock, induced effect etc. We will discuss induced impacts when we internalize the Households into the model by turning them into an endogenous sector in the Type-II multipliers.

## ii. Type II multipliers: Addition of induced impacts by endogenizing households

In addition to the Direct and Indirect impact caused by inter-industry transactions in the I-O framework, we can internalize the Households sector as if it were an additional industrial

sector, at the bottom of the rows and at the end of the columns of the I-O table. The Households' row will then provide their goods and services (such as labor) into each industrial sector, in exchange for receipt of money (income), and the Households' sector in the column will spend some part of its income to purchase output from industrial sector, as necessary input to ensure its existence. This will generate additional monetary flow towards the inter-industry table. While this still falls short of a complete inclusion of all economic transactions within a region or nation, including Households in the I-O structure will yield extra impact, thanks to their additional purchasing activities. An example of the structure is shown in Table 9.

Standardized	AG	MNF	Serv	HH (PCE)
Agriculture	0.1	0.2	0.05	0.01
Manufacturing	0.1	0.3	0.1	0.04
Services	0.2	0.2	0.2	0.07
Households	0.11	0.12	0.2	0

Table 9. A-matrix with Households as an additional industrial sector

If you look at the rows, you see the Household row at the bottom as if it were another industrial sector. If you look at the columns, you can see Households (PCE). PCE stands for personal consumption expenditures, which means that Households will spend some portion of their received income to purchase other industrial sector's output. Because of the addition of another sector, the Output Multiplier would be higher.

Type I multipliers are group of multipliers which are based on the usage of the generic structure of the I-O model, without any other non-industrial sector, while Type II multipliers are group of multipliers which utilize the I-O, while including Households as an additional quasi-industrial sector. Type I and Type II distinguish the structure of the I-O being used to calculate several multipliers, as follows. Besides Output Multipliers, which can be calculated in a Type I or Type II environment (using the typical I-O or the I-O including Households), there are other multipliers which can be calculated along Type-I and Type-II structures.

## 2.5 Structural limitations of the I-O modeling

As it is the case with any other quantitative modeling, the I-O modeling has its limitations due to its structural design. Knowing its limitations will keep your study within reasonable limits and make you prepared to a series of possible criticism of its limitations, which are as follows:

### Homogeneous sector output

If the sector produces more than one commodity, the proportion of such multiple commodities productions will remain the same as in the study period. As an example of the

hospitality industry, let's look at a full-service hotel. They have rooms department and food and beverage department as core department to generate their products, clean rooms and tasty meals. The proportion of those products is not assumed to change, which means that if the proportion was 70% and 30%, then when the total revenue at the hotel increased from \$100 million to \$150 million, the sales of two departments are assumed to increase from \$70 million and \$30 million to \$105 million to \$45 million as the relative ratio of proportions are fixed.

### **Fixed commodity input structure**

Similar to Constant Returns to Scale, the ratio of inputs is assumed to remain the same as it was observed in the study period, irrespective of changes in price of some items. In the real world, if the price of furniture from China becomes so attractive, a general manager of a hotel in the United States may switch to purchase those instead of those from domestic manufacturing industry in Illinois. If the price of turkey skyrockets for some reason, you may find less turkey dishes at the restaurant. Increase in prices would not cause a huge technical problem for the I-O modelers if the change in prices of goods and services are equally distributed all across the society. That is often not the case, such as the surge of crude oil prices. In the I-O world, exact mixture of intermediate goods will remain fixed despite short-term price fluctuations.

### **Constant return to scale**

The required input can be put in relative terms as ratios, as we did when transforming the transaction table into the standardized A-Matrix table. That relationship is assumed to continue. If the apple juice factory's input from the agricultural sector is 0.12, when the total output increases by \$1 million, there should be an additional purchase of \$0.12 million of agricultural product (apples). If the increase in total output is of \$100, there should be a \$12 additional purchase of apples. The relationship is assumed to remain linear.

### **No assumption on supply constraints**

The I-O modeling assumes that the required input is always available without constraints in supply. You can, for example conduct a study of what would happen to a local economy if the number of customers to a popular tourist destination - an ice-cream factory - were to triple in the following year. The model calculates that the required input of sugar, milk, and electricity will increase dramatically, which would stimulate the local economy through industrial interdependency. The model will not ask you whether there will be enough machines in the factory or enough parking spaces and seats for the tourists in that situation, because it will not make any assumption about capacity constraints.

In general, a shock of relatively small changes to the economy in question would have less of a problem, and a shock to relatively larger economic region would create fewer problems in the impact analysis using the I-O framework. Being aware of those structural limitations, mainly deriving from being linear-modeling techniques, you may as well present your arguments in perspective without misleading audiences and readers. It goes without saying that these are not the all limitations of your particular study, as there may be errors that are more specific and applicable to your research in question.

## 2.6 Final remarks

We covered the basic of how the Input-Output model works. The knowledge of how it works will help you understand how the extended models such as Social Accounting Matrix (SAM) functions, and helps you to understand Tourism Satellite Accounts.

The very basic concept you should understand can be depicted in simple visible figure, as shown in figure 3.

When you deal with tourism related economic impact studies, the final demand column vector should represent "all the money tourists spent in the study region" in the form of column vector ( $n \times 1$ ), where  $n$  is the number of industrial sectors in the study region's Input-Output data. Because of the tourists' expenditure over multiple industrial outputs, the final demand column vector will typically have numbers in multiple cells, implying that the tourists' expenditure stimulates various industrial sectors in the economy in question. Now we are prepared to proceed to study about Tourism Satellite Accounts.

BASIC CONCEPT OF THE ECONOMIC IMPACT STUDIES									
LOCAL ECONOMY (FIXED)				<b>X</b>	EXOGENOUS SHOCK		=	RESPONSE OF THE TOTAL OUTPUT	
					(change in final demand)			(change in total output)	
(I-A) <sup>-1</sup>	AG	MNF	Serv			$\Delta Y$ (FD)			$\Delta X$ (TO)
Agriculture	1.179	0.371	0.120			1			1.18
Manufacturing	0.218	1.550	0.207	<b>X</b>	delta Y=	0	=	delta X=	0.22
Services	0.349	0.480	1.332			0			0.35
(Leontief Inverse Matrix)					(FD column vector)				1.75
					1 became 1.75, so the multiplier = 1.75				

Fig. 3. Basic Concept of the Simplified Economic Impact Studies

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# Golden Age of Mass Tourism: Its History and Development

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## 1. Introduction

In the early years of the twentieth century, tourism continued to expand as a consequence of increasing wealth, interest and outgoing attitudes, and improvements in people's transport. Advances in transport allowed people to travel in masses. In fact, mass production and mass consumption was the rationale of that period. Although its roots go back to the eighteenth century, travel was still a novelty for the masses, and the homogeneous character of the demand led to the production of standardized products that could suit everyone. From the 1930s onwards, the growing availability of the motor car stimulated tourism further, and during the interwar years the aircraft began to play a small role in the tourism market as an option for the wealthier classes, particularly in Europe (Swarbrooke & Horner, 2007). Further, the arrival of holiday camps aimed at a growing low income market for holidays was a major development of 1930s, and received widespread acceptance by the public. The instant success of the concept resulted in the construction of similar structures all over the coastal areas and even in inland resorts. Moreover, the allure to the sun in 1960s, from the cool and variable climates of Northern Europe and North America, encouraged the emergence of package tours. As such, the mass characteristic of tourism is strengthened further.

This chapter aims to outline the development of mass tourism. In other words, it is aimed to reveal the golden age of mass tourism, which has dominated the whole industry between 1950s and 1980s. Initially, the constitutional factors effecting the development of mass tourism will be discussed. Further, developmental factors, namely technology, air transportation, accommodation companies and tour operators will be deliberated in detail. Finally, conclusions on the development of mass tourism will be drawn.

## 2. The constitutional factors and conversion process of tourism

The term mass tourism is briefly used for pre-scheduled tours for groups of people who travel together with similar purposes (recreation, sightseeing etc.) usually under the organization of tourism professionals. Mass tourism has been misused or confused as holiday tourism in the progress. However, mass tourism is the opposite of 'individual tourism' and both are wider in scope consisting holiday, circuit, and other tourism markets. Figure 1 indicates the position of mass tourism in the tourism network.

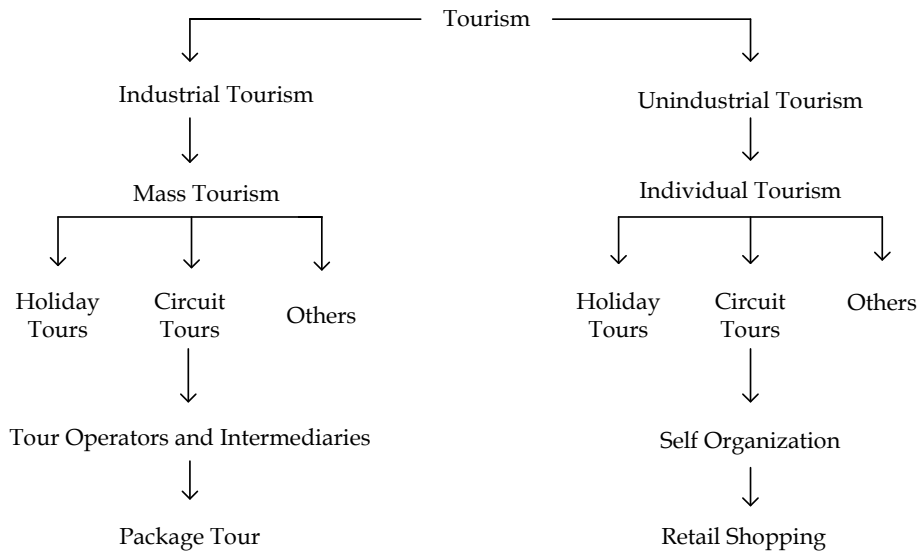


Fig. 1. Mass Tourism in Tourism Network

The continent of Europe and notably England play important roles in the constitution process of industrial tourism. Accordingly, mass tourism initially commenced in England at the second half of the nineteenth century. Mass tourism owes its existence to mainly two specific reasons: the first reason is the development in the transportation technologies and the second is the individual efforts of an English entrepreneur Thomas Cook (Poon, 1993: 30). Using the steam train and ship for transportation, Thomas Cook organized international package tours to three destinations including the Far East, India and America in 1862. By the year 1897, Thomas Cook reached the figure of 20,000 tourists annually (Poon, 1993:31).

It is not a coincidence that mass tourism was first organized in England by an English entrepreneur. It was the Industrial Revolution above the other reasons that brings 'steam train' in technological dimension and inflexible-heavy 'working hours' in sociological dimensions. However, it would seem appropriate to refer to the second half of the 19<sup>th</sup> century and even the first half of the 20<sup>th</sup> century as 'infancy period' of mass tourism. Some authors (Cook, Yale & Marqua, 2006:14) are consistent with the idea and called this period (1800-1944) in the literature as '*mobility era*' while some others (Fuller, 1994; Syrratt, 2003) split the period into two, before the First World War and post First World War taking the developments in the car industry and hotel business into a consideration. Middleton and Lickoris (2005:2) credited 1919-1939 as '*new mobility*' claiming that some remarkable developments occurred in the 1920s and 1930s. Weaver and Lawton (2006:66-67) attributed 1880-1950 as '*the post-Cook period*' as a result of Cook and his adaptation of Industrial Revolution technologies and principles to the travel industry. It is worth noting that it is impossible to talk about the 'industrialized mass tourism' apart from some individual enterprises and some technological developments in the mentioned period.

The economic policies in some countries played important roles for the conversion process of the tourism industry. The trade unions forced governments for more flexible working hours and by the year 1939, many European countries agreed on 'salaried holidays' for employees which brought increased prosperity and the need for vacation together (Yale, 1995: p.37). However, the supply for these new types of vacationers was inadequate during 1920's and 1930's. Hotels were quite luxurious and with the upper- income guests in mind (when taking accommodation supply into account). For transportation supply, it could be claimed that the trains and ships were still the more popular vehicles and air transportation was still in its search of progress. One good example was "Zeppelins" which were pioneered by Count Ferdinand von Zeppelin in the early 20<sup>th</sup> century (Zeppelin, Wikipedia). These huge balloons with passenger cabins underneath carried almost 52,000 people over the Atlantic Ocean by the Second World War (Zeppelin, Wikipedia). However, several zeppelin accidents - mostly because of flammable hydrogen gas- undersized these vehicles' popularity. At the time, the aircrafts on the other hand, were not developed enough to carry bulk of passengers. Consequently, railway and maritime transportation were still popular mass carriers, but far more slow carriers than aircrafts and secured time of the new vacationers' salaried holidays.

The nature of tourist product has dramatically changed after the Second World War, especially between 1960's and 1980's. While the marketing practice is "customer oriented" nowadays, post-war conditions were completely different and marketing was "sales oriented". There were remarkable supplies for many products across Europe and tourism was not an exception to this. On the other hand, the economical and technological developments that changed tourism in the mentioned period could be summarized as follows (Yale, 1995: 37):

- the greater prosperity of the population at large
- paid (salaried) holidays for many European workers
- a new use of excess aeroplanes after the war
- technical improvements in aircraft production which made it possible to fly further and faster
- a greater sense of democracy and equality fostered by the war effort
- better education
- better packaging of the opportunities by tour operators
- spread of television, bringing images of the rest of the world to almost every household

### **3. Developmental factors of mass tourism**

The factors that cleared the way for mass tourism for its golden age are namely technology, production and management related changes in the progress. These constitutional and developmental factors with their sub-factors are shown in Figure 2. However, these factors mentioned in the figure should be taken as a whole in the progress of mass tourism, and it could be said that they are not homogeneous and may vary depending on the continents, trade customs of the continents and countries as well. The very basic two examples for such simulations are Europe and United States of America (USA) which are also identified as the two leading demand markets of the tourism industry.

The hotel chains, airlines, business travels, cruises and short breaks have been the factors that helped development of USA's mass tourism in the progress. However, it is completely a

different story in Europe because of the demographical and economical structures of the continent. The European mass tourism market has grown relatively from richer and more developed European countries' tourism demand for holidays to rather less developed southern (in other words Mediterranean) countries. The necessity for travelling international inside (short-haul) the continent has brought new actors as organizers in tourism, namely *tour operators*. Tour operators, charter flights, and inclusive tours –especially holiday packages– are the identifiers of European mass tourism in the golden age of mass tourism. On the other hand, the common factors that changed the world tourism business and accordingly mass tourism could be summarized as being technology, air transportation, accommodation companies, tour operators, conglomerates and mass consumption depending on holiday needs. These factors are going to be detailed in the following sections.

### 3.1 Technology

Technology today is intensively involved in all the industries, manipulating the business world and the tourism industry is not the exception. The impacts of technology are relatively seen on the aircrafts, credit cards and travel cheques, computers and finally reservation systems used in the communication among organizers and intermediaries when the tourism industry's mass tourism age is considered. Tourism is a more 'information flow' friendly industry than 'product flow' and this characteristic is making it more dependent on technologies. As shown in Figure 2, technology has directly affected tourism on four major topics: aircrafts, plastic cards and travel cheques, computers and reservation systems.

Significant technological improvements in aviation and sea transport played a catalytic role in increasing safety record and in reducing substantially the real monetary and time travel outlays (Holloway, 1998). The basic effect of technology on the aircraft technology is related with the Second World War. The war temporarily disrupted commercial flights, but it brought tremendous long-run gains for the development of the air transportation industry, including (Gee, Makens & Choy 1997: 300):

- The creation of a large body of experienced pilots;
- Increased public acquaintance with aviation, as hundreds of thousands of military personnel and civilian employees experienced their first flight during the war;
- Increased knowledge of the weather;
- Improved maps and knowledge of foreign terrain;
- Construction of thousands of airfields in wide parts of the world;
- A large assortment of surplus aircraft design, flying techniques, and other knowledge necessary for advancement of the industry; and
- The development of jet aircraft.

The jumbo jets (Boeing 747, DC 10), which were developed in the late 1960s, flew further with more passengers in shorter time and at a cheaper price. Although it is impossible to compare these jumbo jets' productivity to today's Boeing 777 or Airbus A380 aircrafts by any variable, it shouldn't be forgotten that it was a tremendous invention for the 70s and the mass transportation. As the airline industry grew, so did the tourism industry's dependency on it.

Another technological development in the mentioned period is the credit cards and travel cheques. American Express had announced its first credit card in 1958, followed by the Bank America Card (today's Visa Card) and Master Charge (today's Master Card) (Poon, 1993:43).

These plastic cards and travel cheques surely helped consumers feel more confident especially on vacation. As such, tourists could feel safe in defiance money loses and robbery.

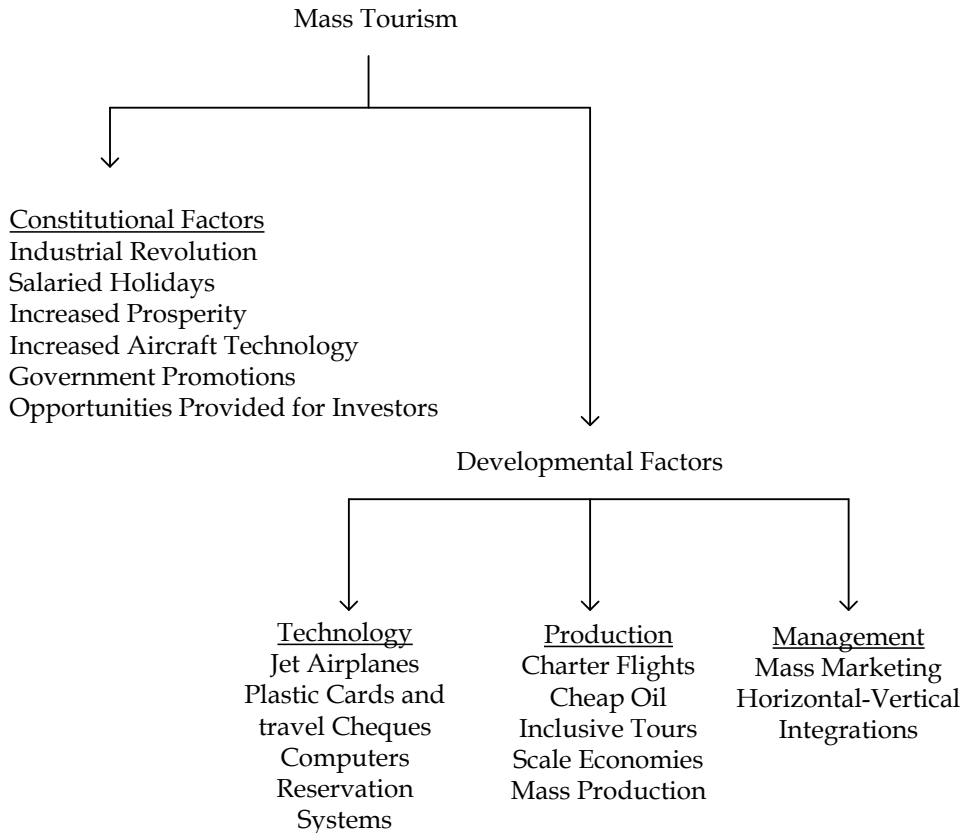


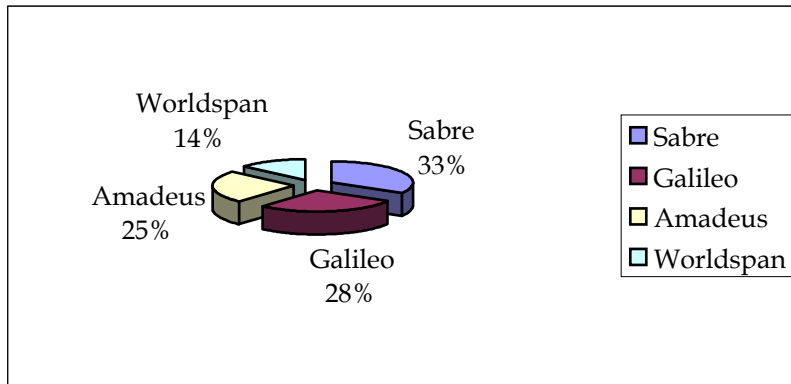
Fig. 2. The Constitutional and Developmental Factors for Mass Tourism in 20<sup>th</sup> Century

In the early years of mass tourism, computer technology was still in its infancy. Thus, computers were used mainly for planning and delivery process of the tourist product. In summary, computers were more the facilitators of the golden age of mass tourism. Conversely, today's computers are also identifiers in either production or marketing stages of the tourism business with the help of the communication technologies.

The most notable impact of the technology in the golden age is linked to the Computer Reservation Systems (CRSs). Starting from the early years (1950s) of mass tourism, firstly airlines and then the hotels with tour operators established their own CRSs. However, the CRSs in the early years were serving dumb terminals without intranet or internet and they were not working synchronously. Moreover, the CRSs of suppliers (airlines, hotels and tour operators) were not thoroughly adaptable for communicating with each other. The communication between airline CRSs and sales offices were provided by SITA (in Europe) and ARINC (in USA) network consortia (Inkpen, 1998:59).

The limited use of CRSs dramatically changed after the *Deregulations* of USA in 1978. The new companies, schedules, fares and services have brought the fierce competition among airline companies with this process. Some airline companies went on strategic partnerships and established global distribution systems (GDSs) for marketing purposes via travel agencies. The development of GDS was in the meantime the beginning of the end of mass tourism's golden age with the emergence of the deep impact of the internet world.

Today's four GDSs and their market shares are demonstrated in Figure 3.



Source: Galileo Turkey.

Fig. 3. GDSs' Market Shares around the World

### 3.2 Air transportation

Air transportation diversifies from all other transportations in the industrial tourism and it's probably because of the inclusive tours that dominate the industrial tourism movements. In fact, while one of the two most important components of an international package tour is the hotel bed, the other is undoubtedly the aircraft seat.

There are two important developments tied with air transportation regarding the tourism industry and mass tourism. The first one is the foundation of International Air Transport Association (IATA) in 1945 (Sezgin, 2010:3). The foundational goals of IATA were the organization of safe, regular and economic transportation worldwide and providing the coordination among airlines. The obligation for membership has brought standardization in the scheduled air transportation (Walker, 1996: 38). Today, more than 230 airlines -mostly flag carriers- are members of IATA and that constitutes 93 percent of all scheduled flights around the world (Papatheodorou, 2008:50).

The second and more important development of air transportation regarding mass tourism is the charter flights and the equal rights which were given to charter and scheduled companies for the new directions in 1960 (Renshaw, 1997:43). By means of the mentioned rights, monopolist air transportation market has turned out to be more reasonable for tour operators. The flag carriers had to give contingent for inclusive tours to tour operators with the fierce competition.

Mass tourism related to charter flights started, as early as 1950s in Europe, while the first charter flight which was a part of a package tour in USA was operated in 1968 (Doganis, 1998:11). The countries and governments in the globalization progress softened some procedures and limited the difference between schedule and charter flights. The airlines known as 'charter-only' could organize flights with the liberalisations to new destinations that were previously operated only by the scheduled airlines. Surely, consumers were the most benefitted leg of these conversions and liberalisations. Tourists could find more alternatives to more destinations with better services sometimes, and paying less than before. However, this was another blast effect for mass tourism's golden age that more people could organise their own travel.

Distribution channels of the scheduled flights are shown in figure 4. Although, figure 4 indicates today's distribution channels, it was similar in the golden age of mass tourism with the exceptions of GDSs and web portals of the suppliers.

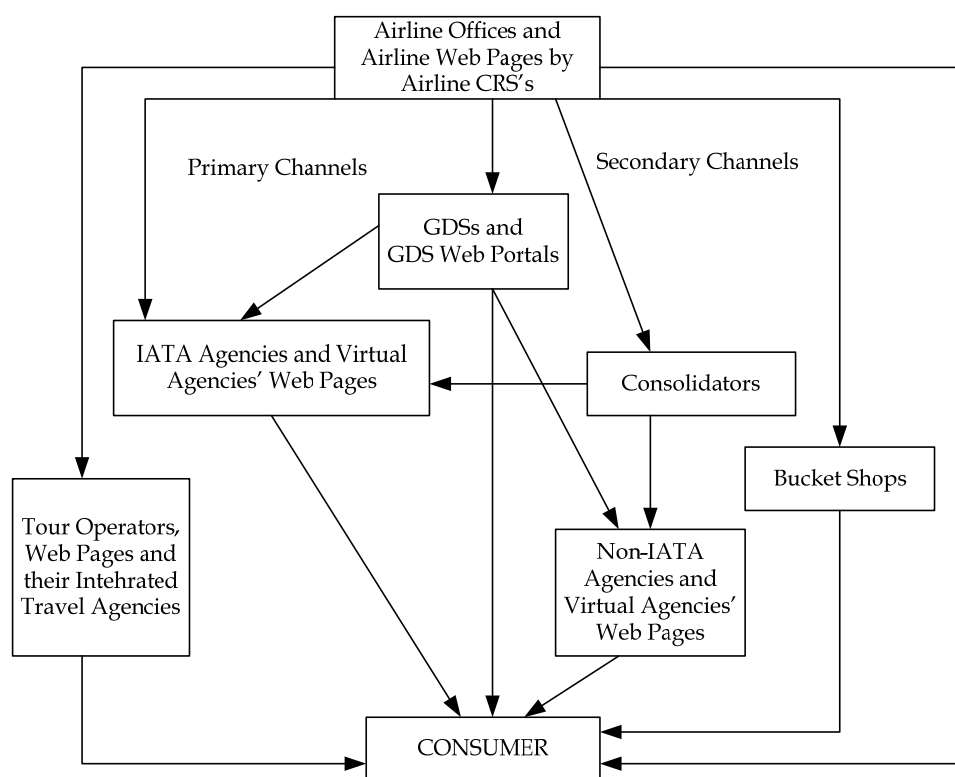


Fig. 4. Scheduled Flights Distribution Channels

Figure 5 demonstrates the distribution channels of charter flights. As can be seen from the figure, it has a much less simple structure when compared to scheduled flights. Today's new intermediaries are also mentioned in the figure.

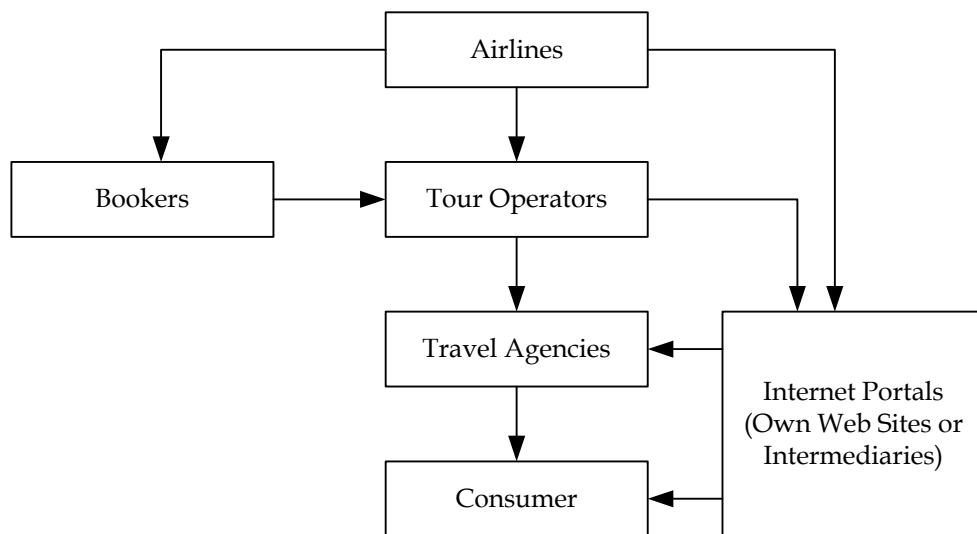


Fig. 5. Charter Flights Distribution Channels

### 3.3 Accommodation companies

As discussed before, the tour operators in Europe and the chain hotels and airline companies in the USA were the leading determinants in the development of mass tourism. The first American hotel was opened in 1794 (Walker, 1996: 78); taverns and small hotels followed. The expansion of hotels in the USA as in the case of Europe was boosted in the first half of the 20<sup>th</sup> century till Second World War. This period witnessed the rise of luxury hotels being operated all over the country and they spread to the continent. The chain hotels and the airline companies being the initiator of mass tourism in the USA did not happen accidentally. Different than Europe, the USA had the potential to develop all kinds of tourism apart from cultural tourism. Consequently, the development of tourism was mainly domestic in the USA.

In the early years of the twentieth century, travel continued to expand, encouraged by the increasing wealth, interest and outgoing attitudes of the population, and by the steady improvement in transport. Roads and the railroad transportation determined the development of accommodation businesses till the First World War. This led to the construction of new hotels and motels in destinations and crossroads. The arrival of the airline industry signaled the beginning of the end, not only for long-distance rail services but, more decisively, for the great steamship companies. Air transportation increased the number of urban hotels and the holiday camps both in the continent and the USA.

The Great Depression of 1930s which originated in the USA not only affected the global economy but also the hotel owners and the investors. This resulted in the limited number of new hotel construction till the beginning of 1950s due to precautions taken by the banks and financial companies to overcome the crisis. The economic recovery in the 1950s and the advent of air transportation led to an exponential growth as tourists could travel almost



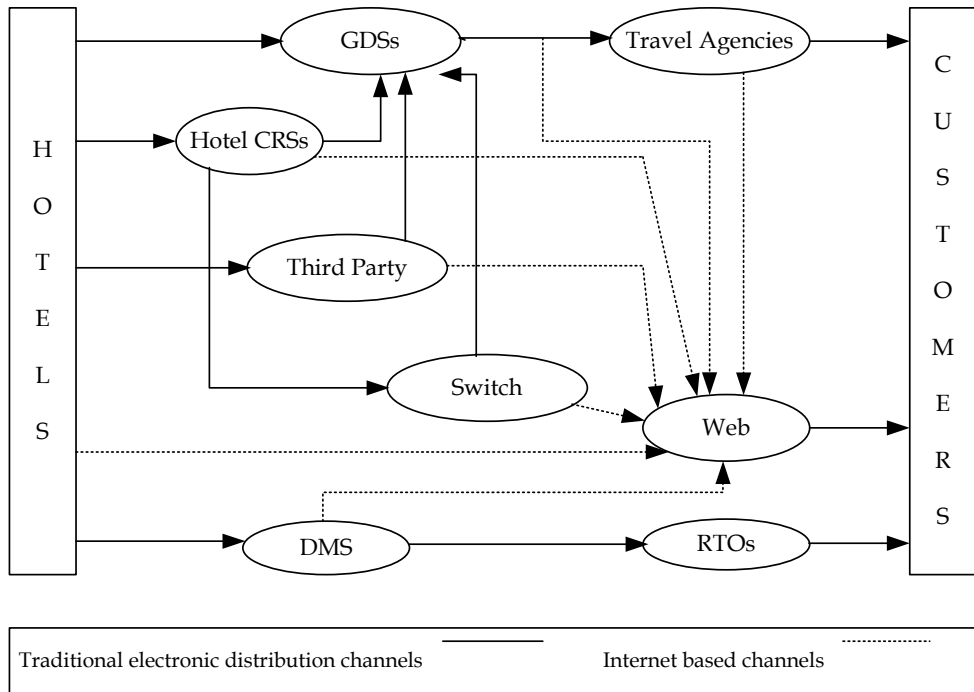
anywhere with a fast, reliable and routine system (Walker, 1996: 78). The increasing number of people travelling resulted in the institutionalization of small, independent hotels converted to multi-partner companies, working with franchise system, benefiting financial instruments such as leasing, management contracts etc. This was followed by flourishing international chain hotels operating in Europe and Asia. Multinational chain hotels in Europe and Asia were so successful that they entered the American market where a fierce competition existed (Go et al., 1990: 297).

Multinational hotel companies had also made important investments in the developing countries. For the developing countries, tourism was appreciated to be an important medium for increasing employment opportunities and reducing the foreign currency deficit. Consequently, they made some regulations to attract foreign investment. Incentives such as build-operate-transfer, privilege of the profit transfer, financial supports, support for financial projection, capital sharing, exemption of income taxes, investment credits and special exchange rates were offered by the developing countries for the potential investors (Poon, 1993: 37). Overdependence to multinational chain hotels in the developing countries was more intense when compared to developed countries. As a result, some hotel chains like Hilton Corporation and Holiday Inn, succeeding a certain level of standardization expanded their branches all over Europe and other countries targeting business travel and high income markets.

In the process of mass tourism development in Europe, economically developed Northern European countries are cited to be tourist-generator countries and less developed Southern countries on the coast of Mediterranean are destination countries. The tour operators in the leading countries in the European tourism industry, namely Germany, the UK and France, have invested in tourist attracting countries. The most influential are the hotel investments for the purpose of product standardization. In this vein, tour operators as the first liable body when any inconveniences occur, tried to eliminate possible problems that could be stemmed from the accommodation businesses. In fact, they maintained their audits via their representatives in the destination countries. In the course of time, however, they further undertook hotel ownership and used other methods to increase their role in the destinations.

Conclusively, the urban hotels mainly American roots serving to business travellers, and meeting organizations, the holiday camps and the resort hotels common to Mediterranean region specialized in leisure travellers. These were sold as a component of packaged tours. In the globalizing process, urban hotels were urged to diversify their markets and developed integration methods specific to destinations they are located in. For example, Hilton Hotels used franchise or management contracts in the markets they perceived to be economically risky while employing joint venture or direct investment in developed countries. Coastal hotels and holiday camps flourished with the mass tourism development on the continent. The leading conglomerates integrated with the accommodation businesses in popular mass tourism destinations in the Mediterranean region. Aimed at the growing low-income market for holidays, the holiday camps set new standards of comfort, offered 24-hour entertainment at an all-inclusive price, were efficient in operation and originally European (Holloway, 1998). According to Holloway the success of this of all-in entertainment concept was later to be copied by hotels, and the hotel with its leisure complex became a popular development even before the war in the USA. Club Med and

Robinson Club chains, which were pioneers and being operated in most of the Mediterranean destinations, are still owned by conglomerates. Although the integration methods used by the urban hotel benefited from holiday camps and coastal hotels, direct investment is much more common due to the policies of mass tourism players such as conglomerates and tour operators in Europe.



Source: O'Connor, 1999:110

Fig. 6. Distribution Channels for Accommodation Companies

### 3.4 Tour operators

Many of the current day trends in tourism can be dated to the post-war period –particularly the rise in demand for holidays. This period saw a growth in income, leisure time and opportunities for international travel (Page, 2003: 41). Mass tourism is basically developed in forms of package tours from developed western and northern European countries to the Mediterranean. Tour operators in developed countries prepared package tours by making contracts with hospitality principals and airline companies, and offered these tours to consumers in travel agencies via travel literature such as brochures, leaflets etc. As such, tour operators are an important component in the European mass tourism market.

In the course of time, tour operators needed to integrate/merge with airline companies and the hospitality units in destination countries in order to increase their control on their final

product, the packaged tour. Such a development boosted tourism investments in Europe and resulted in tour operators to become multinational companies. In order to diminish the risks taken, tour operators also took part in operating and managing coastal resorts and hotels in developing destination countries. However, it was not always possible to control the hospitality units unless an investment was made and the risk was taken. Besides, integrations methods such as franchising, management contracts etc. which eliminates the investment risks were limited for charter operations. Consequently tour operators were faced with heavy investment requirements and managerial costs when they aspired to control the airline companies or the seat capacity.

Heterogeneity of the tourism products poses difficulties in standardizing the experience. Since the package components are all in different places, standardizing the package tours as the final products of the tour operators is more difficult when compared to other industries. Package components that would be purchased from destination countries may not be at a desired standard due to economic, social and cultural characteristics of destination countries. Besides, fragility of tourism businesses under the threats of undesired actions such as terror, natural disasters and economic crises may require customers to be oriented towards other destinations. Considering such risks, tour operators prefer to integrate with the hospitality principals in destination countries in search for control. Moreover, the hospitality units in the destination countries, especially the resorts and camps in the Mediterranean coasts had limited financial resources to mitigate the under capacity and they represent a homogenous structure. As the controllers of European mass tourism, tour operators obtained other advantages apart from the product standardization as a result of homogenous structure of these hospitality units. Most important, they had the power to stimulate the demand. On the other hand, taking the golden age of mass tourism and demand from tourist generating countries (northern European) to destination countries (Mediterranean) into a consideration, figure 7 demonstrates the inclusive tour distribution network.

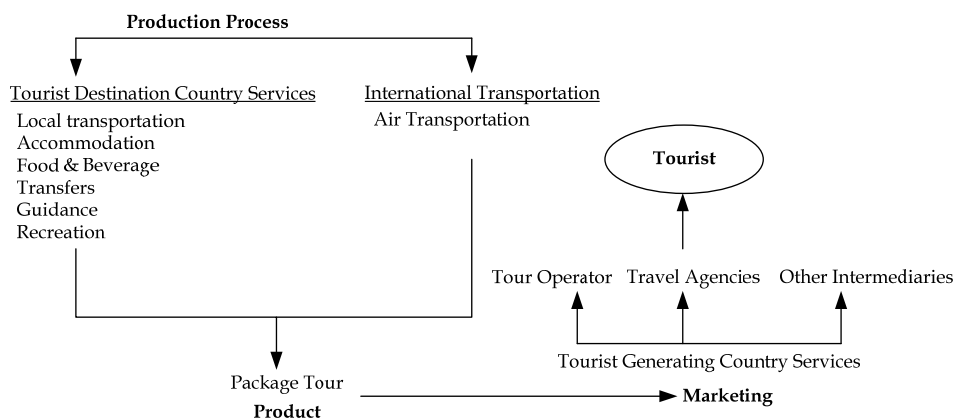


Fig. 7. Inclusive Tour Distribution Network

Security is a must for a healthier development of the tourism industry at a given destination. As such, any crisis in some destinations like Turkey, Egypt and the former Yugoslavia led dominant European tour operators to shift their reservations to other destinations. On the

other hand, large tour operators also tried to help these countries to overcome their crisis by sustaining their operations. For the purpose of eliminating the effects of both political and economical crisis, tour operators should consider some factors (Cavlek, 2002) such as:

- The type, size, estimated duration and the consequences of the crisis in destination countries.
- Their investments in those destinations.
- Government policies in the tourist generating countries about the destinations in crisis.

Tour operators also stimulate the tourism demand due to pricing policies in the destinations. However, it took tour operators more than half a century to become determinant actors in mass tourism, as they are backed by finance companies, banks and holdings. These financial institutes are multi-national and global firms launching in tourism by integrating tour operators, namely conglomerates.

The capitalist economic environment in the beginning of twentieth century in the USA and the UK provided many companies to institutionalize at an early stage. Such institutionalized and growing firms diversified their product range and reduced the associated risks by investing in diverse industrial sectors. Increasing competition and decreasing profits led these companies strive to enlarge the markets and benefit opportunities in other countries. In search for such strategies they formed conglomerates operating in multi-national markets.

Increasing importance of the conglomerates played a vital role in changing the investment structure and in the development of mass tourism. At present, the largest tourism companies are under the control or ownership of these conglomerates.

### **3.4.1 Vertical integrations**

Vertical integrations have been applicable in the all levels of the tourism industry's production and distribution levels. Airlines, hotels, travel agencies and even food & beverage companies have integrated with the other suppliers with different purposes in the golden age of mass tourism. However, the majority of vertical integrations in tourism industry are in fact done by tour operators.

As the producers of the final product (inclusive tour), tour operators went to backward vertical integrations for controlling the product components, product standardization and to gain a competitive advantage. Tour operators also went to forward vertical integrations with travel agencies for marketing purposes and for controlling the market.

The vertical integrations in the European tourism industry are both the reason and the consequence of mass tourism. The reasons of why the vertical integrations increased the tourism demand are lowered costs and prices due to integrations (Yarcan, 1996:65). On the other hand, the urge for more vertical integrations is related with controlling the 'seat' and the 'bed' supply and gaining competitive advantages. Figure 8 depicts the structure of vertically integrated tour operators in the golden age of mass tourism.

### **3.4.2 Horizontal integrations**

Tour operators integrated also horizontally especially for the scale economies. It is expected to increase the production and reduce the cost when the companies operating on the same levels of the production and distribution levels are horizontally integrated (Pender, 2000:233).

When they want to enter new markets, outgoing tour operators horizontally integrated with other outgoing tour operators which they already serve and had some market share in those markets. On the other hand, they sometimes horizontally integrated with incoming tour operators in order to control the operations in destination countries.

Today, horizontal integrations are more popular in tourism industry as in the other industries. The main reason of this is globalization and accordingly, the need for brand image. It is easy to observe that the tour operators serving in the golden age of mass tourism did not have such branding priority and they preferred vertical integrations more as multinational companies with different brands. However, horizontal integrations became very popular in the globalization process and some giant European tour operators have accelerated their branding efforts either by integrating with each other or bringing all the companies under the same brand. Europe's largest tour operator, Touristik Union International's (TUI) integrated structure is shown in Figure 9.

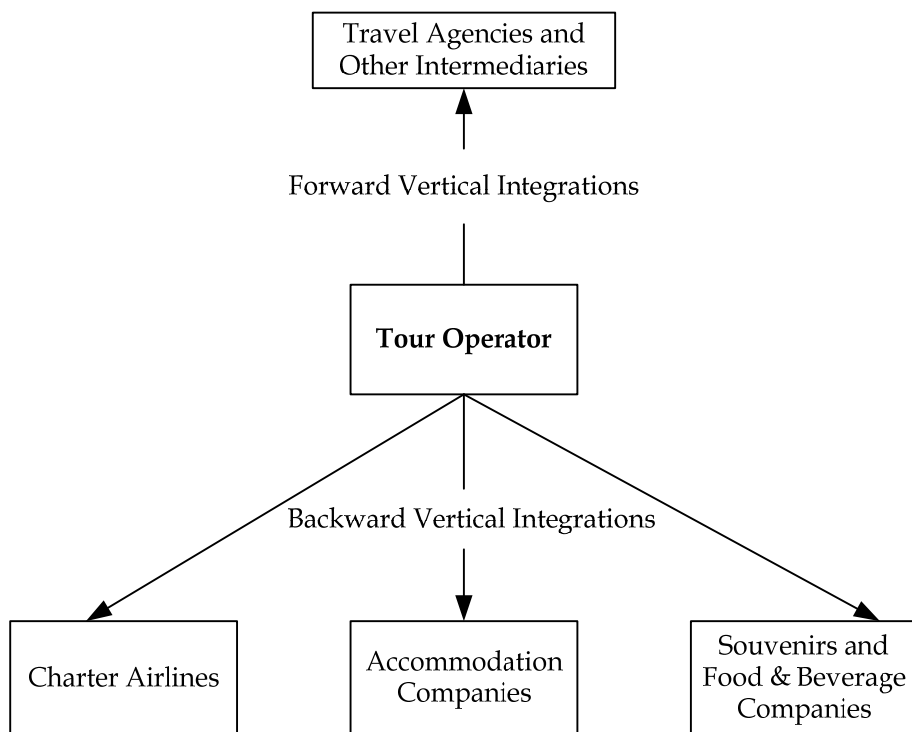
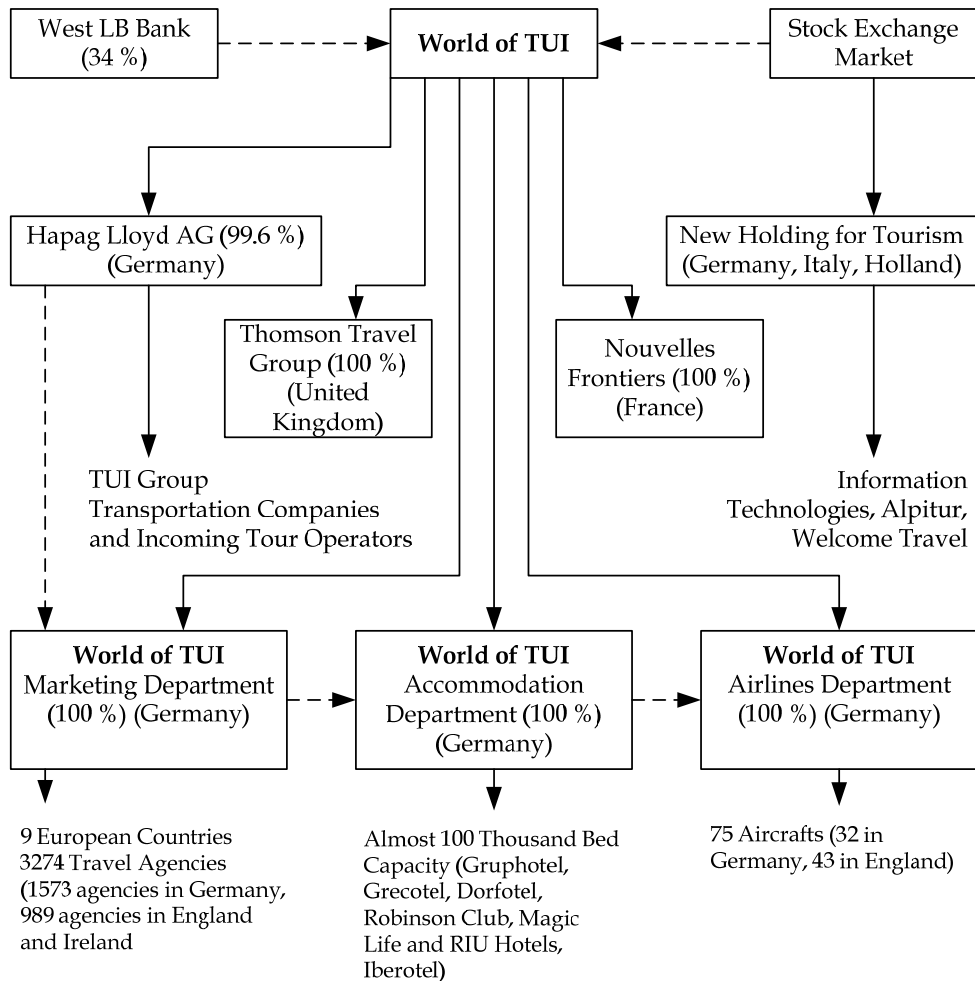


Fig. 8. Tour Operators' Vertically Integrated Structures in the Golden Age



Source: TUI Booklet, 2004

Fig. 9. Horizontally and Vertically Integrated Structure of World of TUI Tour Operator

#### 4. Conclusions and reflections of mass consumption in tourism

Consumers are core to any economic activity, and tourism is not an exception to this. However, the post-war years are slightly different. The focus of business in 50s is the mass production, scale economies, standard products and low prices in the tourism industry as in the case of other industries (Poon, 1993:38). The idea of “selling as much as produced” was common among the businesses due to changes in demand. In short, mass tourism was sales-oriented rather than a consumer one. In other words, due to the large number of tourists demonstrating homogenous interests, the tourism product was provided under conditions

of mass production (Urry, 1990). A changing demand structure also influenced the development of mass tourism after the Second World War. Leisure needs of working classes also facilitated the development of mass tourism.

Although mass tourism was not customer oriented in the beginning, the tourists were the final consumers of the package tour. Supply was composed of accommodation establishments, tour operators and travel agencies. As a result of increasing production, the potential demand was converted to active demand. The trend was mass production, mass marketing and mass consumption. Consequently consumers drove similar cars, consumed similar food and travelled to similar destinations (Poon, 1993: 39).

On the basis of aforementioned reasons it cannot be concluded that mass tourism always expanded in the same direction and manner. Expectedly, wealthier people with higher educational levels were in a way above this trend. However, the masses found mass tourism reasonable due to its price levels.

The core of mass tourism in Europe is composed of cheaper package tours organized by tour operators and charter flights. Tour operators had representatives in destinations on the basis of research. This led tourists to feel secure while travelling. On the other hand, in the USA the determinants of mass tourism were airline oligopolies and hotel chains. While tours in Europe were towards coastal areas in the Mediterranean, package tours in the USA were basically focused on business travel and domestic travel. As a result, the transportation vehicles in the initial phase of mass tourism were charter flights in Europe, and coach companies or private automobiles in the USA. Even in 1987 three fourth of the transportation in the USA was on highways (Poon, 1993: 50). For these reasons, the role of American hotels was completely different than the hotels included in package tours in Europe. Consequently, motels, highway hotels and urban hotels developed in the USA, while resort hotels and holiday camps were flourishing in European destinations. The American chain hotels with standardized products spread out around the world.

Another factor that affects different developments in mass tourism in both continents is the paid (salaried) vacations. The average length of paid vacation is two weeks in the USA compared to four weeks in Europe. As a result, Europeans could elect more international travels. On the other hand, weekend vacations and short holidays are more common in the USA.

Although the development of mass tourism experienced different phases in both Europe and the USA, its global development can be examined in two parts. First is the holidays taken by low or middle income individuals. Their holidays are inclined towards sea, sun and sand. The organizers of the holidays are the conglomerates and the tour operators. In international transportation mostly charter airline companies under the control of conglomerates and tour operators are used. The travel related services are mostly held by incoming tour operators under the provision of conglomerates or tour operators or representatives working under the supervision of outgoing tour operators. Accommodation in these packaged tours is offered by homogenous hotels and resorts in the coastal areas offering entertaining and recreational activities. As can be seen, holiday tourism is directed towards low and middle income tourists having two to four week paid holidays. Vacations are realized in resorts or holiday camps closed to the outer environment and hence cheaper due to higher rate of participation.

The second structure in mass tourism is cultural tourism. The range of cultural tourism activities include the use of cultural heritage assets such as archaeological sites, museums, castles, palaces, historical buildings, famous buildings, ruins, art, sculpture, crafts, galleries, ethnic communities, religious buildings and other features that represent people and their cultures (Miller, 1997). In a broad sense, cultural tourism also includes activities with a cultural content as parts of trips and visits with a combination of pursuits (Medlik, 1996). The income level of cultural tourists is higher compared to vacationers. Essentially, cultural tours are organized by expert tour operators. Destination services are usually supplied by independent incoming tour operators and the guides employed by these tour operators. The cultural tourists stay in urban hotels. In this sense, a comparison of cultural tourism and holiday tourism under the umbrella of mass tourism is given in Table 1.

	Travel Purpose	Consumers	Organizers	Transportation	Destination Country Services	Accommodation
<b>Holiday Tourism</b>	Recreation, Amusement	Low and Middle Income	Conglomerates and Holiday Tour Operators	Charter Airlines	Integrated Incoming Tour Operators and/or Representatives	Holiday Villages and Resort Hotels
<b>Circuit Tourism</b>	Travelling, Sightseeing	Middle and Upper Income, Senior Citizen Groups	Specialist Tour Operators	Scheduled Airlines	Independent Incoming Tour Operators	City Hotels

(Sezgin, 2004:57)

Table 1. Holiday Tourism and Circuit Tourism Characteristics in Mass Tourism

Mass tourism developed differently in two continents but its managerial structure is fairly similar. Product standardization, branding and homogenous company structure is achieved in both continents. However, these are achieved by chain hotels in the USA and by the conglomerates and tour operators in Europe (Poon, 1993: 50). Whatever the direction of the development is, mass tourism allowed masses to enjoy vacations, entertainments and holidays. Although, Poon (1993) claimed that tourism has changed and converted into 'new tourism', and mass tourism has completed its golden age, it may be concluded that mass tourism is still popular and still the dominator of the industrial tourism as long as new markets emerge.

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# Recent Developments in Research and Future Directions of Culinary Tourism: A Review

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## 1. Introduction

People interested in travelling for gastronomic motivations were increasing gradually (Bessiere, 1998). "Culinary Tourism" was a term first suggested in 1998 (Long, 2003). It expressed the idea of tourists' experiencing the culture of a destination through food. Tourism was a vehicle for the communication of official visions which reflected favourably on the regime and could be harnessed to a hegemonic agenda (Hall & Oehlers, 2000). And, it also conveyed images such as those of racial harmony and outstanding economic progress (Henderson, 2004). From this viewpoint, culinary tourism is a very good tool and method.

Food tourism was one constituent of a tourism strategy dedicated to making the best use of scarce resources in an approach for its creativity and adaptability, made necessary by the lack of conventional natural and cultural tourism assets (Teo & Chang, 2000). Namely, it became a viable alternative for new destinations that cannot benefit from "sun, sea, and sand," or natural or cultural resources, or a valid addition to more established destinations. Unlike many other travel activities and attractions, destination's gastronomy was usually available year-round, any time of day and in any weather (Richards, 2002). Gastronomy tourism was a meaningful and possibly a highly loyal market segment, and could also be hypothesized that gastronomy experiences were powerful tools for marketing the destination (Kivela & Crotts, 2005). Food consumption could turn to be a peak touristic experience and could be demonstrated by a newly emerging form of tourism, in which the major, sometimes even sole, motivation to tourism was the tastes of foods that were much more various, with longer range of choices, and different from their daily reservoirs of foods. Such a form of tourism included gastronomic tourism, food festivals, wine tourism, and other food-related events (Quan & Wang, 2004). For this perspective, Hjalager and Corigliano (2000) proposed that Italy had been far more successful in developing the cultural role of gastronomy. Gastronomic tourism had grown significantly in the last few years, thus improving the economic and social growth of weaker areas.

Kivela and Crotts (2005) identified that gastronomy was inextricably linked to the destination and the destination's image; maybe multidimensional forms which were

clearly understood as yet. Food and beverage could be itself an attraction in a destination, such as Chilli Festival in Singapore food festival, Taste of Chicago, Wine tour in Europe, and Chocolate festival in Suffern, New York, and so on. In these cases, foods either constitute an event attraction or act as the gastronomic part of the attractions in destinations. In other words, the gastronomic experience could become a major, or one of major motivations, for travel (Quan & Wang, 2004). As it can be seen, for some areas, gastronomy has become an important attraction and is influential to their development. Therefore, the issues related to culinary tourism are worth of more attention and contribution in the future.

This study aims to review the researches of culinary and gastronomy tourism since 2000 to explore the significant developments and trends in culinary tourism and gastronomy tourism recently. The results of the review are presented by study subjects involved, research countries involved and research methods employed. Several significant research trends are identified for additional discussions in later sections. It's expected to make much contribution to the future researches and important directions of development.

## **2. Topical review**

After reviewing recent researches of culinary tourism, according to the research topics, it mainly can be classified to six subjects: *the relationship of food and tourism, the attraction and impediment of cuisine to the tourists, market segment of culinary tourists, the draft of culinary tourism developing strategies, exploration of promotion and marketing tools, and the application of theories in culinary tourism development.* In the following, it'll be discussed in these six topics.

### **2.1 The relationship of food and tourism**

The relationship of food and tourism is one of the concerned issues in culinary tourism recently. However, it was explored from different perspectives which include culture, the authenticity of cuisines, strategy, participation and supporting of communities in destinations, and so on. As it can be seen, the relationship of food and tourism contains many dimensions.

Food, as it's well known, is primarily a cultural category. In today's increasingly globalized world, food remained one of the most prominent points of cultural difference among regions and communities, as well as an important cornerstone of cultural identity (Delamont, 1994). Every culture was marked by a characteristic choice of foodstuffs, dishes, and menus, habitually consumed and in popular imagination tied to that culture as spaghetti were tied to Italian, wurst to German, and quiche to French culture. During their holiday, tourists naturally desired to undergo a process of (re)socialization which, among their things, was manifested in their choice of food (usually a preference for local dishes), in a change of cultural practices (participation in local rituals), and emergence of new beliefs (the acceptance of local symbolism) (Fox, 2007). Moreover, "local food" has the potential to enhance the visitor experience by connecting consumers to the region and its perceived culture and heritage (Sims, 2009). Everett and Aitchison (2008) proposed its role of food tourism in sustaining regional identity. Therefore, culinary tourism conveys the culture of destination to tourists, it's an essential element for experiencing local culture.

For the perspective of authenticity, there were two myths brought out by Fox (2007). One such myth was the belief in gastronomic authenticity as based on the juxtaposition of “good old food” and “bad new food”. In truth, what was popularly believed to be “old food” seemed not to be old at all. Another common myth was the idea of gastronomic tradition. Throughout history, trade, travel, transport and technology had been affecting the gastronomic identities of regions and countries, continually changing what was generally perceived as customary. These two myths induce us to reflect on the tradition and innovation of local cuisine, and emphasize the importance of local cuisine identity.

Except from the perspective of authenticity, another viewpoint was from strategies and regulations. Hjalager and Corigliano (2000) argued that national economic, agricultural and food policies, rather than tourism policies, determined the standards and development of food for tourists. And, it was proposed that high concentrations of decrease rather than an increase in food standards in restaurants. Being a highly unstable factor, tourists did not have the opportunity to put more permanent consumer pressure on restaurants; this role was reserved for local residents. It revealed that the strategies played an important role for regional culinary tourism development.

Besides, Quan and Wang (2004) suggested that food festivals or gastronomic tourism were one of sources that helped enhance the local identity of a destination community, and hence bring about more community participations. Such community participations and supports were one of social conditions for food-related tourism to be sustainable. Thus, there is no reason why local and traditional foods are seen as trivial and should be ignored in tourism development.

## **2.2 The attraction and impediment of cuisine to the tourists**

The attraction of gastronomy was proposed by previous research (Hjalager, 2002). It mainly comes from enjoyable, unique, and high-quality food and services, better participation in indigenous culture through food, opportunity to purchase and sample unique products that are not readily available in their own country, unique opportunities for discovering new taste sensations, and access to well-coordinated gastronomy-related experiences (Kivela & Crofts, 2006). It was found that experiencing local culture and getting new experience were the main source of attraction. Therefore, McKercher, Okumus and Okumus (2008) suggested that consuming food may be a ubiquitous activity for most visitors. Furthermore, a follow-up qualitative study was undertaken to determine whether the destination's gastronomy contributed to the quality of visitors' experience, whether visitors would return to the destination because of its gastronomy, and whether culinary travelers represent a distinct market segment of an overall visitor market. Regarding the model of local food consumption, a model constituted of three categories: motivational factors, demographic factors and physiological factors was proposed (Kim, Eves, & Scarles, 2009). And, the attributes that influence the evaluation of travel dining experience were identified: tourists' own food culture, the contextual factor of the dining experience, variety and diversity of food, perception of the destination, service encounter, and tour guide's performance (Chang, Kivela, & Mak, 2011).

However, for foreign tourists, visiting destinations and experiencing different cuisines from their countries could result in anxiety and uncertainty (MacLaurin, 2001). Cohen and Avieli

(2004) argued that the tourists met some impediments in experiencing local cuisine even when attracted to local cuisine; including hygiene standards, health considerations, communication gaps, and limited knowledge of tourists concerning the local cuisine. It's a good reminding for the development of culinary tourism; and, it's also an un-neglectful factor.

### **2.3 Market segment of culinary tourists**

Market segmentation was broadly applied and discussed in marketing. The researches focused on culinary tourist segmentation were explored from different perspectives. It included the influential factors of culinary experience (Tse & Crofts, 2005), the satisfaction in restaurants and cuisines (Kivela & Crofts, 2005), and the general classification of culinary tourists (Ignatov & Smith, 2006).

Tse and Crofts (2005) proposed that culinary experience was influenced by national culture, length of stay, age, and repeat visitation. Specifically, respondents from low uncertainty avoidance countries patronized a greater number and diversity of culinary offers when compared to respondents from high uncertainty avoidance countries. Crofts and Pizam (2003) revealed that visitors of different nationalities evaluate identical services in a differential manner, where visitors from large power-distance high-masculinity societies (e.g., Japan and Taiwan) reported more critical satisfaction measures than visitors from small power-distance low-masculinity societies (e.g., Australian, Canadian, U.S.A., Europe). Kivela and Crofts (2005) argued that the self-described gastronomy visitors were more involved and purposeful in their restaurant and cuisine choices than the typical visitors and would therefore search out destination's unique and more satisfying gastronomy. And, these gastronomy tourists were more discerning customers as compared to typical leisure visitors. In addition, these self-described gastronomy tourists were more likely to be from Asian countries instead of the West, such evaluations may also have been influenced by national culture.

Moreover, the classification of culinary tourists was segmented clearly; they were food tourists, wine tourists, and food and wine tourists (Ignatov & Smith, 2006). The differences were displayed on gender, educational level, income, the way of experiencing food and the acquirement of travel information. Tikkanen (2007) introduced five sectors of food tourism where the needs and motivations are linked with Maslow's hierarchy of needs. Ryu and Jang (2006) stressed that past behavior had strong influence on tourists' intention of experiencing local cuisine. Focused on culinary events, culinary event attendees were clustered into two segments: food focusers and event seekers (Smith, & Costello, 2009). The presentation of market segmentation was very important to the restaurateurs who would like to attract tourists willing to experience local cuisine.

### **2.4 The draft of culinary tourism development strategies**

The issues regarding to the relationship of culinary tourism development and national or local strategies were proposed by many researches. It showed that a close relationship existed between both of them. Destinations that already had the advantageous ingredients to support a gastronomy tourism strategy, such resources included unique and/or multiethnic cuisine, creative chefs, unique marine and agricultural products, unique culinary heritage, and so on (Kivela & Crofts, 2006). It provided a practical suggestion for

drafting culinary tourism development by employing SWOT analysis to explore culinary tourism development. Richards (2003) argued that tourists often placed considerable emphasis on how they feel at a destination, and how they experience what the destination offered, by carefully selecting that special restaurant and/or food that might fulfill a particular personal desire. Stewart, Bramble and Ziraldo (2008) argued that in order to attract one-time visitors back to the region of wine and culinary tourism, it's important to enhance service through increased service training.

Besides, there are many researches regarding the role of governments or official organizations. Kivela and Crotts (2006) suggested that developing the gastronomy tourism niche for tourists, it wasn't enough to simply offer a gastronomy experience visiting a destination. It was more desirable to make the tourists feel good about the destination. It required an effort on the part of the destination's DMO (Destination Marketing Organization) and gastronomy provided to educate tourists about why the local cuisine and its associated culture were unique to the city. The capacity of government websites to introduce and advertise traditional and local foods, restaurants, gastronomic tours, recipes and culinary cultures was explored (Horng & Tsai, 2010). And, du Rand, Heath and Alberts (2003) suggested that nearly half of the DMOs were not applying any specific strategies to promote food tourism, which clearly underlined the need for a product potential and attractiveness audit instrument, appropriate guidelines and a framework to enable DMOs to put in a more concerted effort regarding the marketing and promotion of food tourism.

## **2.5 Exploration of promotion and marketing tools**

It could influence tourists' choices of destinations through diversified marketing tools (Baloglu, 2000; Gursoy & McCleary, 2004). The pictures and information in marketing medias and marketing tools could facilitate in promoting positive images of destinations. Now the communication tools used in food marketing were diversified, including brochures, pamphlets, internet, advertising initiatives, radio, TV and printed material (du Rand, Heath & Alberts, 2003).

Regarding the effectiveness of each marketing tools, brochures were used as opposed to other promotional tools since they had been recognized as the most popular medium used by travel and tourism advertisers, and was the key image-creating tool in tourism (Morgan & Pritchard, 2000). The internet had developed rapidly during recent years and could be used as an effective advertising and promotional tool, not least in the tourism and hospitality industry (Wan, 2002). Therefore, recently the researches regarding advertisements and marketing tools which were applied to culinary tourism development mainly contained the exploration of brochures and web-sites.

Focused on the research of brochures, Frochot (2003) took France as an example and proposed that regional food and cuisine were extremely important and very diversified across France and it had been a tool used by French regions to differentiate themselves on the global market place. However, if the "French uniqueness" was probably not debatable in terms of food traditions, the study of the brochures within France didn't show a strong disparity among the regions themselves. For the application of web-sites in culinary tourism, Boyne, Hall and Williams (2003) noted that while initiatives to promote local and regional food were often

being developed with an emphasis on the tourism market, and in some cases had developed high-quality web sites. These web sites were less readily accessible to information-seeking consumers than they might otherwise be. It could be found that brochures and web-sites couldn't convey the characteristics of local cuisine efficiently.

For other researches, Tussyadiah (2005) reported that there were three main references used by travelers in Japan, beside travel brochures: travel magazines, television programs, and the internet. And, the media played a very strong role in the direction of Japanese culinary tourism. So, if the media could be well applied to the marketing of culinary tourism, it's very important to the promotion of culinary tourism. As it can be seen, to well apply each kind of marketing tools is very important to culinary tourism promotion of a destination.

## **2.6 The application of theories in culinary tourism development**

Bourdieu (1984) operated with a model of four basic lifestyles in his work "*Distinction*". Hjalager (2004) proposed this model as sociology of tourism and gastronomy to be applied to tourism research in the future through empirical research; such as which lifestyle segment could be attracted by destinations. Based on this theory, it could infer its implication of tourism and gastronomy. Similarly, by utilizing the theory of social psychology, Ryu and Jang (2006) employed *Theory of Reasoned Action* (TRA) to explore tourists' intention of experiencing local cuisine. In their research, modified TRA model was examined if it could predict tourists' intention of experiencing local cuisine after past behavior was put into TRA model under a simulation context. The results revealed that modified TRA model could predict tourists' intention of experiencing local cuisine; moreover, attitude and past behavior also influenced tourists' behavioral intention. Furthermore, *Theory of Planned Behavior* (TPB) which was developed from *Theory of Reasoned Action* (TRA) could be applied to explore culinary tourists' behavioral intention (Ajzen & Driver, 1992). And, Maslow's hierarchy of needs was utilized to explore the needs and motivations of food tourism, five sectors were introduced (Tikkanen, 2007).

Additionally, by employing marketing physiology or consumer theory (Boyne et al., 2003; Boyne & Hall, 2004), it could facilitate to understand culinary tourists further. It proves that the application of theories of other principles can make much contribution to more deep exploration in culinary tourism.

## **3. Review of the countries involved**

For the review of the countries which were involved in the researches, it included Hong Kong, Singapore, Japan, China, Thailand, Vietnam and Turkey in Asia. For Europe, United Kingdom, Croatia, France, Italy, Denmark, Sweden were included. Additionally, it also included Canada and the United States in North America and South Africa in Africa. It was found that the way of culinary tourism development of each area was significantly different as a result of its geography, climate, history and culture, and so on.

### **3.1 Asia**

Unlike many other travel activities and attractions, destination's gastronomy was usually available year-round, any time of day and in any weather (Richards, 2002). Especially in



Asia, some areas such as Hong Kong, Singapore, if gastronomy tourists can be shown to satisfy all the conventional requirements of a unique market segment, it becomes a viable alternative for new destinations that cannot benefit from “sun, sea and sand”, or natural or cultural resources, or a valid addition to more established destinations. Here, the discussion will be focused on the three main areas: Hong Kong, Singapore and Japan.

### 3.1.1 Hong Kong

Hong Kong's cuisine is renowned for its exotic fusion of Eastern and Western flavours along with a wide variety of culinary delights. Its cultural blend, proximity to mainland China and reputation for quality have made Hong Kong a Gourmet Paradise. It was indicated that Hong Kong's gastronomy was a significant factor that positively contributed to the respondents' desire to return to Hong Kong (Kivela & Crotts, 2005; 2009). Hong Kong's gastronomy plays a major contributing role in the creation of a high-quality travelling experience and return behavior. Namely, gastronomy is increasingly vital to a whole range of tourism products and services that are offered in Hong Kong (Kivela & Crotts, 2005, 2006).

### 3.1.2 Singapore

Singaporeans is a cosmopolitan and multicultural city and passionate about food and eating. It's not just East-meets-West when it comes to feasting in Singapore- it is a tasty tale about a country's unique cultural tapestry woven in with its distinct influences to capture the essence of Singapore's multicultural heritage. And, it uniquely distinguishes Singapore as a food capital of Asia.

Singapore Tourism Board established Food and Beverage Division for the development and marketing of culinary tourism. It takes charge of the market of Singapore cuisine, the development of product and industry, channel management and investment to form it as a destination with a “combining local cuisine, international cuisine, dining experience and nightlife entertainment”. Furthermore, Singapore introduced ten “must try” dishes and expected to become the representatives of Singapore cuisine. Additionally, the quality of tourists' dining experience could be improved. Henderson (2004) identified some of the critical connections between food and tourism with specific reference to Singapore where food and eating out is a tourism promotion theme of growing prominence, and policies were shaped within the framework of the country's distinctive features. Singapore is moving towards becoming a higher order food destination (Hjalager, 2002); and, developing a distinctive form of food tourism adapted to the conditions which prevail there (Henderson, 2004).

### 3.1.3 Japan

Ashkenazi and Jacob (2000) argued that major factors affecting Japanese food culture were geography, history, climate, religion, and external influences. For Japan, in addition to the tradition of visiting *onsen* (hot springs), one of the major purposes of travel for leisure in Japan concerned the enjoyment of different cuisines. Such culinary tourism also involved the exploration and enjoyment of the variety found in food in relation to regional cultural variations in Japan. And, in Japan, culinary tourism had been a major factor in the development of some regions (Tussyadiah, 2005).

Besides, in Asia, Turkey was also a country involved in previous researches. Turkey made little reference to marketing strategy, even though its indigenous cuisine was unique and rich (Okumus, Okumus & McKercher, 2007). It's believed that some practical suggestions will be provided for the country with rich gastronomic heritage but not promoting local cuisine, like Turkey.

### **3.2 North America and Europe**

#### **3.2.1 North America**

For the countries in North America, the countries explored were Canada and the United States. In Canada, Canadian tourism has an established image of "natural" attraction and outdoor activities and is known for its agri- and aquacultural products. More and more destination marketing organizations started to treat culinary tourism as part of the whole marketing strategies. Canadian Tourism Commission (CTC) had been aware that many tourists took food as part of travel experience (Ignatov & Smith, 2006). CTC (2002) has begun developing cuisine as a new tourism product showcasing Canadian diverse cultures and communities (Hashimoto & Telfer, 2006; Ignatov & Smith, 2006), even though it's challenging to compete against well-established gourmet destinations.

For the United States, Donovan and Debres (2006) focused on Juneteenth which originated in Texas as an African-American celebration of the end of slavery and argued that food, and barbecue in particular, was a major attraction of Juneteenth. And, it is proposed that Juneteenth also functions as a culinary tourist event, with barbecue being the major draw. Additionally, Stewart, Bramble and Ziraldo (2008) assist practitioners to continue the forward momentum of wine and culinary sectors in Niagara to present recommendations for future growth and continued success of wine and culinary tourism in the Niagara region.

#### **3.2.2 Europe**

In European countries, the image of France has always been related to food and wine. The images of food products, vineyards and restaurants have traditionally dominated national and regional marketing strategies. No matter in domestic or international markets, food has become a topic in tourism strategies in France. And, regional food and cuisine is extremely important and very diversified and has been a tool used by French regions to differentiate themselves on the global market place. However, most French regions use images of raw products, country products and market scenes to position themselves on the traditional/rural/authentic theme (Frochot, 2003). Additionally, the images of popular Michelin starred restaurants and chefs were seldom presented.

For other countries in Europe, the government departments in the United Kingdom have recognized the linkage between tourism and food, so too have the agencies responsible for the promotion of regional food-related economic sectors. In England and Wales, the government-supported Food From Britain (FFB) organization includes as part of its mission a remit to foster the development of Britain's specialty food and drink sector (Boyne et al., 2003). Further, Hjalager and Corigliano (2000) provided a comparison between Denmark and Italy and illustrated core elements in food cultures. Particularly in Denmark, food

production is a major economic activity, and the power of the agricultural and food processing industries has in many cases compromised the quality image. In Italy, on the other hand, food policies and traditions, which give a high priority to freshness, intrinsically allow consumers to stay in control of food to a much larger extent than in Denmark.

Croatia was also a country involved in Europe. The tourism organization of Croatia started to develop strategies and tourism rules and treated traditional cuisine as unique products for the tourists. The tourism marketing strategies from 2001 to 2005 introduced gastronomic heritage to be a multiple role in tourism. Fox (2007) provided an approach towards the reinvention of the gastronomic identity of Croatian tourist destinations, an identity which will be founded on local gastronomic heritage rather than international cuisine.

### **3.3 Other areas**

For Africa, South Africa was the only one country involved in previous researches. Through a pilot study, du Rand et al. (2003) suggested how food tourism can be marketed successfully and the indicators for future development in South Africa. It revealed that the countries in North America and Europe have stressed to treat food as one of tourism attractions.

To be summed up, gastronomy has played an important role for tourism development in some Asian countries. Some Asian countries own rich gastronomy, it's not only a main attraction for tourism, but also becomes a main factor of development in some areas.

## **4. Methodological review**

### **4.1 Qualitative research**

In recent culinary tourism researches, qualitative approach was utilized more frequently than quantitative approach. The methods included literature review, content analysis, in-depth interview and semi-structural interview and field study. Literature review was mainly applied in exploring the relationship of food and tourism (Hashimoto & Telfer, 2006; Henderson, 2004; Meler & Cerovic, 2003; Quan & Wang, 2004), gastronomic identity of destinations, cultural elements or the types of culinary tourism (Fox, 2007; Hjalager & Corigliano, 2000; Tussyadiah, 2005). Content analysis was mainly applied in exploring marketing tools, such as the internet applied in culinary tourism promotion (Boyne et al., 2003; Boyne & Hall, 2004), content analysis of brochures (Frochot, 2003), gastronomy applied in marketing activities (Okumus et al., 2007), and government tourism websites (Hornig & Tsai, 2010).

Additionally, Cohen and Avieli (2004) utilized observation, field study and interview to explore the attractions and impediments of food in tourism. Meanwhile, observation and interview were employed by Donovan and Debres (2006) to explore the attraction of barbecue in a festival ---Juneteenth. Tellstom et al. (2006) utilized semi-structured interviews to explore the branding of food products. Molz (2007) combined the analysis of web-sites with interviews to explore the implication of food for travelers. Kim, Eves, and Scarles (2009) employed grounded theory and in-depth interviews to examine the factors influencing consumption of local food and beverages in destinations. By applying qualitative interview, the contribution of the destination's gastronomy to the quality of the travelers' experiences was explored (Kivela & Crofts, 2009), the key challenges in wine and

culinary tourism with practical recommendations were addressed (Stewart, Bramble, & Ziraldo, 2008), the role of food tourism in developing and sustaining regional identities was examined (Everett & Aitchison, 2008). And, on-site participant observation and focus group interviews were conducted to identify the attributes that influence the evaluation of travel dining experience (Chang, Kivela, & Mak, 2011).

## 4.2 Survey research

For quantitative researches, most were questionnaire survey. It was focused on tourists' dining experience and perception in destinations. It was expected to understand the role of gastronomy from tourists' perspective (Kivela & Crotts, 2005, 2006; Tse & Crotts, 2005). Ignatov and Smith (2006) utilized telephone surveys and in-depth mail survey to explore culinary tourists' market segmentation. A factor-cluster approach was utilized to segment culinary event attendees into two groups to make contribution to the area of consumer behavior research in culinary tourism (Smith & Costello, 2009). By applying empirical data consisting both of the secondary data and an interview, Tikkanen (2007) explored the sectors of food tourism by using Maslow's hierarchy of needs in the classification.

Additionally, Ryu and Jang (2006) added past behavior into the model of Theory of Reasoned Action (TRA). It tried to examine modified TRA to predict tourists' behavioral intention of experiencing local cuisine and was expected to understand the influential factors.

## 5. Significant trends and comments

To synthesize the above, in this research, the following discussion will be proceeded as the issues of *topical review*. Further, to be combined with the review of countries involved, the trends and comments of culinary tourism will be proposed.

### 5.1 The relationship of food and tourism

For the relationship of food and tourism, firstly, Hjalager and Corigliano (2000) suggested that food was related to the image of tourist destinations in the following ways.

1. Complementary  
The inclusion of food in tourist marketing and management seemed to have increased considerably over the past few decades. Food is used as appealing eye-catchers in brochures, videos and television programs.
2. Inventory  
Much of the creation of new tourist products and experiences was based on the heritage resource, for example the opening of historic food factories and visitor centers. Food became the focal point of festivals and special events that attract tourists as well as local residents (Getz, 1991).
3. Superficial  
Travelling and local products means sharing the local culture. Tourism was synonymous with amusement and entertainment, but it was also a cultural act, a cognitive and participatory moment related to the environmental context concerned.
4. Disconnected

All over the world, hamburgers and pizzas could be consumed under the same brands. The products and the eating styles were globalized. The emerging fast-food sector did little to connect local cultures and images with the act of eating.

This perspective conformed to the concept of *supporting consumer experiences* and *peak touristic experiences* proposed by Quan and Wang (2004). The process of making gastronomy be *peak touristic experiences* from *supporting consumer experiences* can have the relationship with destinations become *complementary or inventory* from *disconnected or superficial*. However, perhaps it can start from viewing gastronomic resources itself while exploring the relationship of food and image of a destination. Ignatov and Smith (2006) classified tourism into four types: facilities, activities, events and organizations (please refer to table 1).

Facilities	Activities	Events	Organizations
	Consumption		
Buildings/ Structures	Dining at restaurants		
• Food processing	Picnics utilizing		
• Wineries	locally-grown produce		
• Breweries	Purchasing retail food		Restaurant classification / certification systems (e.g. Michelin, Taste of Nova Scotia)
• Farmers' markets	and beverages	Consumer shows	
• Food Stores	Pick-your own	• Food and wine shows	
• Food-related museums	operations	• Cooking equipment, kitchen shows	
• Restaurants	Touring	• Product launches	Food / wine classification systems (e.g. VQA)
Land uses	Wine regions	Festivals	Associations (e.g. Cuisine Canada, Slow Food)
• Farms	Agricultural regions	• Food festivals	
• Orchards	City food districts	• Wine festivals	
• Vineyards	Education/Observation	• Harvest festivals	
• Urban restaurant districts	Cooking schools		
Routes	Wine tasting / education		
• Wine routes	Visiting wineries		
• Food routes	Observing chef competitions		
• Gourmet trails	Reading food, beverage magazines and books		

Note. From "Segmenting Canadian culinary tourists," by E. Ignatov & S. Smith, 2006, *Current Issues in Tourism*, 9 (3), 240.

Table 1. General typology of culinary tourism resources

Through the reviewing of countries which promote culinary tourism, as for Asia, activities and events occupied more percentage because dining at restaurants and food festivals are the main attraction in Hong Kong and Singapore. Food has become a focus of media and activities; with the image of destinations, it has formed a relationship of *complementary and inventory*. It's also *peak touristic experiences*. Hence, if gastronomy would like to become main attraction of a destination, it has to make its resource and image become the relationship of *complementary or inventory*. It's the same as France and Japan.

However, if we reviewed the countries which gastronomy hasn't been the main attraction, such as Canada, Croatia and South Africa, the relationship of gastronomy and destination image is still *supporting experiences*. It's also *disconnected or superficial*. But it was found from researches that the government, like Canadian Tourism Commission (CTC), it has begun to create the types of culinary tourism, such as food festival or wine festival. It was expected to gradually change the image and the relationship with gastronomy. From the research in Croatia, South Africa, it was found that the suggestion and strategy of developing gastronomy to be an attraction of tourism had been proposed (Fox, 2007; du Rand et al., 2003). It transformed food consumption to be *peak touristic experience* to promote the relationship of food and destination image.

The reason why some countries placed importance on food as an attraction of tourism could be explored from the benefits brought by key stakeholders--- the tourists, gastronomy providers, residents and community, and travel industry sector (please refer to table 2). For

key stakeholders	benefits
<b>tourists</b>	Enjoyable, unique, and high-quality food and services Better participation in indigenous culture through food Opportunity to purchase and sample unique products (e.g., Chinese foods such as teas) that are not readily available in their own country Unique opportunities for discovering new taste sensations Access to well-coordinated gastronomy-related experiences Helps to crystallize the idea that Hong Kong is a premier gastronomy destination as well
<b>gastronomy providers</b>	Provides potential to increase sales, leading to better returns Provides cooperative marketing and cross-marketing opportunities, offering more potential impact than businesses can afford individually Helps raise the quality of business products and services Capitalizes on future dining-out/gastronomy trends Provides potential for new and additional business opportunities Creates new jobs in rural areas
<b>residents and community</b>	Promotes cross-cultural awareness and understanding Helps local residents to see and understand the economic impact of tourism Promotes new business ideas and opportunities vis-à-vis gastronomy-related support services Takes advantages of regional gastronomy tourist travel
<b>travel industry sector</b>	Explores new gastronomy tourist markets beyond the region Offers an alternatives selling point for convention and meeting business Offers additional support for the DMO from the new gastronomy-related partners

Note. From "Tourism and gastronomy: gastronomy's influence on how tourists experience a destination," by J. Kivela & J. C. Crotts, 2006, *Journal of Hospitality & Tourism Research*, 30 (3), 375.

Table 2. The benefits of gastronomy tourism

tourists, they could experience local culture through food and get better experience. It will facilitate the gastronomy providers to promote the quality of product and service. For travel industries, surely they could benefit from business development and opportunities.

From the relationship of gastronomy and tourism, we understand that we can examine gastronomic resources and types of a destination if we'd like to develop culinary tourism. Moreover, it's important to analyze what benefits or disadvantages it can bring out for the destination; thus, it can develop the suitable types for the destination.

## 5.2 The attraction and impediment of cuisine to the tourists

It could be found that most countries tended to promote the attraction of food in tourism and treat it as an important resource. As what Henderson (2006) argued, enjoyment of and experimentation with food is seen to be a motive underlying much tourist decision making and its marketing and development is considered a route towards attaining a commercial competitive advantage while stimulating rural and urban economies.

However, Cohen and Avieli (2004) argued that overemphasizing the attraction of food and ignoring its impediments for developing areas in past literatures. Except for hygiene, communication and limited knowledge of local cuisine, in order to make tourists accept local cuisine more easily, the transformation of local cuisine has become a more important issue. Focused on this issue, the previous researches concerned on authenticity, commercialization of local cuisine, and proposed the missing of traditional cuisine authenticity due to conforming to tourists' dining habits and flavors (Henderson, 2006; du Rand et al., 2003).

Cohen and Avieli (2004) argued that for a local cuisine to become a popular attraction in its own right, it has to be filtered through tourism-oriented culinary establishments; only after they are in some ways, and to some degree, transformed. However, the manner of their transformation can not be simply represented on some unidirectional and unidimensional scale. Local foods are transformed on different dimensions and in various ways to suit tourists, and foreign dishes are introduced by tourism into the local cuisine and transformed to suit local tastes. Some may undergo a degree of transformation in order to make the food more acceptable to the tourists without impairing its authenticity. The tourists may be indifferent to other aspects of the product. Not all aspects of the local cuisine are equally relevant to the "authenticity" of the food offered by a tourism-oriented establishment, such as to substitute some ingredients more acceptable to tourists, and, to use modern technologies instead of traditional cooking methods to improve the sanitary conditions. However, for example, the Peking duck of Quan Ju De which is very popular was cooked by electric oven instead of traditional oven. It encountered most consumers' opposition because they couldn't experience the traditional cooking way. On the other side, it could be a transformation to improve the hygiene condition and product standardization.

So, in the developing process of culinary tourism, the authenticity and commercialization of local cuisine still need more exploration. The way of transformation is multidirectional and multidimensional (Cohen & Avieli, 2004). Therefore, what's the direction of transformation, how to be transformed, the level of transformation and its relationship with authenticity and commercialization, these issues need to be more concerned.

### 5.3 Market segment of culinary tourists

Regarding the segmentation of culinary tourists, firstly, it can be explored from the types of culinary tourists. Hjalager (2004) proposed the model of culinary tourism experiences to predict tourists' attitude and preference from gastronomy-tourism lifestyle. It can be classified into four types of culinary tourists to be recreational, existential, diversionary and experimental. Among them, existential and experimental tourists of rich gastronomy knowledge are the groups with highest possibility to revisit the same destination. The reason is that the destination with unique gastronomy can satisfy their gastronomic experiences.

However, in the recent researches, this classification didn't combine with other segmentation, such as culture, the length of staying, age and revisiting (Tse & Crotts, 2005). Regarding culinary tourist segmentation, Ignatov and Smith (2006) proposed market segments based on three categories of culinary activities: food tourists, wine tourists, and food and wine tourists. If this classification could be combined with other segmentation and proceed further exploration, it's believed that there will be more understanding on culinary tourist segmentation including gastronomic experience seeking, communication method utilized, and product development strategy, and so on.

### 5.4 The draft of culinary tourism developing strategies

Creating a local cuisine and making it a pull factor for a particular location can be one effective strategy for tourism development (Tussyadiah, 2005). Regarding the draft of culinary tourism development strategy, the importance of government or destination marketing organization (DMO) has been proposed by many researches (Hjalager & Corigliano, 2000; du Rand et al., 2003; Kivela & Crotts, 2005, 2006; Hashimoto & Telfer, 2006; Henderson, 2006). It contains supporting for culinary tourism development strategy, figuring out beneficial elements and uniqueness of developing culinary tourism and relevant regulations, and so on. However, it's not enough to simply offer a gastronomy experience; gastronomy tourism is also making tourists feel good as a result of their visit to a destination. In order to make tourists feel good about being in a destination, it requires an effort on the part of the destination's DMO and gastronomy providers to educate tourists about why the local cuisine and its associated culture are unique to the destination (Kivela & Crotts, 2006). The first priority is to examine its conditions of developing culinary tourism including verifying its own resources, listing gastronomy assets and analyzing its advantages and disadvantages.

For those countries involved in recent researches, culinary tourism development of each area is belonged to different type and relationship. However, no matter which type or relationship, the gastronomy tourism initiatives proposed by Hjalager (2002) could be utilized to examine the developing period.

First-order gastronomy tourism development: the indigenous

- Including gastronomic aspects in promotional materials of the region / country
- Campaigns for particular products, connected to a region or season
- Introducing food trade marks with regional features / names, etc
- Creating tourism appeal for existing food fairs and events



- Public / private planning for the restaurant sector in new urban / resort developments

Second-order gastronomy tourism development: the horizontal

- Implementing and marketing quality standards
- Certification and branding of food providers and restaurants, based on various criteria and values
- Reinventing, modernizing and commodifying historical food traditions

Third-order gastronomy tourism development: the vertical

- Third-order restructuring of the gastronomic food experience
- Establishing and marketing routes
- Creating events based on food and tourism
- Cooking classes and cooking holidays

Fourth-order gastronomy tourism development: the diagonal

- Training for gastronomy, food science and tourism professionals
- Research and development (R&D)
- Media centres
- Demonstration projects

By utilizing gastronomy tourism development order, it'll facilitate in drafting the strategy. Hence, it's beneficial to the sustainable development of culinary tourism.

## 5.5 Exploration of promotion and marketing tools

The application of internet and brochure was proposed by many researches. For the application of internet, some countries and areas devoted themselves on the operation of tourism information web-sites. These web-sites also provided relevant information for the consumers who are leaving for the destination. Even so, it was found that initiatives are often not suitably represented on the web sites of their respectively official local tourist boards. These web sites can either lack the appropriate hyperlinks, or have these "buried" deep within their site where they may not be discovered (Boyne et al., 2003). As it shows, how to apply brochures and internet to create a local cuisine and make it a pull factor for a particular location will be an issue needed to be explored in the future.

Additionally, Tussyadiah (2005) argued that the media play a very strong role in the direction of Japanese culinary tourism. Travelers refer to the media listings when choosing destinations and food. And, the promotional campaigns of many gourmet spots and travel packages in the media reflect the fact that regional variations in cuisine strongly affect the direction of domestic tourism in Japan. There are many food-related programs shown on television, as well as dining and food trip guides on the internet and in travel magazines. Hence, to understand the application and influence of the media is very important to the development of culinary tourism.

## 5.6 The application of theories in culinary tourism development

Owing to culinary tourism is multidimensional, the application of theories will be helpful to clarify each dimension of culinary tourism; such as the theories of consumer behavior.

Boyne et al. (2003) proposed a four-fold taxonomy describing types of consumers according to the level of importance of food and gastronomy in their destination decision-making processes.

1. Type I consumers: Gastronomy is an important element of their holiday experience and they actively seek information relating to an area's gastronomic heritage and/or the nature of the supply of locally-produced or quality food in the area.
2. Type II consumers: Gastronomy is also important; however, they require exposure to the food-related tourism information as a precedent to acting upon this-that is, Type II consumers would not actively seek gastronomy-related information in a tourism context but welcome it.
3. Type III consumers: Consumers do not attach importance to gastronomy as part of the holiday experience but may do so in the future if they have an enjoyable gastronomic experience.
4. Type IV consumers: Consumers have no interest in gastronomy and will continue to have no interest in gastronomy regardless of the quality or ubiquitousness of gastronomy-tourism promotional material.

For the types of culinary tourists, some researchers utilized sociology to do further exploration; such as the lifestyle by Bourdieu (1984) --- recreational, existential, diversionary and experimental (Hjalager, 2004). If Bourdieu's (1984) lifestyle could be combined with the four types of culinary tourists by Boyne et al. (2003), it's believed that it will make much contribution to the classification and understanding of culinary tourists.

For the application social psychology, Theory of Reasoned Action (TRA) is to predict an individual's attitude and behavioral intention (Ajzen & Fishbein, 1980). Ryu and Jang (2006) employed TRA to further understand culinary tourists' behavior model, and added variables to modify the model. It can help understanding culinary tourists' behaviors.

Additionally, tourists differ characteristically in their concepts of value for money. In their cognitions of satisfaction, and in their evaluation frameworks, including in all cases in relation to food and dining (Nield, Kozak & LeGrys, 2000). Therefore, the theories of customer satisfaction, service quality or consuming perception will be applied in exploring tourists' consuming perception in restaurants.

## **6. Summary and general directions for future research**

Through reviewing recent researches of culinary tourism, it can be found that some suggestions had been proposed. However, it revealed that some perspectives needed more deep explorations to be clarified in future researches. Additionally, it showed that some dimensions were not involved in previous researches. In this research, the trend and direction will be explicitly proposed to be referred for future research.

The development of culinary tourism really played an important role for a country or a region. In the developing process, realizing the relationship of gastronomy and a destination and the classification of culinary tourism are the first priority. Some destinations own unique gastronomy, popular restaurants, coffee shops or creative chefs; some areas own characteristic seafood and fresh produce. So, linking the gastronomic

resources of each destination with the types of culinary tourism is the crucial factors of successful strategies. Furthermore, utilizing marketing tools efficiently to form the image of culinary tourism for destinations, like brochure, internet and media, can convey the information. Meanwhile, the information of infusing culture and reducing impediments of experiencing local cuisine is very important to the draft of marketing strategy. Here, after reviewing recent researches, some explorations which were insufficient in recent researches will be suggested in the followings:

1. Regarding the linkage of culinary tourism types and market segmentation, it's short of deep exploration in recent researches.

Regarding what type of culinary tourism could attract which segment of consumers, it's an issue needed to be clarified. For example, there's much difference between Hong Kong and Canada in the culinary tourism types. In Hong Kong, it emphasized diversified cuisines, restaurants, coffee shops and chefs; whereas, in Canada, it stressed seafood and fresh produce. For the differentiation of the tourists, it's worth of being explored further. Additionally, the practical suggestions of application, design and conveying method of marketing tools for different types are not proposed yet. It's an important implication for future research.

2. Culture seemed to be seldom involved in the researches; but, it's an element closely connected with culinary tourism.

The reason is that culinary tourism is quite different from the simple consumption of food and drink during a tourism experience. This term refers to the experience that regionally produced food and drink can provide when they are used to tell a story or to convey some aspect of the culture of the region being visited. Culinary tourism implies transference of knowledge or information about the people, culture, traditions and identity of the place visited. It conveys something that is indigenous, perhaps even unique, to a specific destination (Ignatov & Smith, 2006). Like Japan, what attracts people to search for food in a particular place can be that of the attraction of the food itself: ingredients, presentations, healthiness, freshness and the association of the food with a place of culture. In Japan, there are two factors that have a strong role in determining the culinary tourism pattern: the *meibutsu*\* culture and the seasonal variations (Tussyadiah, 2005). As for Canada, Canada started to join international activities and adopted indigenous or local ingredients to develop local cuisine to showcase its diverse cultures. Moreover, it attracted tourists by food festivals or events, and culinary tourism package through the arrangement of travel agencies (Ignatov & Smith, 2006). To focus on Japan and Canada, both of them display totally different characteristics in dietary culture, and present distinct attraction for culinary tourists. This attraction formed by cultural elements need further exploration and expect to be combined with marketing strategy. Namely, to explore how to utilize brochure, internet and media and infuse cultural elements into these tools is with crucial influence on culinary tourism promotion in the future.

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\* *Meibutsu* is a Japanese term for famous products associated with particular regions. *Meibutsu* are usually items of **Japanese regional cuisine**, although the category includes local **handicrafts**. *Meibutsu* typically have a **traditional** character, although contemporary products may qualify as *meibutsu* if they are distinctive and popular. They are often purchased as omiyage (**souvenirs**) to be given as gifts.

3. More empirical researches will be expected to explore the issues regarding culinary tourism.

The presence of tourists might negatively impact the local culture when developing the food potential of a particular area was argued in previous research (du Rand et al., 2003). That is to say, in order to make tourists accept local cuisine, it's usually changed in the ingredients, cooking ways or presentations; in other word, its transformation (or commercialization). So far, more empirical researches will be expected to explore the issues regarding authenticity and commercialization of local cuisine in culinary tourism; especially for tourists' perception and local residents' perceptions (positive and negative). It's of concern for sustainable development of culinary tourism.

4. Fewer researches explored culinary tourists' consuming perceptions.

The relevant researches regarding tourists' consuming perception of gastronomic experience seem to be insufficient. It can combine consumer perception, service quality with the characteristics of culinary tourism to proceed the researches of culinary tourists. Thus, it will contribute to the improvement of service quality, the quality of the dishes and the dining environment.

In addition, for methodology, there's still much room for qualitative research; especially for the survey of tourists. Perhaps it's a research limitation that it's hard to obtain the tourists as samples; moreover, it's more difficult to survey the tourists with gastronomic experience. There're many dimensions for tourists to experience gastronomy in a destination, such as dining at restaurants, tasting local delicacies or local fresh produce, food festivals or indigenous meals, and so on. It can be focused on each type to proceed more deep exploration and obtain more specific findings.

For the countries involved in recent researches, France which was popular as French cuisine, its brochure conveys gastronomic images which mostly were related to unprepared, natural products, rural products or country life. What the famous fine dining restaurants, delicacy and chefs were not emphasized. Even the Michelin starred restaurants of *Michelin Red Guide* didn't become the emphasis of tourism marketing neither. However, in Hong Kong, Hong Kong Tourism Board introduced the restaurants with *Best of the Best Culinary Award* or *Quality Tourism Services* to the tourists for the reference of choosing the restaurant. Here, an issue induced was what role the restaurant guide should play? If the restaurant guide provide objective reference for tourists? Is the information necessary for tourists? Does it can reduce the impediments for tourists to experience local cuisine according to the restaurant guide? And, how to develop an objective restaurant rating system to offer the guide for culinary tourists, especially in Asia? It's worth of following research in the future.

Finally, since most of recent researches were still focused on exploring one country, cross-national comparison and cross-national populations could be applied in exploring all dimensions of culinary tourism. For cross-national comparison, the strategies of culinary tourism development and the images that the marketing tools convey could be compared. For cross-national populations, it could be employed to compare culinary experience or consumers' behaviors among the tourists of different nationalities in a destination.

Furthermore, some solid theories of other fields such as Social Psychology can be applied to explore culinary tourists' behavioral model. It'll make much contribution to future research.

Nowadays, the countries which pay much attention to culinary tourism are increasing gradually. Nevertheless, there are still some unclear questions and under-explored issues. For this specific type of tourism, it will need more efforts to be devoted to and more practical suggestions to be proposed in the future.

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# Enterprise Proportionalities in the Tourism Sector of South African Towns

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## 1. Introduction

Determination of the enterprise structures of towns followed by clustering and ordination techniques yielded important information about the similarities/dissimilarities of Karoo towns in South Africa (Toerien & Seaman, 2010). These techniques also revealed important proportionalities in the enterprise structures of towns (Toerien & Seaman, 2012,a), which are subject to 'island effects' (Toerien & Seaman, 2012,b). The proportionalities manifested as constant and statistically significant proportions between the enterprise numbers of some business sectors and the total enterprise numbers of towns. Such proportionalities obviously provide a predictive ability about the enterprise structures of local economies.

Tourism and hospitality enterprises are the link between attractions/tourism products (supply-side) and tourists (demand-side) in any economy. Knowledge about the enterprise structures of the tourism and hospitality sector of towns is, therefore, important. However, the enterprise structures of this sector in relation to the rest of the enterprises of South African towns have not yet been analysed in any great detail, an issue this chapter addresses for a group of towns.

Nel & Hill (2008) used a case study approach in studies of the marginalisation of rural towns in South Africa. Toerien & Seaman (2012b) followed their lead in an analysis of 'island effects' in enterprise development in South African towns. This study also uses a case study approach, focusing on 75 towns in semi-arid and arid South Africa. The primary aim of this chapter is to report on proportionalities in the tourism and hospitality sectors of these towns. In particular, an analysis is presented of the 'proportionality-in-proportionality' phenomenon, which was detected during this study. The practical implications of proportionality phenomena for tourism enterprises and authorities in semi-arid and arid South Africa are discussed.

### 1.1 Logic of the chapter

Context is firstly provided for the enterprise analysis. This consists of a brief overview of the importance of tourism in South Africa and includes considerations of the tourism challenges of small towns in South Africa. It is followed by a discussion of the history of the Karoo, the home of the towns selected for the study. The methodology to identify the enterprise structures of South African towns and their positioning as 'enterprise ecosystems' and 'enterprise islands' are then presented. The similarities/dissimilarities and proportionalities

of the enterprise structures of 75 towns from South Africa's semi-arid and arid interior are examined through clustering and multivariate statistical techniques. The tourism-related enterprises of these towns are then considered in greater detail. Proportionalities within this sector, including 'proportionality-in-proportionality' phenomena, receive detailed attention. The results are finally discussed and conclusions drawn.

## 2. Tourism in South Africa

International travel to South Africa surged since the end of apartheid (SouthAfrica.info, 2011). In 1994, the year of South Africa's first democratic elections, only 3.9-million foreign visitors arrived in the country. By 2004, international arrivals had increased to 6.7-million. And in 2007 a total of 9.07-million foreigners visited South Africa, an 8.3% increase over 2006. Tourism was identified as an economic sector that could help to provide much needed employment.

In July 2010, the South African Department of Tourism together with South African Tourism and the Tourism Business Council of South Africa launched a National Tourism Sector Strategy (South African Government, 2011) with core objectives to: (i) grow the tourism sector's contribution to the gross domestic product, (ii) achieve transformation, (iii) provide people with development and decent jobs, and, (iv) entrench a culture of travel among South Africans. Specific aims are: (i) to grow tourism's direct contribution to gross domestic product from an estimated R64.5 billion or 3.2% of gross domestic product in 2009 to R125 billion or 3.5% of gross domestic product in 2015 (exchange rate ~ R7 per US\$), (ii) to grow tourism's total (direct and indirect) contribution to gross domestic product from an estimated R173.9 billion or 8.7% in 2009 to R338.2 billion or 9.4% of gross domestic product in 2015, (iii) to increase the number of foreign arrivals from 9.9 million in 2009 to 13.5 million in 2015, (iv) to increase the number of direct jobs supported by the sector from an estimated 575000 in 2009 to 800000 in 2015, and (v) to increase the number of total (direct and indirect) jobs supported by the sector from an estimated 1.4 million in 2009 to 1.9 million in 2015.

These are formidable targets especially because one-third of South Africa is semi-arid to arid (Cowling, 1986). Travellers regularly perceive this area, regularly referred to as the Karoo, as a 'desert', a badland characterized by heat, dust, overgrazing and marginalized people (Milton & Dean, 2010). The Karoo has also been perceived as: (i) being in economic, agricultural and population decline, (ii) being marginalised through its division into four provinces, (iii) having a denuded landscape, and, (iv) having small town decline (Nel & Hill, 2008).

Such perceptions about an arid area are not unique. Desert economies are internationally characterised by having marginal lands for conventional agriculture, and a high proportion of economic activity in the mining, tourism and service industries (Tremblay, 2006). Their populations are relatively small and sparse, resulting in relatively high service delivery costs (Tremblay, 2006). Typically, tourism is presented as a promising but dangerous form of development, of which the impacts on desert communities are imperfectly understood. Yet, this often takes place in contexts where the number of alternatives (to tourism) is limited and where tourism is likely to compete for resources with other more traditional forms of economic activity (Tremblay, 2006).

Weaver (2001) identified seven attributes that are strongly associated with desert tourism: (i) exceptional geological features and climatic conditions, (ii) wildflower and other episodic floral displays, (iii) ancient, large or unusual vegetation, (iv) caravans or other desert

trekking, (v) indigenous inhabitants, (vi) oases, and (vii) protected areas. On the supply-side quite a lot is known about the tourism attractions and/or products of the Karoo. Maguire (2009) presented a very useful analysis of the attractions of 58 different Karoo towns and villages. The attractions included: geology and landscapes, including mountain passes; palaeontology, archaeology and rock art; architecture; Anglo-Boer War history; literary tourism; Khoisan struggle sites; natural attractions; agricultural attractions; hunting; astronomy; historical interests; food tourism; missionary and church history; and outdoor and adventure tourism.

Atkinson (2010) described the many attractions of the region as follows: space, silence, serenity, a long and interesting prehistory and history, spectacular scenery, great hospitality, different cultures juxtaposed, many different heritage assets, excellent food, authenticity coupled to 'immaturity' as a tourist venue that means that much is unspoilt and non-commercialised, with a rural charm not available in larger urban tourist venues.

On the demand-side, Maguire (2009) analysed the tourist profile of the Karoo. It included: drop-ins who sleep over, retirees on self-drive tours, foreign self-drive tourists, bikers of mixed age groups (local and foreign), people that attend events such as motor bike rallies, endurance runs, car rallies, and festivals, people en route to events who extend their trips, tour groups in luxury buses (mostly foreign tourists), smaller tour groups in mini-buses (mix of local and foreign tourists), clubs and special interest groups on outings to places of interest, owners of recreational vehicle owners, hunters, campers, and families with children. Many different people visit the Karoo for a variety of reasons: nature, tranquillity and solitude, friendly people, openness, fresh air, food, heritage, night skies, ambience, remoteness and cleanness (Atkinson, 2010).

To understand the challenges inherent in an effort to grow the tourism and hospitality sector in arid and semi-arid South Africa, it is necessary to dwell on the general as well as specific problems that face small South African towns, many of which have experienced rapid transformation over the past two decades. This transformation has been assisted by South Africa's re-entry into global markets, changes in transport systems and infrastructure, a greater degree of mechanisation in the farming industry, government policy and global economic change (Centre for Development Support, 2010). As a result many small towns have experienced economic decline and the historical links between commercial farming communities and these small towns have deteriorated. Simultaneously, in-migration of redundant low-skilled farm workers to small towns occurred. This placed considerable pressure on the existing infrastructure of the towns.

Despite the overall concerns related to small towns, a fair number of them have benefited from tourism since the mid-1990s. Clarens (in the north-eastern Free State Province) and Dullstroom (in Mpumalanga Province) were used as case study towns (Centre for Development Support, 2010) to identify important issues associated with the expansion of the tourism and hospitality sectors in small South African towns. Both Clarens and Dullstroom experienced extensive tourism growth since the early 1990s, mainly as a result of an increasing demand for weekend tourism. This benefited local businesses but an increasing number of farmers also diversified into tourism activities. In addition property developers also moved in. However, by the end of 2010 the growth in tourism in Dullstroom had come to a standstill and that of Clarens continued but with definite risks.

Risks identified were: (i) small towns may lose their smallness and natural beauty as a result of rapid and uncoordinated development, (ii) there is deterioration of access routes that

impacts upon tourist visits, (iii) there are demand peaks in local public services that stretch the organisational and technical capacities of small local authorities, (iv) there are quality deficiencies in the services provided, which contribute to: (a) fewer tourists, (b) entice the entry of national and international tourism operators to the detriment of local enterprises, and, (c) contribute to the over-commercialisation of towns, and, (v) a significant number of the poor in the area might not experience any benefit at all from tourism, an issue that remains politically important (Centre for Development Support, 2010).

### 3. The Karoo and its history

The semi-arid and arid heartland of South Africa, called the Karoo, is large (Figure 1). It stretches about 600 km from east to west and about 600 km from north to south (Atkinson, 2010) and covers approximately 400,000 km<sup>2</sup> (Nel & Hill, 2008). It has different sub-regions: the Nama-Karoo (northern parts), the Klein-Karoo (southern parts), the Great Karoo (central part) and the False Karoo (in the southern Free State) (Atkinson, 2010). The Karoo is a single ecosystem, sub-divided into a winter rainfall and a summer rainfall area (Cowling, 1986). It borders on other arid areas in South Africa, notably the Kalahari, Bushmanland, Namaqualand, and the Richtersveld (Atkinson, 2010).

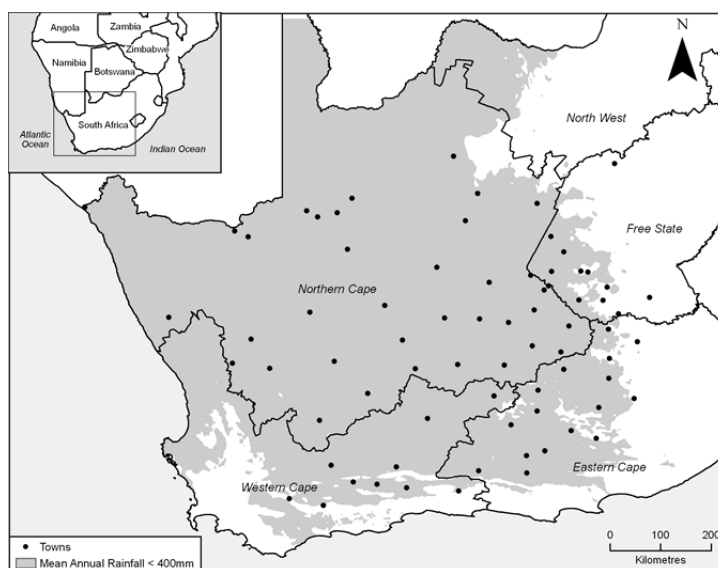


Fig. 1. Map of semi-arid and arid South Africa and the selected towns indicated as dots.

The sheer size of the Karoo means that it has never been administered as a coherent entity, with its own specific needs (Atkinson, 2010). Before 2000, it was administered by rural Divisional Councils and urban Town Councils in the erstwhile Cape Province and Free State Province. Since 2000, it straddles four provinces, each with its own set of priorities.

The Karoo supported hunter-gatherers for about one million years (Deacon & Deacon 2003) and nomadic Khoikhoi herders for more than 1600 years (Boonzaaier et al, 1996; Giliomee & Mbenga, 2007). In 1652 the Dutch East India Company established a victualing station at the

Cape of Good Hope to provide fresh produce and meat to the crews of their ships, thereby establishing a permanent European presence in the south-western Cape (Giliomee & Mbenga, 2007; Guelke, 1979). Their limited capacity to raise stock soon meant that cattle and sheep had to be sourced from the Khoikhoi (Giliomee & Mbenga, 2007). The Company's thrust into the more distant domains of the Khoikhoi consisted of three distinct, though overlapping, phases (Elphick, 1979).

A 'trading frontier' to obtain livestock from the Khoikhoi expanded steadily until about 1700. However, the ability of the Khoikhoi to supply enough livestock also became limited (Elphick, 1979). Secondly, the Dutch East India Company started allocating land that had traditionally fallen under Khoikhoi control and allowed free farmers to settle there (Wickins, 1983). The third frontier was one of semi-nomadic European pastoralists (called 'trekboers') who moved inland (Elphick, 1979). The farmers adopted the agricultural technologies of the Khoikhoi, i.e. the herding of fat-tailed sheep and cattle adapted to local conditions. The 'trekboers' supplied livestock to the Dutch East India Company.

Wool production in the south-western Cape was negligible up to the end of the 18<sup>th</sup> century. During the next fifty years wool farming became the staple economy of the countryside (Burrows, 1994). In 1830 the Cape Colony exported 15 tons of wool and 22000 tons by 1872. Sheep farmers in the Karoo were part of the wool production system.

There were no commercial reasons to establish towns in the Karoo (Fransen, 2006). Two other needs drove this. Firstly, the authorities had a need for administrative control and they established drostdys (administrative centres) around which villages and later towns developed. Secondly the farmers' needs for religious services drove the establishment of new parishes. As soon as a church was built, some stands were sold, houses built and eventually villages and later towns developed (Fransen, 2006).

For more than a century since 1850 the Karoo and its towns prospered as a result of wool exports (Wickins, 1983). In time, however, overexploitation of the Karoo followed, which by the mid-twentieth century had caused land degradation that led to much concern (Milton & Dean, 2010; Nel & Hill, 2008). Current national policy is to invest preferentially in the geographical areas in South Africa with the highest potential for economic growth. This led to an economic slump in the Karoo in which the smaller towns struggled in contrast to the larger towns (Nel & Hill 2008). Tourism is increasingly seen as a business sector that can help Karoo towns to meet their economic challenges (Atkinson, 2010).

#### **4. South African towns as enterprise ecosystems and islands**

There is an on-going interest in the role played by evolutionary biology and Darwinism in evolutionary economics (Witt, 2008). Complexity economics, part of evolutionary economics and in contrast to traditional economics, emphasises the influence of entropy on economic systems and the need for energy to reduce entropy and create local order (Beinhocker, 2006). He stated that economic wealth and biological wealth are thermodynamically the same sort of phenomena, i.e. systems of locally low entropy, patterns of order that evolved over time under the constraint of fitness functions. Beinhocker (2006) suggested that enterprises like organisms are subject to Darwinian competition in which the fittest survive. The enterprises present in a town at a specific point in time, therefore, reflect at that time the outcome of the Darwinian competition.

Natural ecosystems have been defined as biotic communities or assemblages and their associated physical environments in specific places (Tansley, 1935). Towns also meet the norms of the above definition of ecosystems, i.e. they house assemblages of enterprises in associated physical environments in specific places (Toerien & Seaman, 2010). As a consequence they can be considered to be enterprise ecosystems, a hypothesis that was tested and accepted for South African towns by Toerien & Seaman (2010).

These authors employed clustering and ordination techniques, frequently used in studies of natural ecosystems, to investigate the similarities/dissimilarities of the enterprise structures of 47 Karoo towns. These techniques revealed six different clusters of towns at a correlation coefficient level of 0.65 and the clusters differed significantly ( $P < 0.05$ ) in some respects. The agricultural products and services, the tourism and hospitality, and the trade sectors were particularly important in defining the clusters. This provided direct evidence that the tourism and hospitality sector is important in defining the characteristics of towns of semi-arid and arid South Africa.

Toerien & Marais (2012) used similar techniques to study the enterprise structures of 122 South African towns and villages with enterprise assemblages that ranged in size from eight to 1830 enterprises. They found that there were marked differences in the enterprise assemblages of towns of similar sizes, which suggested that the ways in which they provided services differed markedly.

Toerien & Seaman (2012a) found surprising proportionalities in most business sectors of 125 South African towns. In most business sectors, but not all, the number of enterprises per town was significantly ( $P < 0.01$ ) correlated with the total number of enterprises per town. Toerien & Seaman (2012b) showed that the Species Equilibrium Model of MacArthur & Wilson (1967), which describes the dynamics of immigrant biological species on islands, is a metaphor for enterprise development in rural South African towns. In short, towns are 'enterprise islands'. Two of their observations are important: (i) there is an equilibrium number of enterprises in a town, which is determined by the population size of the town, and, (ii) there is a balance between the rate at which new enterprises are established in a business sector and the rate at which enterprises disappear from the sector. These observations have numerous implications for local economic development strategies.

## **5. The enterprise proportionalities of semi-arid and arid region South African towns**

### **5.1 Methods used**

Toerien & Seaman (2010) showed that a selection of Karoo towns provided a suitable case study for testing the hypothesis that towns are enterprise ecosystems. Nel & Hill (2008) also used case studies to investigate towns of the eastern Cape. Against this background, seventy five towns from semi-arid and arid South Africa (Figure 1, Table 1) were selected for this study. The selection was made to include towns of different origins and different parts of semi-arid and arid South Africa. It included towns from the Little Karoo, the Great Karoo, the Kalahari and Namaqualand. It also included former administrative centres, 'church towns' (*sensu* Fransen, 2006), mission towns, river towns (located along the Orange River) and mining towns. The reason for this selection was to ensure that the tourism and hospitality enterprises of the semi-arid and arid region could be examined in detail.

Town	No.	Source*	No. of enterprises	Town	No.	Source*	No. of enterprises
Aberdeen	S1	g	39	Loxton	S39	h	7
Alexander Bay	S2	g	55	Luckhoff	S40	h	16
Augrabies	S3	g	41	Middelburg (EC)	S41	f	161
Barkly West	S4	g	77	Montagu	S42	d	224
Barrydale	S5	d	56	Murraysburg	S43	e	21
Beaufort West	S6	g	353	Nieu-Bethesda	S44	e	21
Bethulie	S7	g	43	Nieuwoudtville	S45	h	30
Brandvlei	S8	h	22	Noupoort	S46	i	30
Britstown	S9	g	27	Orania	S47	g	28
Burgersdorp	S10	g	115	Oudtshoorn	S48	f	897
Calitzdorp	S11	d	54	Pearston	S49	h	19
Calvinia	S12	g	110	Pella	S50	f	8
Carnarvon	S13	g	58	Petrusville	S51	f	17
Colesberg	S14	g	144	Philippolis	S52	f	24
Cradock	S15	g	296	Philipstown	S53	f	15
De Aar	S16	g	223	Pofadder	S54	h	41
Fauresmith	S17	g	22	Prieska	S55	g	108
Fraserburg	S18	g	33	Prince Albert	S56	h	82
Gariepdam	S19	g	21	Richmond	S57	b	30
Garies	S20	g	26	Smithfield	S58	g	35
Graaff-Reinet	S21	e	329	Somerset East	S59	h	191
Griekwastad	S22	g	31	Springfontein	S60	g	23
Hanover	S23	g	22	Steynsburg	S61	g	39
Hofmeyr	S24	g	17	Steytlerville	S62	g	30
Hopetown	S25	g	70	Strydenburg	S63	h	17
Jacobsdal	S26	g	42	Sutherland	S64	f	35
Jagersfontein	S27	g	28	Tarkastad	S65	g	42
Jansenville	S28	g	47	Trompsburg	S66	g	38
Kakamas	S29	g	138	Uniondale	S67	f	42
Kathu	S30	g	135	Upington	S68	g	906
Keimoes	S31	g	101	Vanderkloof	S69	g	18
Kenhardt	S32	h	29	Vanwyksvlei	S70	h	8
Klipplaat	S33	g	15	Venterstad	S71	e	18
Koffiefontein	S34	g	43	Victoria West	S72	a	74
Ladismith	S35	d	88	Vosburg	S73	a	16
Laingsburg	S36	g	56	Williston	S74	a	26
Lime Acres	S37	g	42	Willowmore	S75	e	49
Loeriesfontein	S38	h	29				

\* Year of telephone directory:

a = 2000/01, c = 2004/05, e = 2006/07, g = 2008/09, i = 2010/11

b = 2002/03, d = 2005/06, f = 2007/08, h = 2009/10

Table 1. The selected towns including their identification numbers, the sources of enterprise listings and the total number of their enterprises.

The rapid method of Toerien & Seaman (2010) was used to determine the enterprise assemblages of the selected towns. All enterprises listed in telephone directories for the different towns (Table 1) were identified and listed in spread sheets. They were then categorized into 19 major enterprise sectors that included economic drivers (including the tourism and hospitality sector) as well as service providers (Table 2). When it was impossible to deduce the nature of an enterprise from its name in the telephone directory and/or from an Internet search via Google, the entry was not used in subsequent analyses. The identified enterprises in every enterprise sector of each town were counted to develop an enterprise assemblage profile for each town.

The clustering and ordination of enterprise assemblages of differing sizes of different towns required normalisation of the data by expressing the numbers of enterprises in each business sector as a percentage of the total number of enterprises in specific towns. The computer software package PRIMER (Plymouth Routines In Multivariate Ecological Research) obtained from PRIMER-E Ltd, Plymouth was used to examine the similarities/dissimilarities of the enterprise assemblages of the selected towns. Pearson correlation coefficients based on normalised data were calculated between each possible pairing of villages and towns, resulting in a correlation coefficient similarity matrix. The matrix served as input to subsequent analyses.

Cluster analyses aim to find “natural groupings” of samples such that samples within a group are generally more similar to each other than samples in different groups and the results can be presented in dendrograms (Clarke & Warwick, 2001; Clarke & Gorley, 2006).

Sector no.	Economic Drivers
1	Agricultural Products & Services Sector
2	Processing Sector
3	Factory Sector
4	Construction Sector
5	Mining Sector
6	Tourism & Hospitality Sector
	Service Sectors
7	Engineering & Technical Services Sector
8	Financial Services Sector
9	Legal Services Sector
10	Telecommunications Services Sector
11	News & Advertising Services Sector
12	Trade Sector
13	Vehicle Sector
14	General Services Sector
15	Professional Services Sector
16	Personal Services Sector
17	Health Services Sector
18	Transport & Earthworks Sector
19	Real Estate Sector

Table 2. The business sectors used in the classification of enterprises.



The complete linkage option of the PRIMER 6 software was used for clustering purposes. The correlation coefficient similarity matrix formed the input. The cluster order of towns was used to examine the strength of specific towns in specific business sectors, especially the tourism and hospitality sector.

Principal component analysis is an ordination technique in which samples regarded as points in a high-dimensional variable space are projected onto 'best-fitting' planes (Clarke & Gorley, 2001). The purpose of the new axes is to capture as much of the variability in the original space as possible, and the extent to which the first few principal components allow an accurate representation of the true relationship between the samples in the original high-dimensional space is summarised by the "percentage of variation explained" (a ratio of eigenvalues). The PRIMER 6 software was also used for the principal component analysis. The correlation coefficient similarity matrix (see above) formed the input of the principal component analysis.

The enterprise numbers of South African towns are not normally distributed (Toerien & Seaman, 2011); hence, non-parametric statistical tests were mostly used to examine enterprise structures. Such analyses do not require assumptions about normal distributions of the data but use rank numbers instead. Kruskal-Wallis, Mann-Whitney and Tukey non-parametric comparisons were used to test for the presence of statistically significant differences between identified clusters of towns. WINKS SDA Software (6th edition) obtained from TexaSoft, Cedar Hill was used for this purpose. Cluster 8 with only two member towns was omitted from these analyses because of its small size.

Once it was established that the tourism and hospitality sector was an important differentiator for the selected towns, more detailed analyses were done on this sector. Firstly, the overall structure of the sector was analysed in terms of enterprise numbers and composition. Thereafter the presence of proportionalities in the sector was examined through the use of correlation and regression techniques. To compare clusters with each other non-parametric tests were used where appropriate. Microsoft Excel and WINKS SDA Software (6th edition) obtained from TexaSoft, Cedar Hill were used for this purpose. Where data such as ratios between sector and total number of enterprises proved to be normally distributed, standard ANOVA analyses were used for comparisons of clusters. WINKS SDA Software (6th edition) obtained from TexaSoft, Cedar Hill was also used for this purpose.

## **5.2 Results**

### **5.2.1 Cluster analysis of towns**

Eight clusters were identified in the selected towns (Figure 2). Based on their enterprise structures there are clearly definite groups of towns in semi-arid and arid South Africa. To understand which business sectors are important in determining the differences between the clusters a principal component analysis was performed.

### **5.2.2 Principal component analysis**

The first five principal components were extracted and the eigenvectors are summarised in Table 3. The tourism and hospitality sector together with the trade sector contributed very

significantly to principal component 1. The opposite signs of their vectors indicated that their influences were opposites, when the one was strong the other tended to be weak.

Principal component 1 explained 37.8 per cent of the variation (Table 4). Principal component 2 explained an additional 10.3 per cent of the variation (Table 4) and the agricultural and trade sectors were its major contributors. Their opposite signs (Table 3) also indicated that when the one was strong the other tended to be weaker. The tourism and hospitality sector and the vehicle sector were medium contributors to this principal component, and in opposite directions. Principal component 3 explained an additional 10.3 per cent of the variation (Table 4) and the agricultural products and services sector, the trade and the vehicle sectors were major contributors to this principal component (Table 3). It is clear that three business sectors, i.e. the tourism and hospitality sector, the agricultural products and services sector and the trade sector contributed by far the most to the differentiation of the towns and in ways that differed from each other (Figure 3).

### 5.2.3 Testing for statistically significant differences between clusters

To confirm that these sectors were indeed the main differentiators of the selected towns, further statistical tests were necessary. Kruskal-Wallis analyses and Tukey multiple comparison tests of the normalised data confirmed statistically significant differences between tourism and hospitality enterprises of different clusters (Table 5). This was also the case for the agricultural products and services sector (Table 6) and the trade sector (Table 7).

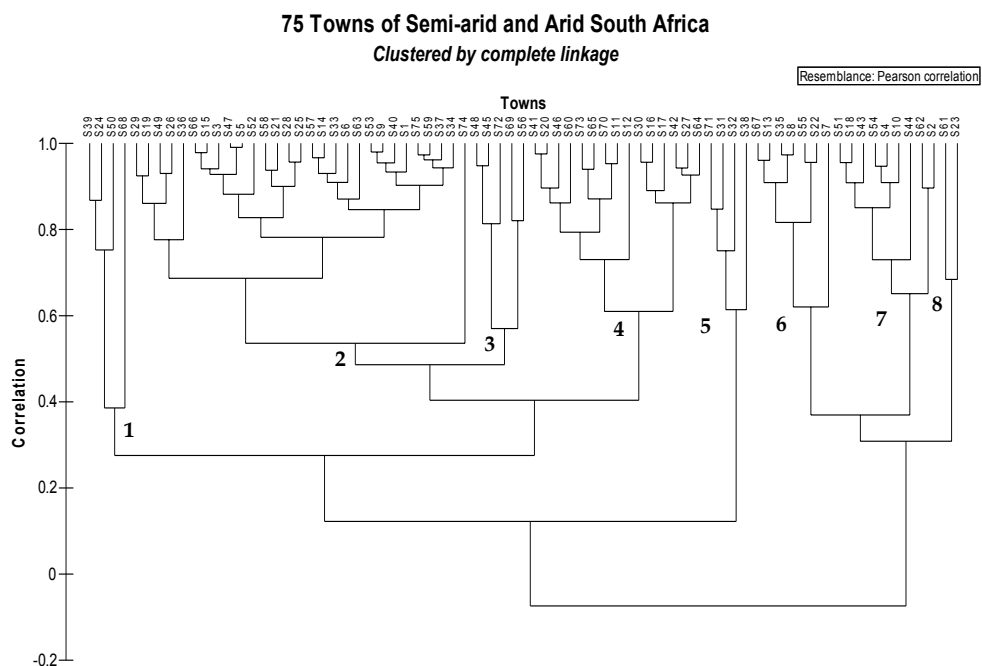


Fig. 2. Cluster analysis of the enterprise structures of 75 towns in semi-arid and arid South Africa (town numbers are presented in Table 1).

Variable	PC1	PC2	PC3	PC4	PC5
Agricultural products & services	0.040	0.693	0.606	0.013	-0.232
Processing sector	-0.025	0.086	-0.084	0.022	0.330
Factory sector	-0.002	-0.015	-0.013	-0.027	0.015
Construction sector	0.049	-0.082	-0.161	0.033	0.001
Mining sector	0.037	-0.032	-0.030	0.006	0.221
Tourism & hospitality sector	-0.894	-0.257	0.157	0.016	-0.184
Engineering & technical services	0.028	0.073	-0.102	-0.067	-0.115
Financial services	0.074	0.057	-0.253	0.400	-0.272
Legal services	-0.005	-0.021	0.001	-0.016	-0.071
Telecommunication sector	0.013	0.035	0.042	0.022	0.067
News & advertising sector	0.001	-0.001	-0.007	0.003	0.002
Trade sector	0.402	-0.610	0.457	0.214	-0.277
Vehicle sector	0.019	0.217	-0.469	0.210	-0.273
General Services sector	0.052	-0.018	-0.097	0.327	0.198
Professional services sector	0.010	-0.014	0.145	-0.055	0.528
Personal services sector	0.128	-0.064	-0.173	-0.706	-0.352
Health services sector	0.081	-0.056	-0.015	-0.364	0.192
Transport & earthworks sector	0.026	-0.019	-0.060	-0.040	0.074
Real estate sector	-0.035	0.028	0.060	0.010	0.148

Table 3. The eigenvectors constituting the coefficients in the linear combinations of variables making up principal components 1 to 5.

Principal Component	Eigenvalues	Variation explained (%)	Cumulative variation explained(%)
1	150.0	37.8	37.8
2	71.6	18.0	55.8
3	40.9	10.3	66.1
4	33.8	8.5	74.6
5	20.2	5.1	79.7

Table 4. Percentage variation explained by principal components 1 to 5.

75 Towns of Semi-arid and Arid South Africa

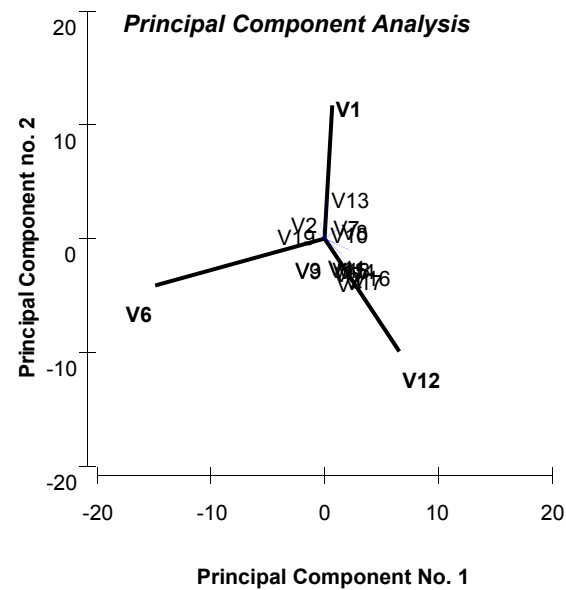


Fig. 3. The contributions of the tourism and hospitality sector (V6), the agricultural products and services sector (V1) and the trade sector (V12) to the differentiation of 75 towns of semi-arid and arid South Africa.

Different clusters of towns clearly depended in different ways upon the tourism and hospitality sector. However, it was not clear how that impacted precisely upon the enterprise structures of the towns. This required a more detailed examination of the tourism and hospitality sectors of the towns of semi-arid and arid South Africa. The possible presence of proportionalities in the tourism and hospitality sector of the region as well as in the clusters of towns was, therefore, investigated.

Kruskal-Wallis test: $H = 42.25$ , $\chi^2 = 42.3$ with 6 degrees of freedom. Significant at $P < 0.001$						
Tukey multiple comparison						
1	5	2	3	4	6	7
_____			_____			

Table 5. Kruskal-Wallis analysis and Tukey multiple comparison of the tourism and hospitality sectors of clusters 1 to 7. Clusters connected by a continuous line in the Tukey comparison do not differ significantly at  $P = 0.05$ .

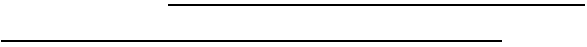
Kruskal-Wallis test: $H = 16.99$ , $\chi^2 = 17.0$ with 6 degrees of freedom. Significant at $P < 0.01$						
Tukey multiple comparison						
3	2	6	4	7	1	5
						

Table 6. Kruskal-Wallis analysis and Tukey multiple comparison of the agricultural products and services sectors of clusters 1 to 7. Clusters connected by a continuous line in the Tukey comparison do not differ significantly at  $P = 0.05$ .

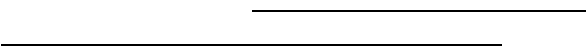
Kruskal-Wallis test: $H = 36.68$ , $\chi^2 = 36.7$ with 6 degrees of freedom. Significant at $P < 0.001$						
Tukey multiple comparison						
5	7	6	1	4	3	2
						

Table 7. Kruskal-Wallis analysis and Tukey multiple comparison of the trade sector of clusters 1 to 7. Clusters connected by a continuous line in the Tukey comparison do not differ significantly at  $P = 0.05$ .

## 5.2.4 The tourism and hospitality enterprises of semi-arid and arid South African towns

### 5.2.4.1 Number of enterprises

The 75 selected towns had a total of 6441 listed enterprises of which 901 (14 per cent of total) belonged to the tourism and hospitality sector (Table 8). The sector is, therefore, an important but not dominant business sector in these towns. Its importance stemmed partly from its contribution to the differentiation of towns of the region.

Enterprises of the accommodation/conference sub-sector numbered 601 or two-thirds of all enterprises in the tourism and hospitality trade (Table 8). The restaurant sub-sector was next most plentiful (120 enterprises). The enterprises of the 75 towns were not normally distributed; there were more smaller than larger towns. The median town had only 38 enterprises in total. The median enterprise number per town for the tourism and hospitality trade was only six, for the accommodation/conference sub-sector it was four, and for the restaurant sub-sector it was one enterprise (Table 8).

### 5.2.4.2 Proportionality in the tourism and hospitality sector

Because the tourism and hospitality sector is an important differentiator of the towns of semi-arid and arid South Africa, there should be significant differences between the clusters of towns identified in Figure 2. Toerien & Seaman (2012a) reported the presence of proportionalities in the enterprise structures of 125 South African towns, a phenomenon that was further examined here for the tourism and hospitality sector. Proportionality occurred in the 75 towns as shown by a significant ( $P < 0.01$ ) correlation and a regression equation that explained almost 86 per cent of the variance (Figure 4). The number of tourism and

hospitality enterprises in towns was clearly related to the size of the total enterprise structures of these towns. The data points of Figure 4 showed quite a bit of scatter which raised the question whether proportionality was also present in the different clusters?

Enterprises	Total no. in region	Median no. per town	Maximum no. per town
Total enterprises	6441	38	906
Total tourism & hospitality sector	901	6	134
Accommodation & conference establishments	601	4	72
Restaurants	120	1	27
Nature reservations/attractions	61	0	16
Tour operators	31	0	7
Roadstalls/coffee shops	29	0	4
Taverns	20	0	5
Museums	18	0	3
Information offices	8	0	1
Rental/reservation agencies	6	0	2
Catering	5	0	1
Health spa	1	0	1
Holiday club	1	0	1

Table 8. The regional total number of tourism and hospitality enterprises in the selected towns.

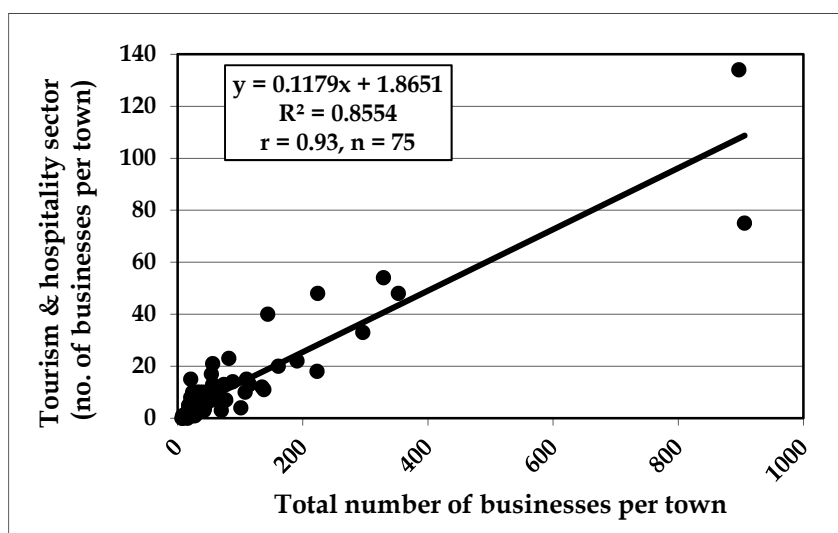


Fig. 4. Proportionality in the tourism and hospitality sector of 75 semi-arid and arid South African towns.

Regression analyses indicated that this was indeed the case (Table 9). With the exception of cluster 3 all clusters showed statistically significant correlations between the number of enterprises in the tourism and hospitality sector and the total number of enterprises and large parts of variances (> 70 per cent) were explained. Proportionality therefore also extended to groups of towns with similar enterprise structures.

Importantly the slopes of the regression equations varied by a factor of 7, ranging from 0.04 for cluster 1 (equivalent to four per cent of all enterprises) to 0.282 for cluster 6 (equivalent to 28.2 per cent of all enterprises)(Table 9). The 'entrepreneurial space' in all clusters for entrepreneurs in the tourism and hospitality sector is a function of the size of towns but there are marked differences in the proportion that this sector contributes to the total enterprise structures of different clusters (see slopes presented in Table 9 and Table 10). Part of the variation in the data points of Figure 4 is, therefore, due to the different contributions of the cluster regression lines to the regression line for the whole sector (Figure 5). Figure 5 illustrates two important phenomena: (i) there is proportionality of tourism and hospitality enterprises in different clusters with the total number of businesses of towns (note that this is true for clusters with a few such establishments, e.g. cluster 7, or clusters with many such establishments, e.g. cluster 2), and, (ii) there are large differences in the slopes of these regression lines, indicating that the towns of specific clusters are utilising or reacting to tourism opportunities in very different ways.

Cluster	Correlation	Slope	Intercept	Variance explained (%)	Number	Significance
1	0.90	0.040	0.15	80.3	4	0.05
2	0.95	0.117	-0.74	90.7	29	0.01
3	0.33	0.114	0.49	10.7	5	NS
4	0.97	0.175	-1.68	93.3	15	0.01
5	0.95	0.135	-0.76	90.2	4	0.01
6	0.99	0.282	-0.98	98.8	7	0.01
7	0.84	0.225	4.66	70.4	9	0.01

Table 9. Regression analyses of the number of tourism & hospitality enterprises per town (dependent variable) and the total enterprises per town (independent variable) for all clusters of towns (NS = not significant).

However, are the differences statistically significant? To answer this question the ratios of tourism and hospitality enterprises to total enterprises for the towns of the different clusters were calculated and examined for normality. Once it was known that the ratios were normally distributed within clusters 2, 4, 6 and 7 (the larger clusters), a one-way analysis of variance (ANOVA) was performed to test a null hypothesis that the average mean values across the different clusters were equal. This was followed by a Newman-Keuls multiple comparison test.

Table 10 summarises the average ratios of the clusters. The ANOVA indicated that the averages were significantly different. The F-value of 37.49 at 56 degrees of freedom was significant at  $P < 0.001$ . The Newman-Keuls multiple comparison indicated that the ratio of cluster 7 was significantly higher than the ratios of clusters 2, 4 and 6. The ratio of cluster 6 was significantly higher than those of clusters 2 and 4 (Table 10).

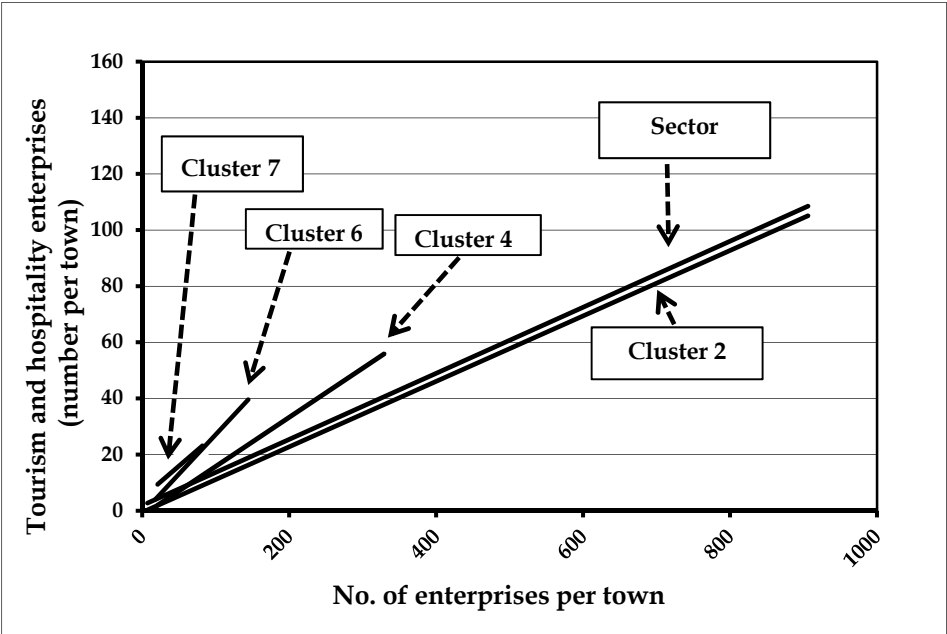


Fig. 5. The regression lines of tourism and hospitality enterprises of selected clusters in relation to the regression line for the whole tourism and hospitality sector (note: all of the regression lines were statistically significant [ $P < 0.05$ ]).

Averages and standard deviations			
Cluster	Average	Standard deviation	No. of towns
2	0.1090	0.0442	29
4	0.1417	0.0505	15
6	0.2509	0.0546	7
7	0.3717	0.1398	9
Newman-Keuls comparison of clusters			
<div>2                      4                      6                      7</div> <div>_____</div> <div>                                 _____</div> <div>   _____</div>			

Table 10. The average ratios of tourism and hospitality enterprises to total enterprises of the towns of clusters 2, 4, 6 and 7 and the outcome of a Newman-Keuls comparison. Clusters linked by a continuous line are not significantly ( $P < 0.05$ ) different from one another.



### 5.2.4.3 'Proportionality-in-proportionality' in the tourism and hospitality sector

The next question was whether proportionalities also extended to sub-sectors of the tourism and hospitality sector. For this part of the investigation the two most important sub-sectors (representing 80 per cent of all enterprises in this sector [Table 8]) namely: (i) accommodation and conference establishments, and, (ii) restaurants, were investigated.

Some clusters of the accommodation/conference sub-sector exhibited significant proportionality with the total number of enterprises of towns and there were marked differences in the slopes of the regression lines (Table 11, Figure 6). Two clusters (1 and 3) did not show significant proportionalities (Table 11).

Were the differences between the ratios of the number of enterprises with accommodation/conference facilities and the total number of enterprises of the clusters of the sub-sector statistically significant? To answer this question the ratios were subjected to Kruskal-Wallis and Tukey non-parametric comparisons (Table 12).

The ratios of cluster 7 were significantly ( $P < 0.05$ ) higher than those of clusters 1, 2 and 5 but not higher than the rest of the clusters (Table 12). The ratios of cluster 6 were significantly ( $P < 0.05$ ) higher than those of cluster 1. The results suggested that the 'richness' (reflected in the ratio between sub-sector enterprises and total enterprises) of accommodation/conference facilities in clusters 6 and 7, is quite different to those of the other clusters. Calculation of average ratios for the clusters provided evidence of three tiers of 'richness' of accommodation/conference establishments: (i) below 7.5 per cent (cluster 1 and 5), (ii) ten to 16 per cent (clusters 2, 3 and 4), and (iii) above 25 per cent (clusters 6 and 7) of all enterprises per town. This suggested a progressive economic dependence of some clusters on accommodation and conference establishments.

Accommodation/ sub-sector				Variance explained (%)	No.	P
Cluster No.	Correlation	Slope	Intercept			
1	0.77	0.022	0.38	60.0	4	NS
2	0.97	0.069	0.08	94.5	29	0.01
3	0.16	0.039	1.60	2.4	5	NS
4	0.96	0.113	-0.57	91.9	15	0.01
5	1.00	0.138	-1.06	99.3	4	0.01
6	0.99	0.218	-0.63	97.5	7	0.01
7	0.80	0.142	4.26	64.3	9	0.01

Table 11. Proportionality of the number of accommodation/conference establishments (dependent variable) with the total number of enterprises (independent variable) in the clusters.

Kruskal-Wallis test: $H = 38.58$ , $\chi^2 = 38.6$ with 6 degrees of freedom. Significant at $P < 0.001$						
Tukey multiple comparison						
1	5	2	3	4	6	7

Table 12. Results of Kruskal-Wallis and Tukey multiple comparisons of the ratios between enterprises with accommodation/conference facilities and the total number of enterprises of clusters 1 to 7. Clusters connected by a continuous line in the Tukey comparisons do not differ significantly at  $P = 0.05$ .

The accommodation and conference sub-sector also demonstrated the two important phenomena noted for the whole tourism end hospitality sector as a whole, namely: (i) for some clusters there was a proportionality with the total number of enterprises in the towns (or in other words ‘proportionality-in-proportionality’), and (ii) the slopes of regression equations differed markedly between clusters, indicating quite different ‘richness’ patterns (Figure 6, Table 13). Four clusters, i.e. clusters 1, 3, 5 and 7 did not have statistically

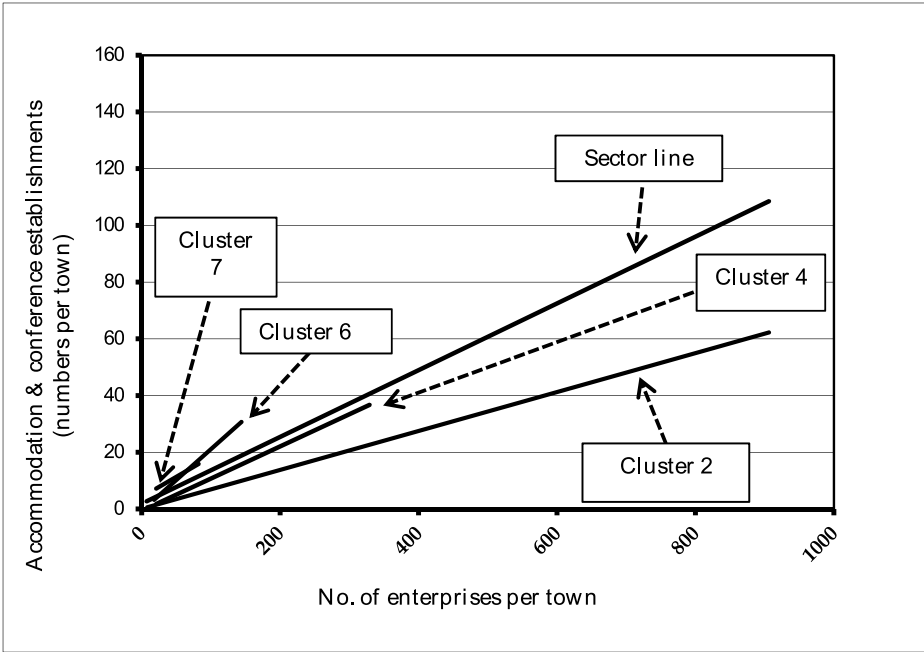


Fig. 6. The regression lines of accommodation and conference enterprises of selected clusters in relation to the regression line for the whole tourism and hospitality sector (note: all of the regression lines were statistically significant ( $P < 0.05$ )).

significant proportionalities between the number of restaurants per cluster town and the total number of enterprises per town. Clusters 2, 4 and 6, however, did have statistically significant proportionalities (Table 13). The slopes of these regression lines were very similar and not significantly different. The restaurant sub-sector behaved quite differently from the accommodation/conference sub-sector.

Cluster No.	Restaurant sub-sector			Variance explained (%)	N	P
	Correlation	Slope	Intercept			
1	0.0	0.0	0.0	0.0	4	NS
2	0.90	0.021	-0.51	80.5	29	0.01
3	0.73	0.045	-0.95	52.8	5	NS
4	0.81	0.028	-0.41	64.9	15	0.01
5	0.0	0.000	0.00	0.0	4	NS
6	0.94	0.022	-0.15	87.8	7	0.01
7	0.56	0.035	-0.30	31.2	9	NS

Table 13. Proportionality of the number of restaurants (dependent variable) with the total number of enterprises (independent variable) in the respective clusters.

#### 5.2.4.4 Overview of results

Taken together the analyses (Tables 5 to 13, Figures 4 to 6) present a picture of the different economic strategies that have developed by design or chance in towns of semi-arid and arid South Africa (Table 14). The towns of clusters 6 and 7 are strong in the tourism and hospitality sector, including the accommodation sub-sector, but weak in the trade sector (Table 14). Hereafter we refer to these towns as 'tourist towns'. However, the presence of two town clusters within the 'tourist town' group indicated that a further division should be made.

The composition of the towns of cluster 6 (Brandvlei, Britstown, Colesberg, Hanover, Laingsburg, Richmond and Vanderkloof) includes towns not known as tourist destinations but which are located on national roads or routes between the south and the north of the country. The strong tourism and hospitality sector (Table 10) and particularly the strong accommodation sub-sector (Tables 11 and 12) of this cluster, suggests that the provision of overnight accommodation to travellers is probably the main tourism focus of these towns. They are here referred to as the 'tourist overnight towns'.

The towns of cluster 7 were very strong in the tourism and hospitality sector (Table 10). These towns (Augrabies, Barrydale, Calitzdorp, Gariepdam, Nieu-Bethesda, Nieuwoudtville, Philippolis, Prince Albert, and Sutherland) serve a different niche market than the 'tourist overnight towns'; they are known as weekend and tourist destinations. They are here referred to as 'tourist destination towns'.

The outstanding feature of the towns of cluster 5 is a strong agricultural products and services sector (Table 14). The towns are weak in the tourism and trade sector (Table 5). The cluster includes the towns of Kenhardt, Klipplaat, Loxton and Vosburg, all except Klipplaat being small distant towns of the Great Karoo. Klipplaat is an old railway town in the Eastern Cape which has regressed in step with the demise of steam trains. These

towns clearly have significant interactions with their agricultural hinterlands and hence they are referred to as 'agricultural towns'.

The towns of cluster 2 (Aberdeen, Alexander Bay, Barkly-West, Beaufort-West, Bethulie, Burgersdorp, Cradock, De Aar, Garies, Griekwastad, Jacobsdal, Jagersfontein, Kakamas, Kathu, Koffiefontein, Ladismith, Lime Acres, Loeriesfontein, Middelburg, Oudtshoorn, Pella, Philipstown, Prieska, Somerset East, Springfontein, Steynsburg, Tarkastad, Upington and Willowmore) are a mixture of small and large towns (Table 1) and have different origins, particularly agricultural and mining origins. The outstanding features of their enterprise structures were relatively weak tourism sectors and strong trade sectors (Tables 7, 10 and 14). They are also relatively weak in their agricultural products and services sector (Table 6).

Hereafter they are referred to as 'trader towns'. It is interesting that Oudtshoorn, one of the largest towns in the study area and known for its tourism industry linked to the Kango Caves and the R62 tourist route (Erasmus, 2004) belongs to this cluster. However, it illustrates the extent to which this town has also grown the other parts of its economy and acts as a trading hub to the surrounding area. This serves as a reminder that the economic choices between the tourism and other business sectors are not based on either 'the one or the other', but balanced growth should be pursued.

Characteristic	Cluster							
	1	2	3	4	5	6	7	8
<b>Numbers</b>								
No. of towns	4	29	5	15	4	7	9	2
Average no. of enterprises/town	27.8	145.6	25.6	79.7	16.7	45.6	40.4	17.0
Significant differences		Highest			Lowest			NI
<b>Sector strengths and weaknesses</b>								
Tourism sector	Weak	Weak				Strong	Strong	NI
Accommodation sub-sector	Weak	Weak			Weak	Strong	Strong	NI
Restaurant sub-sector	No significant differences							NI
Agricultural Products & Services		Weak	Weak		Strong			NI
Trade sector		Strong			Weak	Weak	Weak	NI
<b>Proportionalities (vs total enterprises)</b>								
Tourism sector	P	P		P	P	P	P	NI
Accommodation sub-sector		P		P	P	P	P	NI
Restaurant sub-sector		P		P		P		NI

Table 14. An overview of the strengths and weaknesses and proportionalities of the different clusters (P = the presence of proportionality and NI = not included in comparison).

The only cluster without outstanding business strengths or weaknesses in any sector is cluster 4 (Table 5, 6 and 7) indicating balanced local economies. The towns of this sector (Carnarvon, Calvinia, Fauresmith, Fraserburg, Graaff-Reinet, Jansenville, Keimoes, Montagu, Murraysburg, Orania, Pofadder, Steytlerville, Trompsburg, Uniondale, Victoria West) are a mixture of small and large towns (Table 1) of largely agricultural origin. Some of these towns e.g. Graaff-Reinet and Montagu have significant numbers of tourism and hospitality enterprises; however, the remainder of their economies is also well-developed without any sector dominating. Hereafter these towns are referred to as 'balanced towns'. These towns also serve as a reminder that the economic choices between tourism and other business sectors are not based on either the one or the other.

The towns of clusters 1, 3 and 8 are all small and more defined by business weaknesses than strengths. Cluster 1 towns (Luckhoff, Hopetown, Petrusville and Van Wyksvlei) had on average about 28 enterprises (Table 14), were weak in the tourism sector and had no strengths in any other business sector. Cluster 3 towns (Noupoort, Pearston, Smithfield, Venterstad and Williston) had on average about 26 enterprises (Table 14) and were weak in the agricultural sector. Cluster 8 contained only two towns (Strydenburg and Hofmeyr) with on average 17 enterprises and was too small to include in analyses of strengths and weaknesses. However, its closest neighbours belonged to the two tourism clusters (clusters 6 and 7, Figure 2), suggesting that its towns could potentially develop stronger tourism-based economies. Other equally small towns such as Nieu-Bethesda have managed to do just that.

## 6. Discussion

The promotion of tourism has been identified as a key strategy that can lead to economic upliftment, community development and poverty relief in the developing world (Binns & Nel, 2002). As evidenced by the topics discussed at a conference on tourism in the Karoo (Karoo Development Foundation, 2009) tourism is actively promoted as an additional/alternative economic activity for semi-arid and arid South Africa.

The conference covered a wide range of topics that included considerations of tourism assets (Maguire, 2009). Viljoen (2009) discussed tourist routes in the Karoo and Rademeyer (2009) reviewed adventure tourism, Davids (2009) literary tourism and Rubidge (2009) fossil tourism in the Karoo. Rubushe (2009) discussed funding for the preservation of Karoo heritage whilst Ingle (2009) considered the link between the Karoo and space tourism. However, the tourism enterprises and their relation to other enterprises in the towns of the area received scant attention, yet they constitute the link between the supply-side and the demand-side of the tourism industry of the region.

This study focused on the tourism and hospitality enterprises of semi-arid and arid South Africa and used principal component analysis and clustering to reveal eight clusters of towns (Figure 2). Principal component analysis has been used to reveal clusters of towns based on tourism-related characteristics, e.g. tourism marketing in Romania (Kulcsár, 2010). Toerien & Seaman (2010) also reported the presence of a number of clusters of Karoo towns. Understanding the strengths and weaknesses of different clusters could assist in the formulation of better tourism-based strategies for local economic development in South Africa.

The number of tourism and hospitality enterprises per town was almost always proportional to the size of the total enterprise structures of towns but the ratio of such businesses to all businesses was determined by the type of cluster to which a town belonged (Table 14). In summary: 'tourism destination towns' have relatively more enterprises in this sector than 'tourism overnight towns', which are stronger than 'balanced towns', which are stronger than 'trading towns', which are stronger than 'agricultural towns'.

This study has also demonstrated a proportionality-in-proportionality phenomenon, something that has not been reported before. For some town clusters there is not just proportionality between the number of tourism enterprises and the total number of enterprises in towns of the cluster, but also between components of the cluster such as the number of accommodation/conference establishments and the total number of enterprises. Interestingly this phenomenon was strong in the accommodation/conference sub-sector but less so for the restaurant sub-sector of some clusters (Table 14).

How should the proportionality phenomena be interpreted? Any answer must deal with two issues: (i) the larger a town the more tourism and hospitality enterprise will be present, and (ii) what is the nature of a town, i.e. is it an agricultural, trading, balanced, overnight or destination town? Both issues seem to deal with the magnitude of 'entrepreneurial space' available for the development of tourism and hospitality enterprises. In other words, according to the nature of a town and its total business sector, there is a limited opportunity (or 'entrepreneurial space') for the establishment of tourism-based enterprises and this space is usually well occupied because if this was not the case, proportionalities would not have been observed.

In the case of the tourism and hospitality sector the entrepreneurial space is probably defined by the amount of money that tourists (mostly from elsewhere) are spending in a town. In addition, this study suggests that the reasons why tourists use the facilities of a town also matter. For example, towns of a particular size that attract mostly overnight tourists can expect to have a lower proportion of enterprises in this sector than similarly sized towns that are weekend destinations. The proportionalities should be considered in plans to build the tourism-based economies of towns of semi-arid and arid South Africa because the systemic nature of the industry as outlined above means that merely wishing for increased tourism will not achieve the desired results.

A number of additional factors must also be taken into account. The Centre for Development Support (2010) identified a number of risks for small South African towns dependent on tourism. Firstly, small attractive towns may lose their smallness and natural beauty as a result of rapid development and over-commercialisation. Secondly, deterioration in the condition of access routes lead to a decrease in visitors. Thirdly, tourists are large consumers of basic services and if towns develop capacity or other constraints in meeting these needs in peak periods, tourism is adversely affected. Fourthly if the quality of the service experienced by tourists fluctuates or deteriorates it either scares off tourists or attracts large national and international tourism enterprises to become part of the local tourism scene, to the detriment of local enterprises. Fifthly, although tourism is often associated with positive local development, international experience has shown that this is not invariably the case and that special efforts should be made to ensure that benefits also accrue to the more marginalised communities.

Taken together it is clear that the challenges for the promoters of the South African tourism industry in general but for semi-arid and arid South Africa in particular, are formidable. Atkinson (2009) stated that: "In South Africa little has been done to 'package' and market the many small towns in the rural hinterland. It has always been up to the private sector to develop these tourism products, and due to the difference in economic skills throughout the country there has been a divergence between those towns that 'got it right' and those 'where nothing happens'. In the Karoo, for example, towns such as Prince Albert, Graaff-Reinet and Victoria West are maximising the benefits of their architectural heritage, whereas towns like Loxton and Aberdeen, with fewer entrepreneurial resources, are being left behind". This study has added important additional information about the tourism sector in semi-arid and arid South Africa, which could be used in helping the towns that have been left behind to move ahead.

## 7. Conclusions

Principal component analysis and clustering techniques were very useful and revealed the presence of eight clusters of towns in semi-arid and arid South Africa. The tourism sector has become important in many of these towns; however, the extent to which they are able to utilise tourism-based opportunities differed.

Balanced towns appear to represent the ideal and have built well-developed enterprise structures in all business sectors, thereby reducing the risk of sudden economic shocks. In these towns tourism is important but is matched by other important business sectors. Tourism destination towns with a very high relative number of tourism-based enterprises might have exposed themselves to potential shocks if factors that entice tourist visits diminish in importance as exhibited by Dullstroom and Clarens (Centre for Development Support, 2010). Tourism overnight towns, mostly located on major national roads are dependent on external factors that regulate the flow of visitors from the south to the north or vice versa. They can do little to grow their tourism-based economies unless they move to become more like destination towns. Trading towns and agricultural towns are not very dependent on tourism and their growth opportunities seem to reside in becoming more like the balanced towns.

More analyses of this kind are needed to develop a fuller understanding of tourism-based opportunities for South African towns.

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# New Opportunities for the Tourism Market: Senior Tourism and Accessible Tourism

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## 1. Introduction

When speaking of trends, people tend to relatives arguments due to their fragile demonstrability. To prepare this chapter, we began with two objectives: first, to analyse trends in the tourism sector and their evolution, and secondly, in juxtaposition, to examine tourism trends from a socio-demographic perspective. Our goal is to deepen our understanding of two types of tourism that are both future trends in the tourism sector, namely, senior tourism and accessible tourism. This paper does not seek to review market niches or narrow market segments, but rather the opening of new tourism segments based on the synergies that can be generated between these segments based on both the potential and real needs of tourists. Accessibility is established as the key link, as older people and people with temporarily or permanently restricted capacities are the direct beneficiaries of accessibility. Indeed, accessibility is considered to be a parameter of quality and usability for tourist attractions and is, therefore, a key determinant of user satisfaction and loyalty. Also, we must not forget that disability is often directly related to the elderly and that, "with increasing age, disability or restricted capacities also increase in a gradual way" (Burnett, 1996:7).

Although these segments of tourism have not been very important in the past, their importance is now growing and they have been established as priorities in policy lines of action. For instance, in 2009, the European Commission launched the Calypso 27 project (aligned with the objectives of social tourism), arguing that by increasing the accessibility of disadvantaged populations to tourism, social tourism contributes to achieving the key objectives of the Lisbon Strategy, particularly in terms of economic development and employment. This project has four target groups: senior citizens and retirees, youths, the disabled and families with difficulties (e.g., social, financial). It intends "to correct social inequalities among the population, as these exclude many from tourism and travel, and ensure universal access to vacations, while aiming to generate economic activity and growth in Europe, combat seasonality in tourism, create more and better jobs in the tourism sector and strengthen the ties among European citizens."

Borja *et al.* (2002) have shown that the segment of adults over 55 years of age will increase the overall volume of tourism the most; these adults are characterised by extensive experience in tourism, making them more demanding consumers and allowing demand to shift away from peak seasons because this is a segment of the population that is often retired. This segment is augmented by disabled people, with whom senior citizens share

common needs, mainly accessibility. Thus, this potential segment of tourists approaches one fifth of the population. Accessibility improvements not only benefit these groups but also pregnant women and those with temporarily restricted capacities, such as children and families. In general, everyone benefits from greater accessibility.

The aim of this study was to determine the profile and behaviour of the elderly traveller and that of those seeking accessible tourism, as well as the market opportunities and profitability that can be generated nationally and at the European level, as it was assumed that these two types of tourists require similar amenities. Initially, we reviewed the existing literature to define and identify those variables that influence or explain tourists' motivations. Subsequently, we carried out a quantitative study in which data were collected from potential tourists. After analysing this data, we concluded that the elderly and tourists concerned with accessibility create a market of significant size both from demographic and economic perspectives and those active policies should be implemented to provide tourist attractions that can be enjoyed by all travellers, on the basis of both quality and social responsibility.

## **2. New market trends**

### **2.1 Trends in the tourism sector**

According to the World Tourism Organisation (WTO), some of the 2020 future market trends are: an increase in the number of elderly tourists, a change from active vacations to experience-based holidays and an ever increasingly complex segmentation of the demand to comply with the different objectives or purposes of traditional travel (e.g., travel to destinations, honeymoons with sun and beach access, or cultural or cruise-related products).

Therefore, we can say that, in general, the current trends in tourism demand are conditioned primarily by the following scenarios:

- The increasing importance, within the overall demand, of the segment of tourists over 55 years of age.
- Higher demand in terms of quality and sophistication.
- More segmented markets.
- A shortage of time and plenty of money.
- A growing awareness of environmental and sustainability issues.
- More participatory and active holidays, with longer itineraries and itineraries that are managed individually in many cases.

### **2.2 Socio-demographic trends of tourists**

Studying the evolution of society as a whole makes it easy to set future trends in tourism demand because it also requires the study of the elements linked to individuals' economic situations, both from social and economic perspectives as well as a behavioural perspective.

Two blocks of study were structured for this purpose: population and family structure, and habits of behaviour and leisure. For this analysis, Europe was used as a reference, as it is the continent with the largest number of inbound tourists received both now and in the short-term future.

### **2.2.1 Population and family structure: Current situation and trends / forecasts**

In Europe, there are already more elderly people (over 65 years old) than children. In 2004, the elderly population (75.4 million) exceeded the younger population (less than 14 years of age) (74 million). This finding follows the trend of the decrease in the latter from 1984 onwards in favour of a greater number of people older than 65 years of age, who now represent one-sixth of the European population (Institute for Family Policy-IPF-2007). When we add the significant decrease in mortality and fertility to this, we observe a remarkable transformation of the population pyramid, setting the European stage for a situation in 2025 in which the maximum width of the pyramid will be comprised of the group between 40 and 60 years old, thus causing the pyramid to rupture.

One cannot forget either that family structure has changed, with a reduction in the average household size to 2.4 members in the EU 15 (2000) and the emergence of single-parent families who tend to invest income increases not in having more children but, increasingly, in the already existing family.

### **2.2.2 Habits and leisure behaviour: Current status and trends / forecasts**

Clearly, the behavioural habits of tourists are heavily influenced by their socio-demographic contexts, i.e., education level, age, economic activity, environment and lifestyle, with the largest percentage of tourists who travel being those with a higher level of education and employment positions that include greater responsibilities and salaries.

Tourism is also a seasonal activity, occurring mainly during holiday periods: summer, Easter and Christmas, as well as weekends. The primary reasons for tourism are leisure travel and vacations, followed by visits to relatives and friends and, to a lesser degree, work or business and studies. The duration of trips has tended to decrease and ranges from one week to two weeks. Note that short trips abound among young people, while the trip duration increases for adults over the age of 40.

We can say, therefore, that the tourism industry needs to adapt its offerings to these new trends and demographic behaviours, which are mainly characterised by:

- More holiday periods.
- Shorter vacations.
- Combining leisure travel / leisure and work.
- Searching for products that offer more enriching experiences in a shorter period of time.
- Discretionary tourism as an escape for rest, relaxation and leisure.

## **3. Senior tourism and accessible tourism – Theoretical bases**

One of the key elements that can be drawn from the above, both from the perspective of the tourist sector as well as the individual tourist, is the importance of the segment formed by older people that, because of the aging population, will continue to increase steadily. Thus, it is essential to consider senior tourism as crucial to the reformulation of tourism or the range of available products and destinations. In addition, senior tourism is directly linked to accessible tourism because disability is often directly related to the elderly. According to the World Health Organisation (WHO), 35% of people over 65 have some type of disability (Fuguat, 2008).

These two types of tourism must adapt and meet the expectations of the new scenario proposed above. At the sector level, great importance is given to the segment of the population over 55 years of age, but not as a niche market, rather as an integrated part of tourism offerings based on elements of quality and environmental sustainability. They are not subject to established periods of enjoyment, but can be variable depending on the user. The characteristics of the product offered can be adapted to different formats and seasonal holiday periods and to very different motivations: leisure, relaxation, pleasure or simply experiences according to the behaviour of the tourist.

Below, a theoretical contextualisation is presented for both types of tourists to outline their main characteristics and their fundamental bases.

### 3.1 Senior tourism

Senior tourism is a segment that has not held great importance in the tourism industry, although this trend is changing. The importance of the senior citizen segment in markets, in general, is determined by the process of aging (Norman *et al.*, 2001:115; Szmigin and Carrigan, 2001:1092), which is linked to improvements in the economic status and the health conditions of this group (Gunter, 1998:6). In this sense, some authors suggest that the unprecedented change in the demographic structure of the population will entail a shift in markets (Nedelea and State, 2008). Specifically, these authors point to the baby boomer generation as one that will introduce profound changes in the compositions of markets in the coming decades (Prideaux *et al.*, 2001:211; Ramos, 2005:406). We must remember that the most important factors for an aging population are its increasing life expectancy, lower birth rate and the impact that the baby boomer generation will have on the rest of the population as it ages (Metz and Underwood, 2005:5). Thus, because the baby boomer generation has begun to form part of the mature population, an increase in attention to seniors as consumers has resulted (Norman *et al.*, 2001:114). Several years ago, Tongren (1988:138) echoed the importance of this generation and pointed to the desirability of not limiting ourselves to the characteristics of the elderly consumer today, but also to study the buying behaviour of this generation with regard to the products and services they will demand in the near future.

This tourist segment is still considered very new; therefore, there is not much literature that addresses their issues. This leads to a dearth of a description of the concept, as there is no clear definition of it or agreement by authors (Chen, 2009; Le Serre, 2008). This lack of consensus highlights its fragility and its impact on two key issues: from a theoretical view, the lack of a conceptual framework to research the behaviour of the elderly, and from an applied perspective, the lack of suitable tools to identify the senior consumer (Le Serre, 2008). This phenomenon is clearly reflected when analysing the literature. Thus, Hossain, Bailey and Lubulwa (2003: 4) use the term “senior” for those 55 years of age or older, and *non-seniors* are those under 55 but over 15 years of age. In turn, these authors segment seniors into two subgroups: *younger seniors*, from 55 to 64 years old and *older seniors*, 65 and older. On the other hand, Alcaide (2005) states that some companies set the senior age break at 55 years of age, the age at which the consumer begins to sense different needs and forecast and plan for aging. From this age, they are considered as part of the segment of the elderly in the banking system, which begins to differentiate between and specialise treatment for them. Other companies set the boundary at 60, the age that marks the

differentiation between older people and the mature, and begin to consider the possibilities of offerings that are appropriate to the interests and realities of this group. According to García and Martorell (2007), senior citizen tourists are those over 65 years of age. In the Diagnostic Phase of the Plan for Enhancing the Competitiveness (PRC) of the Tourism Cluster in Montevideo (2009), senior citizen tourism is considered to be comprised of groups made up of people over 60 who are mentally and physically self-sufficient and have the time and financial resources to travel and visit a tourist destination. In sum, it may be noted that the ages used to identify senior citizen tourists vary, and we can find four groups of studies:

- Those that define a senior citizen as an individual over 50 years of age (Cleaver, 2000; Kim, Wei and Ruys, 2003; Littrell, Paige and Song, 2004; Sellick, 2004; Wang, 2006).
- Those that place the senior tourist beyond the age of 55 (Fleischer and Pizam, 2002; Hossain, Bailey and Lubulwa, 2003; Hsu and Lee, 2002; Huang and Tsai, 2003; Reece, 2004; Shim, Gehrt and Siek, 2005).
- Those that define the senior tourist as 60 years of age or older (Horneman, Carter, Wey and Ruys, 2002; Jang and Wu, 2006; Lee and Tideswell, 2005).
- Those that define the senior citizen tourist as between the ages 65 and 74 (Zimmer, Brayley, and Searle, 1995).

Therefore, the issue of the use of cognitive age – whether subjective or self-perceived – to assess the buying behaviour of the older consumer as an alternative to chronological age arises (Barak and Schiffman, 1981; González *et al.*, 2009; Patterson, 2006; Wilkes, 1992). Grande (1993:56) asserts that "the key age for segmenting the market is the self-perceived age, which is what sets the lifestyle by determining attitudes, interests and opinions." Similarly, Gwinner and Stephens (in Iyer *et al.*, 2008) have shown that cognitive age may explain some consumer behaviours better than other commonly used variables such as income, education and health.

The lack of consensus suggests an inconsistency in the concept. Le Serre (2008) proposes a new definition based on a review of the available literature on tourism and marketing magazines. He claims that the concept of the senior consumer is characterised by two types of elements: a) those that do not vary, regardless of marketing specialty and of the type of industry in which s/he works; all researchers agree with these intrinsic characteristics of the senior consumer and b) variable elements. The elements that do not change when considering the concept of senior consumers are:

- Senior citizen consumers are an important potential market for the industry because of the large number of older people and their purchasing power;
- They have reached or passed the threshold of the age at which there are some signs of aging. This element is linked to the etymological meaning of the word; originally, 'senior' meant older;
- They feel young relative to their chronological age and, as a consequence, there is a new subjective variable related to the self-perception of a person and his or her feelings about particular age groups. This variable has already been used to segment the senior market, and previous results confirm that it is more useful than chronological age to explain the purchasing behaviour of this group (Le Serre, 2008).

With respect to aspects that vary in the definition of the senior consumer, a review of the literature highlights two issues: 1). each definition is intrinsically linked to an approach that

allows a differentiation between senior and non-senior consumers, and 2). there is a lack of consensus on the definition of a senior consumer and, consequently, the criteria used to define him or her.

In marketing, two criteria are used: chronological age and retirement. With regard to chronological age, there was a lack of agreement about the age of the onset of the senior segment. Some authors justify why they choose a certain age, but others do not. Even the justifications themselves may differ from each other. These discrepancies make it difficult to compare the results obtained by different studies. In addition, chronological age is a very simple criterion in regards to defining the entire senior segment, which is a very heterogeneous group. Finally, we should also note that there is a dynamic approach linked to historical and cultural circumstances (e.g., medical advances); hence, the economic and social realities can vary over time. Consequently, chronological age is a criterion that must be supplemented. On the other hand, the criterion "retirement" can also create difficulties in comparing results because it changes from one country to another. Although in many countries the legal age of retirement is age 65, this age distinction differs in other countries. For example, in Norway the legal age of retirement is 67, and in Korea and France the legal age of retirement is 60 (Le Serre, 2008). Moreover, under certain circumstances, people may qualify or apply for early retirement or enjoy a pre-retirement. The legal age of retirement may also vary depending on social and political changes. These observations emphasise the cultural dimension of the concept of a senior and suggest that the retirement criterion is too restrictive and the scientific community should supplement it.

There is, therefore, confusion about the definition of tourism activities undertaken by older people derived from the multiplicity of meanings offered by the concept of "older or senior." However, in light of the discussion above, it can be taken as a hypothesis that senior tourism covers a broad spectrum of activities that are done by older people, retired or not retired, 55 years or more, with different income levels. In this sense, it seems logical to consider that senior tourism should not be treated simply as a non-seasonal type of active aging and directed to a minority group, but as a much more extensive activity.

### 3.2 Accessible tourism

When talking about *tourism for people with disabilities, or limited or restricted capacities*, one of the biggest problems is the great variety of existing words to convey very similar ideas. "These euphemisms have the effect of depoliticising our own terminology and devaluing one's own vision of ourselves as people with disabilities" (Heumann, 1993:262), sometimes reaching the point of distorting and limiting the meaning, as in the case of the term "accessibility", or simply creating confusion. "The choice of language and labels that emerge from within the disability community creates positive imagery to counter this derogatory and oppressive language used by those outside the culture of disability to describe people with disabilities" (Gilson and Depoy, 2000: 211). An example of this is the variety of terms relating to leisure and recreation by people with partly or wholly restricted capacities.

On September 27, 1980, in Manila (Philippines), the terms tourism and accessibility were first linked by the Manila Declaration, and later elaborated upon by the World Tourism Organisation. This declaration recognised tourism as a fundamental right and key vehicle



for human development. It recommended the regulation of tourist services to member states, highlighting the most important aspects of tourist accessibility. Pérez and González (2003), note that *accessible tourism* has been conceived from its inception as one that guarantees the use and enjoyment of tourism by people with physical, mental or sensory impairment disabilities, i.e., to facilitate the access of people with disabilities to infrastructure and tourism services. According to Gómez (2002), accessible tourism can be defined as the variety of activities occurring during the free time devoted to tourism by people with restricted capacities, which enables them to fully integrate their functional and psychological perspectives and achieve individual satisfaction and social development. It follows that an accessible activity is synonymous with integration.

In the late 1980s, another term arose to refer to tourism for people with restricted capacities, that is, *tourism for all*, which can be defined as the set of activities oriented towards tourism and leisure that take place in an individual's free time and that all people can access, regardless of varying degrees of ability / disability, achieving full integration and, therefore, an individual and social fulfilment from the interaction of the user with the environment. Its objective is, "to achieve the normalisation of tourism and leisure for all people and contributing to their incorporation as users of tourism infrastructure and services" (Fernández-Villarán, 2007:49). One tries to design tourism for all, i.e., activities that can be enjoyed by individuals without any disability as well as by different groups with specific accessibility needs (physical, mental or sensory) without any differentiation or discrimination among them.

There is also the concept of *accessible tourism for all*. Almost identical to tourism for all, this concept "is not based on the separate creation of services for people with disabilities, but aims at the full integration and inclusion of people with special needs, particularly disabled people and elderly people, in the tourism sector" (Leidner, 2006:1). That is, all tourists can be active participants in the tourism sector, regardless of their characteristics, abilities and needs.

Other concepts that are also employed in the field of tourism in relation to those with disabilities (although to a lesser degree and with limited significance) are social tourism and quality tourism. "*Social tourism* was created with the objective of making leisure tourism available to a broad segment of the population. All authors agree that, "it is a modality that seeks to promote leisure and conviviality among these disadvantaged groups" (Fernández-Villarán, 2007: 50). This idea is based on providing resources to those groups with limited resources - elderly, young people or people with different abilities - in order allow them to travel with the appropriate conditions of economy, accessibility, safety and comfort.

In relation to quality tourism, it is essential to define the term quality to understand the extent to which it can be applied to tourism based on the disabled user. Quality can be defined from multiple perspectives. One of the most interesting perspectives comes from the discernment of value, defined as a property or a set of properties inherent to a product or service that permits it to be appreciated equally, better or worse than others like it. Meeting the needs and expectations of consumers of products / services is the key to quality, which should not be perceived as a luxury or privilege, but as a tool to differentiate the positioning to competitors. "We will be placed sooner rather than later in a scenario where terms such as: accessible, barrier-free, universal, for all, etc. will stop being used and talk only of *quality*

*tourism*, that is, offering a comprehensive service appropriate to each type of client regardless of their particular conditions" (Salgado, 2007:1).

Given the heterogeneity of this group and its broad classification according to the International Classification of Functioning, Disability and Health (ICF) (WHO, 2001), a number of subdivisions marked by common characteristics among them in which disabled people are included were established:

- *Physical or motor*: due to neurological, muscular, surgical or traumatic causes.
  - *Mobility*: occurs when there is difficulty in maintaining and changing the different positions of the body as well as standing up, lying down, standing, sitting or moving. Those movements involving the use or transportation of various mobility aids and objects are also included.
  - *Apprehension*: sometimes with a considerable amount of stress or anxiety, the person may provoke in him / herself a response that in itself is harmful to the body, creating psychological situations that lead to physical or trauma problems.
- *Psychic*: those arising from problems in intellectual abilities or conditions therein.
  - *Mental illness*: disorders related to different degrees of mental disability.
  - *Intellectual disability*: resulting from difficulty recognising people, objects, orientation in space and time, recalling past events or understanding and executing simple or complex orders.
- *Sensory*: those arising from injuries causing a decrease in or loss of a sense.
  - *Visual*: the individual may find it difficult to perceive any image, carry out visual tasks wholly or in detail, or other disabilities related to vision.
  - *Hearing*: the person may have trouble hearing any sound, hearing loud sounds or hearing speech.
  - *Communication or speech*: problems that arise when trying to communicate through speech, alternative languages, unsigned gestures or by conventional reading and writing.
- *Hidden*: those that are not visible to the naked eye. We distinguish mainly:
  - *Visceral*: those caused by cardiovascular insufficiency and / or respiratory or kidney dysfunction or problems including enterostomies.
  - *Pathological*: caused by allergies, epilepsy, haemophilia, dwarfism, gigantism, leprosy or similar conditions.
- *Multiple disabilities*: when an individual has more than one disability simultaneously, such as deaf-mutes.

## 4. Potential and actual market analysis

### 4.1 Market opportunity

Both economic and social yields set market trends from the point of view of supply. One works with what is demanded by the consumer or what is assumed as a market opportunity for one's area of competence. Working with accessibility in the tourism sector results in a number of advantages that can be converted into opportunities that are reflected both in the senior segment of tourists as well as tourists who are disabled or have temporarily restricted capacities. Some of the more important are:

*Business opportunity:* with senior tourism and accessible tourism, a competitive advantage is generated. This is not a niche market, but an extension of the tourist segment based on quality as it increases the supply of goods and services.

*Growing market segment through demographic and lifestyle changes:* there is a growing segment of people with disabilities or with restricted capacities and socio-demographic and lifestyle changes anticipate continued growth, mainly driven by: work or traffic accidents, population aging, war, changes in the number of people with disabilities or possible variations in the segment of people affected by diseases with consequences that undermine capacities (hidden disabilities such as leukaemia, cancer, etc.).

*Increased market:* as shown in Tables 1 and 2, the percentage of the market related to people with disabilities and older people, i.e., the direct beneficiaries of accessibility, is very attractive, representing around one fifth of the global population between the two groups.

*Shifting away from seasonality:* one of the big problems with the tourism sector in Spain and in countries with similar tourism models is seasonality, i.e., the mass influx of tourists during predetermined periods. Senior and accessible tourism would help to move away from seasonality, as most disabled people do not work. According to Eurostat data, 51% of this segment is not active and receive a disability pension or retirement (Eurostat, 2005). This represents a very attractive market, both due to its size and their availability to travel. A similar case is found with the elderly, who are no longer integrated into the labour market and have occasion and money to enjoy their leisure time. Also, one should not ignore the increase in both state and European initiatives regarding travel programmes for senior citizens and persons with disabilities, which are offered primarily in low-intensity tourism periods. Spain has been a pioneer in its conception of senior tourism as a reality independent of other tourism subsectors (Álvarez, 2006) and has even served as a model for other countries with its IMSERSO (Institute for the Elderly and Social Services) programmes, which attempt to improve the quality of life of older people by increasing their participation in travel and tourism activities, while contributing to the creation or maintenance of employment in the tourism sector in the low season.

*Competitive and quality tourism:* there are many countries - mainly the Nordic countries, Germany and the United Kingdom - where accessibility is even more evolved. They encourage their citizens to view travel as an activity of daily life and a method of personal fulfilment. Spain is one of the most popular destinations and, thus, should tend towards a quality image. To do this, it is necessary to raise awareness of the quality tourism sector, with the implementation of different standards, such as UNE 17001-2, which certifies the management of systems for restricted accessibility.

*Social rights for all:* in 1996, the EU set into motion the first steps that require all states to recognise the rights of persons with disabilities, assuming that the needs of all people are equally important, respecting human diversity as a base for building society and the provisioning of resources to ensure *equal opportunities* for all citizens to participate in social life.

## 4.2 Demand figures

When one speaks of data regarding people with disabilities, the numbers can vary greatly depending on the source (see Table 1). This fact arises from the commentary above, i.e., the variation in terms of definitions and criteria applied to the term disability.

POTENTIAL OR OVERALL DEMAND FOR PEOPLE WITH DISABILITIES			
Location	Estimate	% of the population	Source or Reference
<b>Global</b>	From 600 to 859 million people.	From 9% to 13%	- Van Horn, 2002. - Horgan-Jones and Ringaert, 2004.
<b>USA</b>	Almost 54 million people.	21%	- U.S. Department of Commerce, 1997.
	From 50 to 80 million people.	From 16% to 26%	- Stumbo and Pegg, 2005.
<b>Canada</b>	More than 2.7 million people in 1991.	15.5%	- Van Horn, 2002.
<b>Australia</b>	More than 3 million people in 1993.	18%	- Darcy, 1998.
<b>Europe</b>	Around 45 million people in the EU-25 countries (aged 16 to 64 years)	15.7%	- Dupré and Karjalainen, Eurostat publication (2003).
	From 45 to 90 million people who have some type of disability	From 10% to 20%	- Toerisme Vlaanderen (2001). - National Disability Authority (2003).
	50 million people in extended Europe.	Aprox. 11%	- European Disability Forum, 2005. - Gerlin, 2005. - Qualitas, 2004. - Brown, 1991. - Van Horn, 2002. - Horgan-Jones and Ringaert, 2004.
	From 69 to 92 million people.	From 15% to 20%	- Pühretmair, 2004.
	From 60 to 80 million disabled and reduced mobility people.	From 13% to 17%	- Community Research and Development Information Service CORDIS, 1995.
	From 92 to 115 million people.	From 20% to 25%	- Stumbo and Pegg, 2005.

Table 1. People with disabilities. Overall demand.

If we now analyse the figures for older people's overall demand (see Table 2), we see that, at the European level, there are older people than children. Furthermore, in 2004, the population over 65 years of age (75.4 million) exceeded that of the population aged 14 years or under (74 million). This continues the trend since 1984 for the decrease in the latter in favour of people over 65, who now account for one sixth of the European population (IPF, 2007). Focusing on Spain, only one in seven Spaniards is young and only 14.5% of the population is under 14, while one out of every six Spaniards is over 65. Spain is one of the notable leaders in the rankings of aging populations. This demographic transition is also reinforced by the low birth rate. By 2020, it is estimated that 20% of the population will be over 64 years of age (IPF, 2006). Spain will be one of those countries that experiences a significant demographic aging in Europe, and one in two people will be at least 55 years of age in 2050.

Location	Estimate	% of the population	Source or Reference
Global	About 600 million people (in 2025 it is estimated that it will be 1.6 billion people)	10%	- OMS, 2000
USA	About 31.88 million people	12.4%	- U.S. Department of Commerce, 1997
Europe	More than 85 million people	16.6%	- IPF, 2009
Spain	More than 6.5 million people	16.8%	- INE (National Institute of Statistics), 2008

Table 2. Senior citizens

Elderly people, aged 65 years or older without disabilities, comprise 10.9% of the total Spanish population, due to the aging population. Focusing on this segment, we observe that "travel and tourism," which is the second activity they would like to do after "walking", is a desire shared by 60% of women and 46% of men (NSI, 1995).

When determining the number of potential tourists who directly benefit from accessibility, we found different sources with different estimates. The potential market for accessibility has been currently estimated at 127.5 million beneficiaries in Europe; this figure includes 7 segments (Buhalis *et al.*, 2005):

- People with mobility impairments.
- People with visual impairments.
- People with hearing impairments.
- People with speech impairments.
- People with mental or intellectual disabilities.
- People with hidden disabilities.
- Senior citizens.

When we perform a more detailed study of the segment of the population benefiting from the removal of accessibility barriers in Spain (see Table 3), the figure totals 16 million people, thus representing almost 40% of the Spanish population (Ministry of Labour and Social Affairs, 2003:28).

Beneficiaries of accessibility	Estimate	% of the population	Source or reference
People with disabilities	3,528,221	8.8%	- INE - EDDES, 1999.
People older than 64 years of age	6,434,609	16%	- INE - EDDES, 1999.
No disability	4,361,957	10.9%	- INE - EDDES, 1999.
People without disabilities <sup>1</sup>	7,828,635	19.5%	- INE-EPA, 1999a.
Pregnant women <sup>2</sup>	209,475	0.5%	- INE - EMH, 1997.
Temporarily disabled people	515,140	1.3%	- INE- EMH, 1997.
<i>Total affected by barriers</i>	<i>15,718,813</i>	<i>39.1%</i>	
Total Spanish population	40,202,160	100%	- INE - EDDES, 1999.

<sup>1</sup> A member is considered to be a person younger than 65 for each family unit, forming part of the collective of beneficiaries from the removal of accessibility barriers due to transitory circumstances.

<sup>2</sup> Includes people affected by fractures, trauma, sprains and injuries to ligaments and bones.

Sources: National Statistical Institute, documents from the Survey on Disabilities, Impairments and Health Status (EDDES), Labour Force Survey (LFS), Hospital Morbidity Survey (EMH) and Accessibility White Paper (Ministry of Labour and Social Affairs, 2002 and 2003).

Table 3. Beneficiaries of the removal of accessibility barriers in Spain

Based on the data, people with disabilities and older people, i.e., the direct beneficiaries of accessibility represent almost a fifth of the world population, totalling between 1.3 and 1.6 billion. In Europe and the United States, the figures are larger, encompassing more than a quarter of the population. Moreover, there is an increasing number of consumers with disabilities and older people who demand goods and tourist services, who together with families with children have increased their number of trips. These three groups have similar needs for accessible tourism (Rains, 2008). According to the European Commission (1996), the approximate figures total 35 million potential overnight travellers and 630 million overnight stays each year (see Table 4). However, as the document itself points out, not everyone is able to experience tourism. In some cases, their disabilities prevent them from travelling and, in others; their economic conditions prevent them from doing so. In contrast, there are other groups that would benefit from accessibility, such as pregnant women, people with transitory physical disabilities, people with temporarily reduced mobility or communication, or families with children, as discussed above.

OVERALL DEMAND		
Europe	<ul style="list-style-type: none"> <li>- 8 million who will travel abroad.</li> <li>- 15 million who will travel domestically.</li> <li>- 22 million local day trips.</li> <li>- Average of 0.5 companions.</li> </ul>	- European Commission DG XIII "Tourism" unit, 1996.
	This would comprise a potential market of 35 million travellers who stay overnight and 630 million hotel nights annually.	

Table 4. Overall demand of European tourists with disabilities

The WTO estimates that by 2050, the population aged 60 and over will make more than 2 billion international trips as compared to 593 million in 1999 (Patterson, 2006:214). In Spain,

75% of couples without children in which the head of the family is between 51-64 years of age made some kind of trip last year (ITS, 2010) and thus comprise the third most travelled group as compared with the rest of the Spanish population.

## **5. Profile and behaviour**

To study the profile and behaviour of the segments of tourists with disabilities and senior tourists, we have chosen to conduct the analyses separately (despite their similar needs) in order to establish their behaviours more clearly and concisely.

### **5.1 Disabled tourists**

The literature on the segmentation of tourists with disabilities in Europe is scarce; above all, there is mostly public institutional and organisational research, for which a clear statistical methodology was generally applied.

Here, we examine two of the most relevant studies. The first is the Federal Ministry of Economics and Technology of Germany (2004), which conducted a survey of German tourists with disabilities, highlighting the following main conclusions:

- More than half of respondents were over 65 years of age.
- Savings and pensions were the primary means of subsistence.
- The average income was € 2,250 / month.
- Over 50% of respondents had a degree of disability approaching 100%.
- The largest group was people with physical disabilities, representing more than 60%.
- People with disabilities travel less compared to people without disabilities.
- 37% of respondents had decided not to travel due to lack of accessible facilities.
- 48% of respondents would travel more frequently if more accessible services were available.

The other study is the National Agency for New Technologies, Energy and Environment of Italy (ENEA) (1999). The primary conclusions are summarised below:

- 54% of respondents were women and 46% were men.
- The respondents mainly belonged to the middle class (i.e., clerks, teachers, small business owners).
- Their trips were usually self-organised; 79% of the time, the respondents organised their own trips. The rest of the time, the respondents relied on travel agents, tour operators and / or associations and support agencies.

To analyse the segment of Spanish tourists with disabilities, we began with the premise that people with disabilities form a group of users with the widest range of needs and, therefore, requirements. The identification of their profile and behaviour was conducted through quantitative research. Thus, for data collection, a quota sampling was used, dividing the population into distinct subpopulations. The sample population analysed consisted of Spanish tourists with disabilities, with a sample size of 404 valid questionnaires and a confidence level of 95.5%. Using the NSI (1999) and Eurostat (2005) data as the basis, four key elements for structuring the sample were established: gender (male / female), age (17-64 years of age / 65 and over), autonomous region (20 in total) and type of disability (physical, mental, sensory and hidden).

SEGMENT	GROUP 1	GROUP 2	GROUP 3	GROUP 4	BEHAVIOUR	PHYSICAL	MENTAL	SENSORY	HIDDEN
Sex	Female	Male	Female	Male	Seasonal preference for Travel			Summer	
Age	Younger than 65 years of age	Older than 65 years of age			Reason for not travelling in this season	Economics and mass tourism	Lack of companion	Economic reasons	Economic and work-related
Civil status	Married	Single	Married		Means of travel			With families	
Level of education	Secondary or university education	Basic or higher level of technical education or university			Why this means is chosen				
Work situation	Employed or receiving social security	Employed	Receiving social security		Decision making about travel	Person and family	Family	Person and family	Person
Monthly income of the family unit	Between 1,200 € and 3,000 €	Up to 3,000 €	Up to 1,200 €		Destination that they would like to visit	Spain	Spain and the rest of the world	Rest of the world	Rest of the world, Spain and Europe
Disability type	Physical or hidden	Physical or hidden	Physical or hidden		Attractions which they typically visit	Beach	Small towns	Heritage sites and large cities	Beach
Degree of disability	Severe (from 50% to 95%)	Severe (from 50% to 95%)	Severe (from 50% to 95%)		They would like to visit				
Mobility aid	None or wheelchair	None or canes, crutches or similar	None or canes, crutches or similar		Activities they would enjoy doing	Cultural and relaxation activities	Nature and relaxation activities	Relaxation	Cultural activities and relaxation
Desire to travel	Great	Great	Very Great	Between Average and Great	Average spending		Between 500 and 750 € for a 5-day trip		
Travel frequency	More than once a year	Once a year	Once a year		Transportation	Family car	Family car and bus	Family car, train and bus	Their own family car
Trip duration	From 2 to 4 days or from 5 to 10 days.	From 5 to 10 days	From 5 to 10 days		Accommodation			Hotel	
					Sources of information	Family	Family and associations	Family and friends	Family and friends
					Personnel rating	Between moderate and good enough	Good enough	Between too little and moderate	Between moderate and good enough
					Additional personnel training needed		Attention to specific needs		
					Main barriers	Architectural, urban and transport	Human, architectural and urban	Communication and transport	Architectural, human, urban and transport

Table 5. Segmentation, behaviours and habits of tourists with disabilities



Initially, the main customer segments were established according to their socio-demographic and economic characteristics. Subsequently, we studied the habits and behaviours of tourists with disabilities in Spain by type, as the needs of different groups are not always homogeneous (see Table 5). The results are synthesised in Table 5 and, due to the size of the data sample, exclude secondary and partially relevant aspects. The four groups identified in the table are the result of a cluster analysis that included the socio-demographic characteristics of the sample and travel-related variables.

The Spanish tourist with disabilities can be characterised as a user who generally chooses Spain as a destination, mainly looks to relax, travels with his/her family in the summer, stays at hotels and has an average expenditure of between 500 € and 750 € over 5 days. In addition, the segment of people younger than 65 years of age generally takes more than one trip per year given that they love to travel and have a monthly family income of between 1,200 € and 3,000 €. It is surprising that the group that travels the most comprises people with a severe degree of disability, i.e., those who have between 50% and 95% of their capabilities limited. It is important to highlight that the different disability groups all agree that the staff for the tourism sector should be better trained in order to attend to specific user needs. Last but not least, the study shows that architectural as well as human barriers are a constant, with the exception of the group with sensory disabilities, who highlighted communication and transportation barriers.

## 5.2 The senior tourist

One of the areas most relevant to the elderly is their leisure time, mainly their leisure time dedicated to tourism, which influences their physical, mental and social well-being (Lee and Tideswall, 2005; Vellas, 1986). In fact, it is possible to increase one's life expectancy and counteract the aging process by helping the person stay active. Travelling can also help people avoid loneliness and lack of meaning in the later stages of life, which are some of the main problems that older people have today (Marín, García-González and Troyano, 2006). Among the positive effects of leisure in the life of the elderly, Lee and Tideswell (2005) highlight life satisfaction. Travelling can be an enriching experience for senior citizens as it provides a change in their daily routine and the benefits of new experiences. Tourist activity involves movement / displacement to a different place from the place of residence, a form or manifestation of leisure, discovery, interaction with the environment, intercultural contact and social interaction. Santos (1992:36) found that older consumers spend more of their income on travel and less on other things.

As the tourist profile of the senior is not clearly established and there are several discussions about their socio-demographic characteristics, it was assumed that they are over 55 years of age, usually retired with pensions or social benefits, and have leisure time to devote to travelling at any time of the year. Delving a little deeper into their socio-demographic characteristics, we suggest that:

- With regards to *sex*, while it seems that, in maturity, women have a more dominant role than men with regards to purchasing decisions, especially after the retirement of the spouse (Gunter, 1998: 24). This behaviour cannot be generalised for all older women and ignores the changes that are occurring in the role of adult women today.

- *Marital status* also does not determine the buying behaviour of senior citizens, and furthermore, different patterns in spending exist due to the changes in household structures produced in recent decades. Today, there are many statuses: married, single or widowed, as well as second marriages, and so on that will influence the patterns of consumption of senior citizens.
- *Socioeconomic status*, determined by educational level and occupation, can also differentiate various consumer groups. Gunter (1998:24) pointed out that those with a higher socioeconomic status are more receptive to brands and are also more influenced by the print media, as opposed to those with a lower socioeconomic status, who, as a result of increased consumption, are more influenced by television in their purchasing decisions. However, socioeconomic status alone does not ultimately determine the purchasing power and buying behaviour of the individual because, as seen above, these factors will also depend on other variables such as life cycle stage and individual biographies, which are constantly changing. Anken *et al.* (2008) and Grande (1993:100-101) have argued that the purchasing behaviour of senior citizens is not determined exclusively by their age, gender, income or educational level, but that there are a number of variables related to the personality of the individual that are manifested in consumer lifestyles and are related to purchasing behaviour. Stroud (2008) has suggested that the psychographic variables used to segment this group are built on stereotypes of the elderly population and, in turn, Moschis (1992) calls into question the validity of these variables because, as is shown by some studies, the same lifestyles can apply to the whole population, young and old, regardless of the different lifestyles that depend on the characteristics of an older population (Moschis, 1993).

Accordingly, an interesting endeavour is to try to analyse the variables that allow for an understanding of the causes of why an older person travels or not, together with his or her needs, preferences and desires, which are key elements to discern to respond to their needs and enable them to access tourism. Variables such as the sources of information used, type of accommodation, number of people travelling, trip preparation time, travel duration, means of transport used and type of trip help to describe the behaviour of senior tourists, along with data on their motivations and socio-demographic characteristics.

### 5.2.1 Motivations of senior tourists

From a theoretical point of view, experts in the field of motivation have stated that motivation is involved in the reasons for our behaviour; an understanding of motivations is essential to understanding the decision-making process of travellers and fundamental to assessing their satisfaction with their tourism experiences (Pearce, 1982; Snepenger, King, Marshall and Uysal, 2006). The following table provides a brief description of the research that has been reviewed on the motivations of senior tourists and broader works in which the variables of motivation or reasons for travel were included in the study.

As can be observed, this market is not homogenous and different reasons can influence the choice of tourist activity. Senior citizens travel for many reasons, especially for: rest and relaxation, socialising, seeing new places and partaking in new experiences (Fleischer and Pizam, 2002). These reasons will depend on many factors including the person's socio-cultural context, education and work environment.

Authors and study location	Senior citizen motivations
Horneman, Carter, Wey and Ruys (2002) Queensland (Australia)	Travel while health is good Spend time with family and friends Visit places they have always wanted to visit Make the most of free time
Acevedo (2003) Brazil	Try new things/visit new places Rest and relax Escape the daily routine Interact with other people
Hossain, Bailey and Lubulwa (2003) Australia	Vacations Visit family
Huang and Tsai (2003) Tapei and Kaohsiung (Taiwan)	The three most important: Rest and relaxation Meet people and socialise Be with family
Lee and Tideswell (2005) Korea	Enjoy natural attractions Visit new places and try new things Rest and relaxation Occupy free time
Chen (2009) Tainan (Taiwan)	There were no significant differences between the motivations of both groups. The two most important motivations are: See things during vacations that they would not normally see in their daily life Be with family and friends

Table 6. Research on the motivations of senior citizen tourists

### 5.2.2 Behaviour of the senior tourist

The travel patterns and behaviours of senior citizens are very diverse, as was the case with their motivations. Thus, one can observe differences in their choices for food, accommodations, shopping and entertainment, among others (Bai *et al.*, 2001:148). Those with the highest incidence are analysed below.

- *Type of accommodation.* Keep in mind that the type of accommodation used when travelling will be intrinsically linked to factors such as the reason for travel, income and company. In this regard, senior citizen tourists demonstrate a broad range of selection when choosing accommodations.

- *Travel Companions.* Senior citizen tourists are very heterogeneous in this respect and this heterogeneity, as with the previous variable, arises from factors such as family circumstances, income and occupation.
- *Travel time preparation.* A better understanding of this behavioural variable, along with the source of information used by senior citizens when planning their trips, will be key to creating effective marketing to reach the target population efficiently and at the minimum cost. Some studies, for example, Gitelson and Crompton (1983), have stated that those who travel for longer periods of time and at greater distances plan further in advance. Conversely, those who visit family and friends plan less. Rao, Thomas and Javalgui (1992) found that those involved in more activities and who spend more have a longer planning horizon for their trips, and Fodness and Murray (1997 in Huh, 2006) have suggested that those who enjoy a longer stay, a greater number of destinations, visit more attractions and spend more dedicate more time to planning their trips.
- *Duration of the trip.* There is a wide disparity of opinions regarding this variable. However, it is commonly believed that senior tourists enjoy a longer stay than the rest of the population (VVAA in Batra, 2009:200). However, Bai *et al.* (1999:76) list the studies of several authors in this regard who note that the length of a senior citizen's trip can range from 1 to 3 nights, 4 to 5 nights or even up to 9 nights. Thus, there is no consensus on the typical duration of the senior citizen's trip, perhaps as a result of the homogeneity with which the collective of older travellers is treated by the tourism market and the lack of unified criteria when segmenting this group, as identified in the study by the authors.
- *Means of transport.* The car, in particular the private car, is the preferred mode of transportation by senior citizens for leisure travel, followed by planes and trains (Javalgi *et al.*, 1992 in Patterson, 2006; Prideaux *et al.*, 2001). However, it should also be noted that the bus is a very recurrent theme in this segment, highlighting its frequency of use as compared to the younger population (Baloglu and Shoemaker, 2001; VVAA in Patterson, 2006). The profile of the senior tourist that uses the bus as a means of transport is, according to Patterson (2006), typically a couple. However, Javalgi *et al.* (Patterson, 2006) have claimed that, after 65 years of age, the popularity of the car as the preferred mode of transportation by senior citizens decreases as age increases, with a tendency towards travel by bus, which is used more as the population ages. However, the means of transport is closely related to other factors related to tourism behaviours. In particular, the type of trip will determine the use of one type of transport or another. Moreover, this choice will also be influenced by the factors such as the reason for travel and the travel distance and destination (Patterson, 2006).
- *Organisation of travel.* Tour packages are one of the options preferred by the senior citizen versus the non-senior (Javalgi *et al.*, in Bai *et al.*, 2001), mainly for reasons of convenience, security and to have travel companions (Patterson, 2006). This is an alternative travel mode compared to travelling independently, especially for those senior citizens who are single, widowed or divorced (Patterson, 2006). There are many studies linking the package tour to people of advanced ages, using age as the sole criterion of segmentation (Bai *et al.*, 1999). However, some of these studies (Bai *et al.*, 2001; Javalgi *et al.*, in Patterson 2006) have shown that age is only one of the variables that explain this behaviour and there are other variables such as sex, income, employment status, and type of companion. In this sense, Javalgi *et al.* (Patterson,

2006:146) found relationships between the type of trip chosen and the traveller's employment status and income, among other factors; they suggested that retired senior citizens who depend on a retirement income prefer tour packages because these are cheaper, compared with senior citizens who are still active in the labour market and younger individuals. On the other hand, senior citizens also travel independently, especially younger ones who prefer to organise their trips themselves.

- *Sources of information used.* Varying sources of travel information are used. In several studies, there have been a number of interesting conclusions about the sources of information used by older people (Chen, 2009; Cleaver, 2000; Horneman *et al.*, 2002; Grande, 1993; Shim *et al.*, 2005):
  - The main source of information for this group is their experience as consumers.
  - The information search process is conditioned by the consumer's income, educational level and degree of socialisation.
  - These consumers tend to collect information personally, which they then contrast with that provided by external media.
  - Above all, they obtain information through family, friends, acquaintances, neighbours and word of mouth. Ananth, DeMicco, Moreo and Howey (1992) demonstrated that the comments concerning a hotel and its reputation play an important role in decision-making by older travellers when choosing a hotel.
  - Older people also read a lot and listen to the radio. Therefore, the press and radio are very effective means to reach senior citizen tourists. Horneman *et al.* (2002) confirmed that the print media and travel agents were highly valued by this group, and Shim *et al.* (2005) highlighted the importance of mass media as a source of information.
  - According to Grande (1993), the information that a company provides through its brochures or catalogues will not be widely read by older people. On the other hand, Ryan (1995) suggested that leaflets are the preferred media chosen by senior citizens and, according to this author, have a strong influence on the chosen destination.

## 6. Sector Profitability – The cases of Europe and Spain

When presenting figures for the potential profitability of the tourism sector associated with offering services to senior citizen tourists and visitors with disabilities, both in Europe and in Spain, it is important to reinforce the idea that this is not a niche offering, but rather expands current segments by differentiating based on accessibility and usability as quality parameters and, thus, increases satisfaction and loyalty among tourists.

As already mentioned, not all people with disabilities are able to travel, but according to Van Horn (2002), 70% of Europeans with various accessibility needs are physically and financially able to travel and do so with an average of 0.5 companions per potential traveller. A fact that reinforces this statement is that of 4,000 respondents in the German study, 52% of the respondents travelled with a partner (German Federal Ministry of Economics and Technology, 2004). On average, 59% of European households have a member with a disability and 38% of the population have a friend with a disability (Eurobarometer, 2001). On average, disabled people would take more than one vacation per year, travelling with more family members or friends, if they could find more and better information about accessible sites (Buhalis *et al.*, 2005).

If we combine all of the elements listed above, we can talk of a beneficiary market of more than 260 million disabled and older people that would generate tourism revenues of 166 billion euros (Eurostat, 2005), as can be seen more clearly in Table 7.

Overall Demand	70% are physically and financially able to travel	Multiplier effect of friends and family	Number of friends and family	TOTAL potential market of travellers	Average spending per person and per vacation <sup>1</sup>	Potential revenues from tourism
127.5 million	89.3 million	0.5	44.7 million	134 million	620 €	83 billion €
		2	178.6 million	267.9 million		166 billion €

Source: Eurostat, 2005.

Table 7. Potential market of European travellers that would benefit from increased accessibility and the associated tourism revenue.

The estimates presented above could be higher, mainly for two reasons. First, the calculations are based on the assumption that European citizens will take their holiday in Europe, but there are also tourists around the world who choose Europe as a holiday destination who have not been included. The estimate of potential travellers worldwide is between 600 and 900 million people. Second, the numbers cited refer only to people with disabilities or direct beneficiaries of accessibility while, as already mentioned, accessibility benefits all users (Buhalis *et al.*, 2005).

Considering the facts presented above, the ignorance of the market towards the large group of disabled people seems incomprehensible. Nadine Vogel (2006) put forward three main reasons to explain this fact: people are generally uncomfortable with the disabled, the special needs of these groups are considered a "niche" and companies are afraid to "do it wrong".

Thus, the lack of accessibility of the tourism industry in relation to its goods, services and environments can result in three scenarios, (Franco, 1999):

- In general, accessibility is an element of quality and, if it is not available, the service offered is of lower quality.
- If the sector (industry, establishment, product, service or destination) does not consider this market segment and does not establish and meet accessibility standards, it will lose business opportunities from potential tourists with various disabilities (and their companions).
- Taking the opposite case, if they claim to be accessible and emphasise this competitive advantage, but really are not, they will take on costs of non-quality.

To identify the beneficiaries of accessibility and to identify the potential revenue for the tourism sector in Spain, we drew on the model designed by Eurostat (see Table 7) and the variable studied in the original model proposed by Eurostat, i.e., accessibility beneficiaries: the disabled, elderly, temporarily disabled and those with similar restricted capabilities. This effort was based on the data analysed in Table 3, the results from the quantitative study, that is, an initial demand of 15.7 million people who are beneficiaries of

accessibility. By applying the multiplier effect of travel with 2 relatives or friends, we can calculate a potential demand of 32.97 million Spaniards out of a total population of 40.20 million people (according to the original study, i.e., NSI 1999). This is 82% of the population, to which would be added the percentage of people who do not travel; hence, the segment we consider in this scenario includes, directly and indirectly, nearly all of the Spanish population. Therefore, the potential revenue would range from nearly 8,000 million € in the most negative case to 31,881 million € in the most positive case.

Overall Demand	70% are physically and financially able to travel	Multiplier effect of friends and family	Number of friends and family	TOTAL potential market of travellers	Average spending per person and per vacation <sup>1</sup>		Potential revenues from tourism
15.7 million	10.99 million	0.5	5.49 million	16.48 million	96.70 €	10 days	15,936.16 million €
						5 days	7,968.08 million €
		2	21.98 million	32.97 million		10 days	31,881.99 million €
						5 days	15,936.16 million €

Table 8. Scenario 2. Potential Spanish tourism market that benefits from increased accessibility and the associated tourism revenue

If the data discussed above are extrapolated to the entire tourism sector, the travel expenditure by the tourist resident in Spain, depending on the scenario chosen, would represent a range between 5.86% of total expenditure by Spanish tourists both nationally and internationally, when including only Spanish tourists with disabilities who travel with 0.5 companions once a year for an average duration of 5 days, up to an estimate of 97.32% of total expenditure by Spanish tourists, which includes all the potential beneficiaries of accessibility, travelling with an average of 2 relatives or friends and taking a trip with an average duration of 10 days each year.

Scenario s	Potential tourism revenue from beneficiaries of accessibility	Domestic and international travel expenditure by Spanish residents (Familitur, 2010)	Percentage of potential revenue compared to total expenditure by Spanish tourists
-	1,929.16 million €	32,757.28 million €	5.86%
	3,858.33 million €		11.77%
	7,716.66 million €		23.55%
	7,968.08 million €		24.32%
	15,936.16 million €		48.64%
+	31,881.99 million €		97.32%

Table 9. Potential weight of the influence of accessibility on the entire Spanish tourist industry

Both in the low (-) scenarios, as in the highest estimate, the estimated profitability is sufficient for public and private organisations to make an effort to seize the opportunity that is generated by expanding the tourism market and working on the basis of increases in quality and social responsibility.

## 7. Conclusions

At the beginning of this chapter, three clear objectives linked to senior tourism and accessible tourism were proposed: to determine the profile and behaviour of tourists from these segments, to identify the potential market opportunities and to estimate the economic revenues for Europe and Spain.

After carrying out this study, it can be concluded that in reference to the user profile and behaviour, there are groups with a range of superior needs who have a common characteristic, accessibility, who are considered to be any person able to use and enjoy products, tourist infrastructure and services. Focusing on the importance of the synergy between the two groups (elderly and disabled), one can establish that their demographic profiles are important but not decisive for the creation of tourism product offerings. Variables such as gender and age do not have a great influence on travellers' priorities, while educational level, occupation and status have a greater weight, as they are part of the lifestyle determinants of these segments. When we instead focus on behavioural elements, we reveal more accurate and determinate actions for establishing possible strategies to increase accessibility. It should be stressed that, for both segments, the main reasons for travel are searching for relaxation and rest, preferably using one's own vehicle (although this also depends on the destination of choice), with two main ranges of trip duration, not more than 3 or 4 days or 9 to 10 days. Accommodation choices are variable, but hotel stays are the most common, and word-of-mouth information is an important source of information for travel arrangements.

In terms of the market opportunities that exist and can be developed in the future, the potential of shifting tourism away from peak seasons is favoured, as most members of these groups do not perform paid work activities and receive some social benefits, which makes it possible for them to travel throughout the year, and they also have the purchasing power to do so. Moreover, in the case of Spain, this tendency is enhanced by the various state-run social programmes that co-finance holidays for the elderly or disabled. Non-seasonal tourism increases revenues and the use of infrastructure throughout the year, boosting destinations and, most importantly, creating jobs. It should be highlighted that these segments are not niche markets, but by expanding the market through improving products and services associated with accessibility, businesses increase their market potential and improve their image by increasing the quality and competitiveness of their tourism offerings.

Once we know how potential tourists who require accessibility behave and determine the opportunities that can be generated for different components of the tourism sector, both private and public, we still need to confirm whether this segment of tourism is attractive enough to make an effort to adapt and capture it through the supply of tourism goods and services. As has been noted, the potential market for elderly and disabled people varies according to the reference source, but if we summarise the data, we can estimate a target



population of between 1.3 and 1.6 billion worldwide, 135 million in Europe and approximately 10 million in Spain. Understandably, not all of these people are able to travel, either because of health, economic or other limitations, but the data indicate that there is a potential European tourist revenue from beneficiaries of accessibility that varies between 83 and 166 billion € depending on the number of companions. For the specific case of Spain, depending on the length of stay and the number of companions, the figure varies between 8,000 and 16,000 million €. Accessibility, directly and indirectly, benefits everyone, as can be observed by its potential influence on the entire Spanish tourist industry, for which the most positive scenario indicates that this segment of tourism could account for 97.3% of the potential revenue from travel expenditures made by Spanish tourists.

The appeal of attracting senior and disabled tourists in order to generate elements for new opportunities has been confirmed. Now, we wait for both the private and the public sectors to begin to develop their interest by increasing the supply of tourism products that meet accessibility parameters by and for all, i.e., increasing the quality of tourism offerings.

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# The Role of Time in the Global Tourism Market – A Demand Perspective

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## 1. Introduction

The earliest western concept of leisure (Greek: *scholé*) is credited to the Greek philosopher Aristotle who juxtaposed production activities performed from the necessity to labour (e.g. by slaves) with self-actualisation activities fit for free men, such as education, pursuance of arts and philosophy, contemplation, or the performance of political duties (de Grazia 1926). Aristotle was first to point out that time should be used in accordance with the values which determine the sense of human existence.

In the modern times leisure has been a subject of reflection by many philosophers and scholars, most often analysed in relation to working time. Among the best known concepts that set a reference point for the reflection on leisure are Marx's theory of alienation of the worker in the capitalist labour system, Max Weber's theory explaining the influence of protestant ethics on the spirit of capitalism (a specific, ascetic attitude based on work ethos and self-discipline in consumption), and "the theory of the leisure class" by Thorstein Veblen arguing that leisure activities, and especially conspicuous consumption, denote superordinate social status.

Later leisure theories can therefore be divided, by their relation to working time, into concepts based on separation between work activities and leisure (the contrast hypothesis) or on unity of work and leisure (the congruence hypothesis).

The modern sociological concepts of leisure are constructed on the assumptions of one of the three theoretical paradigms: functionalism, structuralism, and postmodernism (Rojek 1997). Researchers have focused on issues such as: leisure as a factor of social integration and stratification, lifestyles, attitudes and social roles, ethnic identity, social exclusion and deviant leisure, electronic media use for role model creation, and leisure constraints. Recently, leisure has also become a subject of culture and gender studies, and a focal point of the so-called visual and figurative sociology. Many interesting specific concepts have been proposed to portray the "leisure society". However, a unified and cohesive theory of leisure has not yet been developed.

Tarkowska (2001, p 27) believes that leisure is a historical category referring to a relatively recent past, "associated with the industrial society, having originated along with it, and disappearing – or transforming – along with that society's transformations". In her opinion leisure is "merely but one form of social time and should be studied as such"

Among Polish authors who explored the subject of free time, or leisure, were Wnuk-Lipiński (1972), Czajka (1975), and Rogoziński, Cieloch and Kiczyński (1992). According to Czajka (1975), the notion of free time refers to all activities which are performed of an individual's free will for the purpose of relaxation, informal or self-education, and voluntary or community work after having freed oneself from paid work activities, domestic chores, and family and social commitments. In turn, Wnuk-Lipiński (1972) defines leisure as the time remaining at a person's disposal after fulfilling work responsibilities, family and school duties, and meeting one's biological needs.

A somewhat different approach to free time is represented in the work of Rogoziński (1992) who interprets leisure as the time which by virtue of free choice is filled with activities (situations or states) performed for their own sake.

(Buhl 1982) claims that man's life has several dimensions. The rhythm and duration of human life is determined by a person's biological clock and his or her participation in various social groups whose members interact and influence each other. This period of interaction between individuals and groups is known as social time. The economic dimension of time, on the other hand, is construed as the time scale of economic phenomena and processes related to the conversion of nature into goods and services in order to satisfy human needs (Ronek 1997).

It has to be noted that leisure can be defined in strictly sociological, or strictly economic dimensions. In the sociological dimension leisure is usually related to time free from work, duties and compulsion. It is connected with various forms of recreation, relaxation, social life, sports and travelling (Tarkowska 2001, p. 18). The difficulty in defining the phenomenon arises partly from the fact, that in the English language the terms *free time* and *leisure* are often used interchangeably, while in some approaches the two terms are distinct from each other: free time refers to quantifiable periods of time measured by hours and minutes, whereas leisure refers rather to the very activities filling the time away from work and other duties. To find the answer what free time really is we should refer to the classic definitions of leisure by Joffre Dumazedier (Winiarski 2011).

In their empirical studies, Robinson and Godbey (1999, p. 12) accept that free time is the time available after paid work, household work and family care, travelling and commuting, and also sleeping, physiological needs, and personal care and hygiene. The time budget studies conducted by GUS (Main Office of Statistics) in Poland use a similar division of activities, identifying specific classes of activities in line with Eurostat recommendations to enable comparability of data throughout the European Union. The classes of time-use activities are as follows: sleep and physiological needs, paid work, education, household work, travel and commuting, and leisure. The leisure category includes such activities as participation in culture and entertainment, social life, sports and recreation, hobby and games, mass media use, reading, voluntary and community work, passive relaxation, and other pursuits. Leisure is therefore understood as the time used for relaxation, or activities outside daily commitments.

It has to be noted that in some approaches leisure has a broader meaning, e.g. as the time after work which includes such activities as improving one's qualifications, participating in political, community and social life, or child care (such approaches are explored in greater detail by Tarkowska 2001, pp. 20-21).



In all leisure concepts free time is closely connected with tourism. In fact, availability of free time is a precondition of pursuing tourist activities. According to Jung (2011), to meet their needs in a well-balanced economy, people both purchase goods and services and have time to make full use of their purchases. The author thinks that rational individuals at every level of work remuneration will choose an optimal number of working hours to both finance their consumption needs and have enough time to enjoy the consumption. Applying this thought to real life with its numerous limitations, such as increased income polarisation observed since the late twentieth century, we find that such optimum is difficult to achieve given that consumers today are usually either money-rich/time-poor or time-rich/money-poor. Gershuny (1995) mischievously suggests that if we were to apply Keynesian approach to demand stimulation we should redistribute time to the richest groups, since deficit of time is the greatest barrier hindering consumption among the better-off.

A literature review shows that despite an obvious connection between free time and tourism, it is difficult to find works dedicated specifically to this relationship.

## **2. Conceptual model of the chapter**

The aim of this paper is to show how globalization affects the understanding of time at different stages of human life, and how the changing concepts of time impact tourism demand both at work ("economic time") and leisure.

The effects of globalization on people can be succinctly summarized as the shrinking time and space. The impact of globalization on time is expressed both in biological and economic senses. The economic perspective pertains to working time and leisure alike, hence time can be considered from the viewpoint of both the enterprise, and the individual – a client who purchases tourism services.

The underlying theme of the discussed aspects of time, particularly in reference to the client, is tourism. Given the complexity of the tourism phenomenon, our considerations will be limited to the demand side.

Tourism demand pertains both to working time (business travel) and leisure (private travel). Hence it is important to show the relationship between changing concepts of time and tourism demand in both these aspects.

We begin with a discussion of the globalisation phenomenon which has raised the significance of economic time, an integral part of the so-called social time. The relationship between processes of globalisation and tourism is reflected in increased business travel. The article explores other interdependencies between the two phenomena. It also presents a typology of tourists according to the time perspective (Seaton 2002). The most prominent feature of this typology is a distinction between "traditional tourist" and "traveller". Considerations on free time and its perception in the society are concluded with a projection of future tourism services.

## **3. Results**

Globalization has a fundamental impact on time use by man. In tourism this is particularly apparent in the planning and realization of travel. The profound and multidimensional transformations effected by globalization are due to many factors, of which the most important is the development of information technology, mobile communications, and

transportation – air transport in particular. Almost all aspects of human activity - business, finance, trade, labour market, social relations and also tourism-related activities - are subject to these transformations. Globalization affords direct and instant access to almost unlimited variety of tourism offers, allows direct purchase of tickets to all parts of the world, and makes it possible to book services such as hotels, restaurants, cultural attractions, entertainment, and transport in almost all corners of the globe.

For humankind the extent of these transformations is best summarized by the phrase “the shrinking time and space”. This is reflected in the diminishing importance of the public space and in the shortening of time distances. With instant communication and unrestricted mobility time loses its traditional dimension. Space is no longer an impediment: distances are not as important as they were in the past. Growing in importance are the “cyber space” and the “new freedom”. Today’s elites, including tourists, set new standards and values: their ties with specific territories loosen; less restrained by socio-cultural and political spaces they are becoming increasingly ex-territorial. A new social polarization and asymmetry arises between old “territoriality” of societies and “ex-territoriality” of “mobile” elites (M. Golembski, 2007).

As a result, globalization leads to increased importance of economic time, which itself forms part of social time. Time spent at work, as well as time between jobs (a consequence of employee mobility), and time outside work which is used to recover mental and physical strengths, are all parts of economic time. Its importance in the functioning of social structures will continue to grow.

The growing importance of economic time results in consumptive lifestyles. This is a consequence of globalization, particularly relevant to the provision of tourism services driven by worldwide competition between regions, service providers and intermediaries. The new, increasingly sophisticated media, such as the Internet, facilitate creation of new needs, which in turn drive global demand. Thus the accelerated consumption, characteristic of the so-called western civilization, leads to the extension of the biological and economic times of human activity.

The biological clock may differ from conventional measure of time that determines the duration of human life. Scientific progress in medicine, psychology and sociology as well as technological advances can “put back” the biological clock, a phenomenon having profound economic implications. Simultaneously we can observe an accelerated pace of time, mainly in production processes (work time) and consumption. Perception of time and the concept of time use are not uniform across social groups and societies. In some societies time passes at a slow pace in a monotonous rhythm, whereas in others life is dynamic and tumultuous. Time is perceived differently in different cultures. The way members of a given culture perceive and use time says a lot about priorities of that society and its life philosophy (C. Ezzell, 2002).

Even though globalization does not affect perception of time to the same extent in all societies, the direction and the rate of changes have already been set by the leaders: societies which change their perception of time the fastest. It is true that the impact of globalization on the concept of time varies in different cultures, but in the long run globalization tends to blur cultural differences.

Globalization has the greatest impact on the perception of economic time which can be divided into three parts: working time, work-related time which is not physically spent at work, and leisure. Tourism demand, construed as the need to travel beyond one’s place of residence, can arise in any of the three divisions of economic time.

Working time pertains to activities of man performed in the production of goods and services (Kozioł 2000), and extends beyond the physical presence of employees in the workplace by including the time at which the employee remains at the employer's disposal. The employer's perception of time is oriented towards the company's interests and its main objective – efficiency. The role of time in the efficiency issues can be analysed on two planes. Firstly, time considered in its physical dimension is a production asset in its own right. Secondly, measurement of work time efficiency has a profound impact on productivity (M. Golembski, 2007).

An important role in productivity improvement can be attributed to actions taken during and as a consequence of business travel. There are many forms of business travel, with the frequency and variety of business trips continuing to grow. The range of business travel objectives includes skill improvement events organised by the employer, participation in trade shows, business talks, and meetings. Some jobs, such as auditing of multinational corporations, involve travelling to distant parts of the world. Incentive travel is growing rapidly, as is conference and convention travel. Globalization is indisputably a major standard-setting force in business travel. Business travellers have certain common characteristics, needs and preferences regarding procedures and service levels. The nature of business travel requires a specific time-saving model of services. The necessary services expected by business travellers (in addition to accommodation and food) include efficient communication facilities, access to the Internet, access to specific television channels, availability of major international newspapers, copying and printing facilities, and translation services. It is noteworthy that business travellers often exhibit characteristics of the global client: spatial mobility and extensive international contacts (Niezgoda, Markiewicz, 2007). Apart from general factors mentioned before, the perception and use of time in business travel is affected by the characteristics of this type of demand, such as:

- short duration and elite nature of business travel
- high expectations with respect to infrastructure, accommodation and service levels
- greater use of hotel accommodation compared with leisure tourism
- higher spending in the destination compared with an average tourist
- lower price sensitivity relative to leisure tourism.

The lower sensitivity of business travel to price fluctuations is to some extent due to the sharing of expenses between the trip organiser, or delegating organisation, and the business traveller ("customer dualism"). It is a fact that expenses incurred by people travelling on business are generally higher compared with leisure tourists, but usually the costs of business travel are covered by the delegating institution.

It can be said that during an intensive professional career the frequency of travelling on business increases at the expense of time spent in private travel (people increasingly take short breaks from work)<sup>1</sup>. One effect of globalization is a growing number of tourism offers and their division into mass (unified) propositions, and special interest differentiated packages offering new forms of activities at ever-new destinations.

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<sup>1</sup> According to the World Travel & Tourism Council, 2006, over the period 2001- 2016 business travel will have grown the fastest compared with other types of tourism expenditure. Between 2006 and 2016 the business travel expenditure will increase from USD 11.16 billion to USD 26.91 billion, showing a 141% rate of growth; after: G. Golembski, 2007.

Business tourism in simple terms can be divided into individual business travel, conference tourism, trade shows, incentive travel, and corporate tourism. Duration of business travel generally depends on factors such as:

- the extent of economic globalization
- the state of economic welfare
- development of transportation infrastructures

The state of national as well as global economy has a great impact on the demand for business travel. Even though demand for business travel is more stable and less dependant on psychosocial factors than private travel, the amount of business travelling usually reflects the fluctuation of economic growth.

Economic time does not refer solely to the time spent physically at work performing duties organized by the employer. This is also work-related time whose scope and organization depends on individual decisions, and includes such activities as job changing, employment seeking, qualifications improvement, and generally providing for one's family. This often requires mobility and involves travelling. To describe the phenomenon of frequent job hunting that involves short periods of joblessness between subsequent employments the economics theory uses the term "frictional unemployment" (Samuelson, Nordhaus 1990). This notion, in the past referring mainly to young people, nowadays has relevance to the entire population in productive age. People need to adjust their qualifications to the demands of fast-changing (due to globalization) labour market, hence a growing individual demand for travel beyond one's place of residence (to attend job interviews, training courses, post-graduation studies). This work-related time plays an increasingly important role in people's lives, particularly in their economic time.

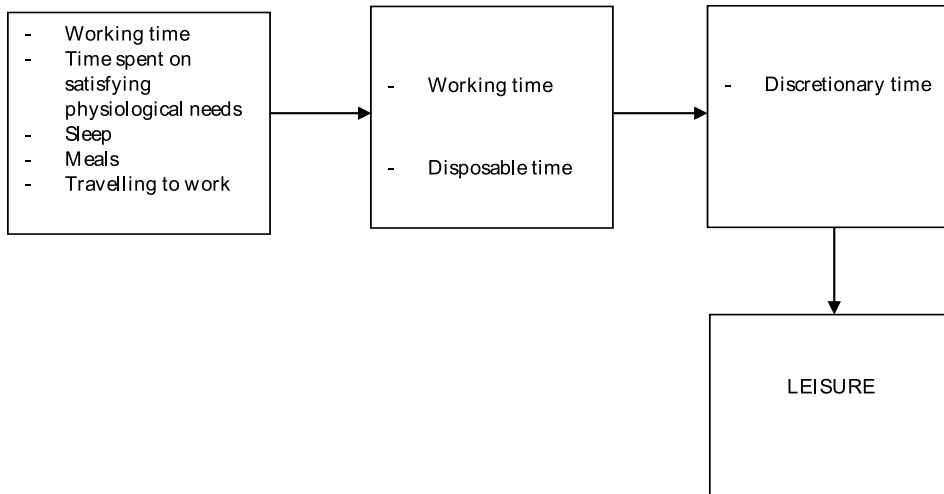
Leisure plays a tremendous and ever-growing role in the social time of a person. Leisure refers to time spent outside work, a period of discretionary time used for resting, pursuing one's interests, enjoying pleasures afforded by the civilization, participating in cultural and entertainment events, etc. Free time can just as well be spent on improving one's qualifications through self-education and thus increasing one's productivity at work time.

Rest and the recovery of a person's physical and mental strengths, supported with activities such as tourism, have a great impact on personal development and productivity at work, since time spent outside work has three basic functions:

- physical regeneration (recovery of physical strength)
- entertainment (regeneration of mental strength)
- cultural development (development of personality, knowledge, qualifications)

Changes brought about by globalization processes have the following consequences for the use of free time and subsequently work productivity:

1. The amount of leisure time available to an individual depends on his or her period of life. In productive age and in the time of raising children, availability of free time is limited but the range of activities that one can engage in at leisure is greater (this is particularly relevant to tourism). In post-productive age, which nowadays tends to become longer, the amount of free time is greater.
2. In productive age, the way free time is used has a great impact on work productivity, and the efficiency of enterprises and the entire economy.



Source: M. Golembski, "Determinants of the use of working time in enterprises of the Wielkopolska province", doctoral dissertation, Poznan 2007, p. 25, based on G. Cieloch, J. Kuczynski, K. Rogozinski, "Free time – consumption time", Warsaw 1992, p. 10.

Fig. 1. The four stages in the process of "arriving" at free time

Leisure is a complex phenomenon, affected by changes in the perception of time. Historically, time has been perceived as a circular construct consisting of recurring events in human life based on the nature's cycles. In modern societies time is perceived as linear, reflected in the experiencing of the present and looking into the future. This perception implies conscious spending and utilisation of time, and a compulsion to save it.

Another phenomenon affecting the perception of time and the use of free time is societies' evolution towards a so-called leisure civilization. This phenomenon is a consequence of changes in individual systems of values influenced by mass media and caused by civilization stresses as well as an increasingly felt desire to relax, divert from every-day activities, gain new experiences, meet new people, visit new places, etc.

Tourism is a mass phenomenon, therefore in analysing tourism demand and the meaning of time in tourism we must not overlook social processes in their broadest sense (Niezgoda 2004).

In tourism literature there are numerous analyses looking into the process of departure from a traditionally construed idealistic "traveller" towards the notion of the "tourist" (Mehmetoglu 2004). The traveller is a person working on a project, for whom journey is a process and a means to greater goals; the tourist, on the other hand, pursues pleasures, new experiences and adventure. The tourist passively awaits events and service. The traveller is active and does not want to be served. Seaton (2002) proposed a new typology of tourists that takes account of the time perspective and social conditioning:

- a. metempsychotic – the tourist presents a non-linear behaviour, and expresses himself in a journey as a precisely defined person, always the same;
- b. metensomatic – in the course of a journey the tourist plays multiple roles (a chameleon behaviour).

According to Seaton, this model highlights individual stages in the motivation process, showing the dynamics of tourist behaviour. People become tourists not because of the desire to satisfy their needs but through a socially conditioned desire for personal development. This development proceeds through culturally-endorsed role-playing. Therefore people should not be asked “where” they want to travel, but “what” they want to be in their journey (Niezgoda 2010, p.26).

#### 4. Discussion

Beside disposable income, availability of leisure time is the necessary pre-condition to engage in tourist activities. On the other hand, tourism is only one of many possible leisure pursuits. In this paper we will attempt to answer the following questions:

- What is leisure time for the tourist?
- What goals can the tourist set for spending his or her free time?
- What are the risks in arranging one’s holidays, selecting a tour operator or choosing a destination for one’s vacations?
- Can people plan their holiday destinations far into the future in a sequential manner (such as: this year I will travel to France, next year to Spain, and the following year to Portugal)?
- To what degree can people manage their time off work in a conscious, deliberate manner during their entire life?

Answers to such questions are particularly important in the countries which have initiated and are continuing a total transformation of their political, economic and social systems. Perceptions of leisure time by people subjected to socio-economic transformations have changed dramatically. In the centrally planned economy, characteristic of totalitarian political systems, leisure time pursuits were seriously limited for the following reasons:

- major administrative difficulties in travelling abroad (passports made available to citizens at the sole discretion of authorities; necessity to obtain visas to destination countries);
- black market for convertible currencies raising the price of foreign exchange many-fold relative to its real value, and thus making foreign travel uneconomical;
- limited possibilities for arranging one’s holidays domestically (around 80% of all reception facilities were holiday hostels or camps belonging to state-owned industrial plants, institutions and offices; employees could either make use of those facilities or stay with their relatives or friends);
- producer market for tourism services, resulting in the dearth of offerings and lack of choice for the tourist;
- a steep decline in the value of the domestic currency, resulting in permanent shortages of goods and services whose prices were fixed by the state (the amount of worthless money in circulation exceeded many-fold the value of goods and services offered in the market);
- little differences between salaries across all sectors of the economy;
- existence of privileged social groups (e.g. the ruling party establishment, or certain groups of industrial workers such as coal miners), having priority in the access to more attractive offerings (Szubert-Zarzeczny 2005, Golemski ed. 2009).

Following 50 years of a totalitarian order, the systemic transformations in Poland have brought about deep socio-economic changes. These changes have made a significant impact

on the manner people spend their free time. The most important developments in this regard include:

- full opening of borders with all European countries, and unrestricted use of passports;
- exchange rate stability for the local currency and systematic adjustment of domestic price structures to those characteristic of free market economies;
- emergence of a free market in tourism leading to proliferation of service providers, tour operators, and tourism offers (transport, tour packages, diversified propositions for spending leisure time);
- opening of the domestic market to foreign providers and investors;
- growth and diversification of tourism reception facilities;
- accelerated differentiation of incomes, and polarisation of the society;
- total freedom of choice for the buyer, in accordance with market economy rules;
- growing productivity and efficiency of labour.

All these changes have been responsible for increased spending on leisure time activities (economic effect) and - above all - resulted in a rapid growth of outbound tourism (tours, stays). In recent years we have also observed a growth in the domestic tourism. Consumption has undergone significant differentiation. On the one hand, people have realised the importance of managing their free time by themselves, on the other hand people are more inclined to follow current trends and fashions, and are more responsive to aggressive promotions and psychological aspects of choosing the way of spending their free time.

A much greater choice of tourism offers afforded by the free market economy has led to a change in preferences with regard to the way leisure time is arranged. Instead of one leave lasting two or three weeks the Poles prefer several short holidays. This is characteristic of societies that not so long ago espoused market economy. A frequent change of destinations is due to a desire to see as many places as possible in the shortest possible time, in a way to make up for the lost time. Another reason is the responsiveness to massive advertising campaigns and other promotional activities.

The studies made by the authors (Golembski, Nezgoda 2003) reveal that the longer the holiday the more people consciously plan the order in which they will visit destinations.

The reasons people do not plan their holidays include both the lack of financial stabilisation and little knowledge about the world due to limited travelling experience. With limited and unstable disposable incomes people decide to travel not when they really want to but when they have the money. The lack of knowledge and experience is a result of long isolation and practical inability to travel abroad, as well as limited choice for domestic travel, in the past usually organised for people by their state employers. This is why most Poles do not know how to plan and organise their holidays.

Consequently, travel decisions are largely affected by incidental factors (such as advertisements, opinions expressed by other people, information obtained unexpectedly). It is little wonder, therefore, that in Poland very popular are „last minute” holiday offers.

To evaluate people's readiness to make conscious life-time plans for their holidays, in our recent survey we asked respondents how far into the future they planned their vacations. The Poles are still little aware that their lives can be planned and their lifetime goals can be realised. They underestimate the possibilities to develop their personalities and expand knowledge. After all it would be possible to plan subsequent trips to, say, Egypt, Tunisia,

Sicily, Greece and Turkey to increase one's knowledge about the history of European civilisation. The Polish people still do not see such possibilities and do not plan their travel destinations in a purposeful manner long into the future. It can be seen that the various opportunities afforded by the free market of tourism services influence the choices of potential tourists and allow them to plan their holidays in detail. The study shows, however, that people tend to plan only the one forthcoming vacation. The destination is carefully chosen, but it is a short-term planning (up to one year) rather than a life-time scheme.

The paucity of financial means and shortage of time are the reasons why Poles use only a small amount of leisure time for holiday travel. Therefore a correlation between the length of leave and the way it is utilised can only be determined for a small group of people who have substantial amount of disposable income.

The transformation of political system gave people freedom of movement and freedom of choice, but still the deciding factor is the country's level of affluence. The multitude of offers playing on people's imagination has brought about a short term effect of frequent travels and frequent changes of destinations. Financial constraints decide that holidays are short, and destinations not excessively distant.

Twenty years of socio-economic changes have not been quite enough to teach people how to make conscious long-term leisure plans. We can therefore restate the importance of tourist education to raise people's awareness of what leisure time means for them and how important it is to make their lives happier. A special attention must be given to educating tourists about the relationship between self-development, or self-actualisation, and the conscious planning of leisure time. Such opportunity is afforded by the free market which creates conditions for long term leisure planning irrespective of prevailing political systems.

## **5. Vision for the industry**

Analysis of tourism demand reveals ever-new customer needs. The complex nature of tourism and a wide spectrum of needs that drive tourism demand lead to the emergence of a growing number of market segments and types of tourists in a broader, social sense. People look for variety to satisfy their needs, and at the same time they demand instant access to information and bookings, and the ability to make quick decisions. Globalization and communications development, including universal access to the Internet, have made it easy for tourists to look for suitable offers and book services by themselves. As a result tourists are able to plan their time individually, and more often than before decide to organize travel on their own. Tourists want to use time "effectively" by maximizing the amount of experiences per unit of time, at the same time expecting the best quality of services (Niezgoda 2010).

Tourist destinations, therefore, must deliver a high standard of basic services and a wide variety of ancillary services to satisfy visitors' expectations. The tourist wants to enjoy lots of experiences in the shortest possible time. The tendency to make quick decisions leads to a "chameleon behaviour" (Roth, Schrandt 1992). In the course of one journey tourists can play multiple roles, for example they can use inexpensive accommodation and at the same time a very expensive mode of transport, they can economize on food while purchasing very expensive items of clothing, etc. In response to tourist expectations, on the demand side we can observe a transformation from service-oriented economy to experience-oriented economy. Apart from physical experiences, tourists expect the satisfaction of their spiritual



needs. Surveys conducted among young people in Poland have revealed that tourism is increasingly regarded as a deliberately chosen lifestyle rather than just a way of spending time (Różycki, Winiarski 2005). Young people want to expand their horizons through tourism. They want to escape the control of their parents and spend time in the company of their peers, experiencing as many pleasurable moments as possible. The surveys have also revealed that young people engaging in tourist activities perform better at school, even though they themselves are not aware of this correlation. For young people the most important thing is to have a good time and enjoy themselves.

Availability of free time is not a sufficient condition for engagement in tourist activities. What is also needed is income which could be spent on discretionary items after satisfying the essential needs, a pool of money enabling the realisation of tourism demand. The personal income variable is positively correlated with the “price of time”. In market economy, and in the conditions of globalization, there are many ways of acquiring the same product or service. This, however, entails a trade-off between time and money. Consumers consider and evaluate different ways of satisfying a need, comparing benefits and costs of individual offers or variants of the same offer. In this process time is considered as a value. Hence we can talk about the *price of time*. People on higher incomes usually put a higher price on their time. This is reflected in the behaviour of consumers: those who do not value their time highly are inclined to spend more time looking for cheaper products or services. In tourism practice, people who value their time highly are prepared to pay an intermediary to organise their holidays, whereas people with lower personal incomes are inclined to sacrifice time in order to organise their tourist activities by themselves, saving on the agent’s commission (Niezgoda, Zmysłony 2006).

A large and continuously growing segment of travelling population are “third age” persons – retirees having time on their hands and enjoying substantial discretionary income. This, of course, refers primarily to retired populations in affluent countries, particularly in the aging societies. These people can easily spend a lot of time travelling. The world’s division into affluent countries generating substantial tourism flows, and poor countries whose outbound tourism is negligible, produces a gap between populations having time on their hands and populations enjoying purchasing power.

To summarize the discussion we may conclude that despite cultural diversities and differences in affluence between societies, globalization affects all countries, albeit with varied intensity. Cultural differences, however, are going to blur at an accelerated pace. Tourism, a phenomenon of travelling beyond one’s place of residence, will continue to grow at a high rate. Owing to globalization, access to tourism offerings becomes almost unlimited. The world is rapidly shrinking: people across the world can book air tickets and hotel rooms directly and instantly by themselves. The intensity of time use will grow – the pace of life is likely to continue accelerating. Tourism demand will be generated equally by individuals and organizations, with the type and intensity of tourism activities becoming more than ever correlated with man’s life cycle. The role of tourism for people in productive age will strengthen not only at leisure but also during their working time (incentive travel, training, job interviews, business travel, scientific conferences, and conventions). The structure of leisure tourism demand generated by people in productive age is already changing: breaks from work tend to be shorter but more intensive in terms of activities. Enjoying longer retirement (longer life expectancies), people of post-productive age also increasingly engage in tourist activities during their free time. In a desire to play the roles of “travellers” rather

than “tourists”, they deliberately extend the duration of their trips to enjoy and savour the atmosphere and uniqueness of the visited destinations.

To travel, whether in productive time or retirement, people need disposable income and purchasing power. However, the choice between being a “tourist” who expects to be served during his or her short break and the time-savouring “traveller” depends on personal attitude towards free time.

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# Mature Tourist Destination: A New Tool to Forecast Internal Composition of Its Demand

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## 1. Introduction

Tourism activity and its impact on the development and growth of specific economies are undeniable. Although tourism in its origins was considered as a luxury event only enjoyed by the very few, it now has not only been established as an inalienable right for every human being and recognized in the Universal Declaration of Human Rights (1948), but has also found a place in the household budget. The economic analysis of tourism is relatively recent and a review of the literature confirms the imbalance with regard to their different dimensions of tourism economics. Supply in general, specific tourist subsectors and the relationship between the public sector and tourism have received less attention in theoretical and empirical analysis. Demand, expense, forecast and impact multipliers of tourism, however, are areas that continue to be heavily studied. This chapter can now be added to the list of demand studies because it will show how tourist demand forecast can be carried out with a micro focus. This focus is essential in specific tourist destinations.

It is important to distinguish between new and mature tourist destinations. New destinations are beneficiaries of annual forecasts on tourist expense, number of visitors, number of nightly stays carried out with the help of available statistical-econometric techniques. However, in mature tourist destinations, where tourist demand is consolidated, another type of forecast is absolutely necessary. It is not aggregate, but instead directed towards the internal composition of the demand, that is, individual characteristics from future potential tourists. In this new approach the integrating elements of the tourist supply can be better adjusted to the specific characteristics of those tourists using that supplied service, with the consequential increase in the degree of satisfaction obtained by the tourist.

Nevertheless, this type of analysis, necessary from a private initiative perspective or a legislative and zoning point of view, must cope with its inherent limitations. On the one hand, the researcher usually must deal with the absence of empirical microeconomic data with a certain degree of depth or detail. Available individual information is usually limited to those that have carried personal interviews to tourists just before returning to their permanent residence, usually performed by official government organisms. But these interviews have just one aim: to obtain average values that synthesize all of the information on tourist expense, type of lodging and number of night stays, among others. Hence, in the majority of cases there is only access to summarized information by tourist groups, which

necessarily leads to the type of typical aggregate analyses on different identifiable variables of tourist demand. On the other hand, there is an absence of appropriate statistical techniques to aid in the tourist forecast based on individual interviews. These interviews provide information on the changes in the demand composition for a specific destination. Fortunately the development of techniques in the fields of Computational Intelligence and Artificial Intelligence open up new research perspectives. Specifically, genetic algorithms, one such technique in Computational Intelligence, can serve as an appropriate tool in the analysis of the evolution of the characteristics of the potential clients of those tourist services that are offered in a specific destination.

The aim of this chapter is to show that the genetic algorithms can be conveniently adapted in its structure and in its component definitions when performing detailed forecasts on the tourist demand composition which are necessary in a mature tourist destination.

## **2. Tourist consolidation: The need to stabilize the number of satisfied visitors with the supply**

Tourist activity generates a multiplier effect on the service sector and other sectors in an economy, and this resultant activity in turn drives and diversifies total economic activity. Tourism is frequently an important source of exports for an area, although the goods are not physically exported. Tourists travel to a country to participate in tourist services and the resultant paid currencies make up, in terms of balance of payments, an export of services similar to other goods and services. The export of the tourism sector becomes a source of income and employment for the population that is directly linked to tourism, but it also has an indirect impact on other sectors of the economy that are responsible for providing other produced goods and services in the region. From a strictly economic point of view, in the initial stage of tourism development, tourists expect that their arrival, together with an entrance of foreign currency, to be rapidly redirected to the production or import of those goods and services that are needed by the new visitors. In addition, the entry of foreign currency can be transformed into a source of regional financing for currently needed investments that are required in this non-existent tourist supply –namely lodging, transport, restoration.

In the economic take-off stage, the injection of capital provides an increase in residential income in the tourist area –more jobs, opening or reactivation of business activities–, which translates directly in purchases, taxes on tourist goods and services and income from rentals and lodging, or what is the same, the entrance of foreign currency. On the other hand, the increase in residential salary income can simultaneously convert these residents into tourists in other areas. This transformation, in turn, when added to the needed imports to satisfy tourist demand, non-resident salaries, lost income due to exchange rate in tourist operation transactions paid in the country of origin, tourist promotions carried out in the foreign countries, the expenses in infrastructure improvements, and investments in tourist activities, cause foreign currency exiting.

The result from the consolidated stage of tourism –or the presence of a mature tourist destination– is therefore a set of related effects amongst themselves which are concerned with the degree of dependence of the destination with respect to the exterior, its own tourist development strategy, production, employment, balance of payments, exchange

rates, monetary supply, public income and expenses, inflation, property value speculation, income distribution, consumption habits, professional training, socio-cultural changes, effects on the environment, rural settings and regional development. Bull (1992) reviews the externalities generated by tourism and classifies them from the individual and group perspective. The externalities for individuals are divided into 1) benefits: new transport route connections, new shops and amenities, high property values, evidence of local positive effects (mirage effects); 2) costs: inflation, traffic congestion, noise. Externalities for governments and groups: 1) benefits: tax revenue increases, increase in cultural value, preservation of flora and fauna; 2) costs: maintenance of tourist infrastructure where tourists do not cover these expenses, additional services – police, healthcare –, destruction of flora and fauna.

Opportunity costs must be considered and understood for each one of the actions that it causes before the proliferation and potential reach of tourism expansion. Opportunity costs reflect the value that is given up by using resources in the tourist activity and not in other activities. Nevertheless, all of the transformations and mechanisms that are put into place and that are interrelated with regards to the numerous arrivals of visitors to the area complicate the measure of what really generates tourist activity. The inherent difficulties found in the nature of the service industry and actual circumstances may, however, reflect that the costs are not always valued as highly as the benefits.

This fact could be reduced in part if some reliable statistics were available on tourism supply and demand components. Nevertheless, available statistics provide a very limited view of the reality hidden behind this market. A common calculation, especially in areas that have been intentionally developed as tourist destinations, includes figures that are given which evaluate the number of expected foreigner visitors that they will periodically receive. The continuous increase of such a number continues as if it were the only sign of the tourist destination. Nevertheless, as Frechtling stated (1987a, 1987b), in a world of limited resources, the measure of economic profits from tourism in an area without parallel measure of the associated costs of the same, can induce, not only harm to the environment, but also waste public funds or drastically reduce the quality of life of the local residents.

Nevertheless, it is necessary to understand the difficulty of establishing a real value of these impacts – positive and negative –, created in most cases from mass tourism, as analyzed by Archer & Cooper (1998), and how these impacts can be transformed spectacularly by the appearance and the quality of the receiving area and the lifestyle of the residents. In spite of all of the inconveniences that could exist in the valuation of this subsector, the transcendence of tourism as an activity with multiplier effects, extremely complicated in terms of control from the supply perspective, and only quantifiable from the demand perspective, is such that all generalizations that are carried out will still be useful.

In summary, tourism interacts with general economic activity of the receiving area, impacts economic growth of the surroundings where the activity is developed and is influenced by it. These interactions should not be ignored by any tourism planning project, and the project will benefit if in the initial stages of tourism take off is accompanied by good forecasts of the aggregate tourist demand, and, in the case of a mature destination, other types of disaggregate forecasts on the potential tourist of the destination will be available.

### 3. Aggregate and disaggregate focus on tourist demand

A tourist market is considered established when a potential tourist and a tourist supplier contact each other. Tourism supply tries to adapt its offer to the particularities of the potential tourist, and if these are disregarded or unknown, the existing imbalance between both sides of the tourist market of the developed model will cease to exist in the tourist destination. In this case, Say's Law does not seem to apply, instead demand determines the guidelines of how supply will act. It is clear that additional encouragement in the path towards knowledge of future demand at a specific site is welcome, not only in absolute terms – aggregate tourist demand –, but also in internal composition – disaggregate demand.

Although there is a need by the supplier to know the individual peculiarities of potential tourists, the arrival of an important number of tourists to specific countries or areas in a tourist destination has drawn scientific interest in the quantification and explanation of tourist trends in absolute terms, that is, of aggregate demand. The main objective of the majority of empirical studies on tourist flows does not focus on their explanation of demand but instead on forecasting. Without reliable forecasts of tourist demand it is difficult, if not impossible, to create developmental plans, or to formulate political solutions in tourism.

Tisdell (2000) summarizes the five reasons why the forecast of tourist demand and the number of tourists is important for mature destination: 1) evaluation of tourism projects; 2) influences on relevant tourism strategies, such as price fixing, the grouping of tourist products or the determination of promotional expense levels; 3) assistance to governments when establishing tax charges in appropriate tourist activities; 4) guideline for governments in the provisions of needed infrastructure and public services to attend to tourists and minimize possible social costs that are generated by tourism; 5) significant variations in tourism demand can have important macroeconomic repercussions on employment and inflation.

Thus, taking into account the undeniable importance of the aggregate forecast of tourist demand, the most referenced typology has been to classify the forecasting methods into three categories: quantitative, qualitative and mixed (see recent developments in tourism demand modelling and forecasting in Song & Li, 2008, and Song et al., 2009). Quantitative techniques are methods that obtain the forecasted values of a studied based on its past evolution or on observed relationships among the forecasted variable and explanatory variables. Thus they are divided into univariate analysis of time series and causal methods. Univariate analysis of time series is based on the identification of historical data patterns using statistical methods and the extrapolation of observed behavior in the past (see Li et al., 2005). All causal factors are considered aggregate, and it is assumed that the net result of these variables is what has caused any tendency, seasonality or cyclical behavior that could exist in the data, and that an extrapolation of the tendency, seasonality or cycle would lead to an appropriate forecast. Among these methods are the naive expectations method, global and local trend adjustment methods, and the ARIMA models (see Box et al., 2008).

Witt & Martin (1987) stated that this type of forecast using extrapolation assumes that the factors that are the principal causes of the observed movement in tourist demand and would continue to be so in the future. Consequently, any change in these relationships would probably result in obtained forecasts that were worse than those produced from other

techniques. The second criticism of this type of analysis centers on the lack of incorporation of other variables which the forecasting variable depends on. Nevertheless, this absence could be corrected, at least in part by recurring to transference function models, and also to structured time series models (Harvey, 1989). These models recur to more flexible specifications from the typical components from a time series, as opposed to the traditional deterministic formulation, assuming that each one is stochastic (see tourism demand analysis using structural equation modelling in Turner & Witt, 2001).

Causal methods are quantitative methods that look for explanations for one variable based on other variables that it depends on. Among this type of methods there are econometric models using multivariate regression, based on causal relationships derived from theoretical principles. Nevertheless, specification errors and data measurement can limit their estimating ability, producing comparable results with other models that require lesser effort and are less expensive.

Qualitative methods introduce judgments and expert opinions in tourism and, in particular, of the economic agents that directly intervene in the market – airlines, hotels, tour operators, etc. These techniques are particularly appropriate when past data are insufficient or inappropriate for the study, or when the changes in a previous non-tested stage convert the past data as inappropriate. Among these methods are the Delphi technique and morphological analysis. The Delphi technique consists in reaching a consensus in a group of expert opinions in the subject to be forecasted. The experts are interviewed and later have access to the responses from the other experts, and are given an opportunity to reevaluate their own opinions until the groups reach a consensus for all of the questions. The objective of morphological analysis is to structure the existing information in an ordered form to determine the most probable outcome. In the first stage the most important variables are identified, in addition to the parameters and constraints which affect them. The relationships of these parameters are then determined in order to compare how they perform when combined with the others. The results of these combinations lead to the calculation of demand levels under different assumptions on the variables (see Kaynak et al., 1994). Criticisms of the subjective methods, especially with the Delphi technique, focus on the need to avoid the possible existence of bias on part of the field interviewers, and specifically, in the problem of the appropriate choice of experts and the analysis of the responses, over-pessimism or over-optimism, or the possible inadequacy of the technique to a specific problem.

The third forecasting method category includes mixed methods, which are based on the assumption that neither the purely quantitative point of view nor the exclusively qualitative perspective can properly forecast in any time-space dimension. That is, the short-term forecast is inclined towards the use of time series, while the mid-term and long-term appear to be more appropriate for some of the subjective methods, in spite of their disadvantages.

Some models have developed estimates based on quantitative techniques. Choy (1984), Clewer et al. (1990) and Witt & Witt (1992, 1995) compared the obtained results using quantitative techniques from several different models. From this comparison he came to the following conclusions: 1) It is extremely difficult for any one model to forecast small tourist tendencies. 2) It is not possible to construct one model that is appropriate for all origin-destination pairs, nor one set of explanatory variables. 3) In general, ARIMA models and the assumption that the future does not change with respect to past data – naive expectations – seems to provide forecasts with high levels of precision, while an analysis of the tendency

curves reveals that relatively inexact forecasts are given. 4) Exponential smoothing and econometric forecasts are good methods in terms of the change in direction of the tourist demand and of the changes in the trends in the one year time horizon. 5) Structural models from time series have been shown to be just better or even more precise than econometric models, especially if the forecasted time period horizon is not greater than two years. What is clear is that no econometric technique from this group is superior to the rest. Nevertheless, Martin & Witt (1987) and Witt & Witt (1995) indicated that econometric models do have a great advantage over other time series models that are summarized by simply focusing on their definition: the causality that is introduced in the initial term is not considered by the second or following terms.

Witt (1993) pointed out his expectation that other techniques would come along with greater precision that were not only useful to forecast the number of visitors from year to year, but also for a longer horizon. Along this same line of research, Tisdell (2000) states that the emphasis in the short and mid-term could be the result of bias in the research introduced by the market and political systems, and some tourist demand models could benefit from alternative forecasts instead of the traditional ones in Economics, such as the life cycle, the analysis of market segmentation, and the introduction of new variables.

To this context we need to add the limitation of the econometric methods that have been developed at present when trying to determine the internal composition of tourist demand. Internal composition is defined as the proportionality of each individual characteristic, in the form of prior information (nationality, number of nightly stays, expenses, type of lodging, age, sex) about the tourists that visit a destination. This type of disaggregate estimate is essential in mature destinations that have reached the consolidation stage, where the determination of future tourist entrants is not so urgent –it is assumed to be stable–, compared to the knowledge of those individual characteristics of the future tourists that would allow tourist supply to be conveniently adapted and thus avoid important imbalances with the demand which could create a tourist reduction in the destination.

Given the absence of valid tools for the type of required forecast, the implementation of proper genetic algorithms to this context can contribute to cover the present void. In the next section we describe the activation procedure of this method and show its utility as a forecasting tool. The procedure uses an explanatory or implicit argument from traditional economic analysis and can provide a disaggregate vision of demand. Furthermore, it allows individual characteristics of the tourist that has the highest level of satisfaction with his stay to be discovered –something not available in other techniques, that is, a potential repeat visitor and one who encourages other to do the same–, a basic element that the now mature destination needs to continue as an active destination.

#### **4. Computational intelligence and its contribution to economic research**

Current developments in information technology have led to a new and dynamic field of research which tackles the understanding and limitations of human behavior. The new area is called Artificial Intelligence, or expert systems, and one of its spinoff branches: Computational Intelligence. Artificial Intelligence is a set of technologies that is able to supply reasoning abilities to a computer that are similar to human intelligence, and importance is given to the use of this technology –what it does. The other branch is called Computational Intelligence and studies the mechanisms of human intelligence that uses any



computer science implementation as a simulation tool to validate theories; from this point of view, importance is given to the method — how it is done.

Although there is a clear use of these approaches for a social science such as Economics, significant communication between economists and researchers in Computational Intelligence remains absent. The main reason for this weak interaction lies in the fact that the tools and the objectives of both lines of research are very divergent. Traditional economic forecasting consists in analyzing economic systems with the help of mathematical theory. Economists use a mathematical representation of the model and try to derive analytical results. In order to make these models analytically tractable, the majority of them use behavioral assumptions that are extremely simple. Mathematical analysis then allows ideas and structural explanations of the similarities and differences in the behavior of different formulated models to be given. However, in most cases, they only allow minimal or local results to be obtained. Forecasts using Computational Intelligence offer a very different approach. It tackles the knowledge of the models that can be efficiently implemented in a computer. Usually the mathematical considerations are of minor importance and the algorithms use subjective arguments and similarities with nature. Usually, the analysis of these implementations is performed comparing with a large number from a real problem. The obtained numerical results are used to construct conjectures considering the execution of the implementation in different contexts. In this way, this approximation allows more complex knowledge models to be used although the simulations can only suggest, and not prove, some characteristic of the model.

An artificially intelligent agent —the center of all computational techniques— has greater flexibility than the traditional economic agent. It possesses two obvious advantages over it. In the first place, the artificially intelligent agent is the explicit representation of each individual in the population, which allows that different individuals from a same population have different rules to construct its expectations, and that the researcher can carry out simulations of the evolution of the population under study and observe with detail the behavior of the population faced with new knowledge. The second advantage is that, contrary to the rules found in econometric principles, artificially intelligent agents allow the construction of a basically heterogeneous population of agents that not only differ in their strategies, but also in their behavior when given certain information (Dawid, 1996).

Economic models have frequently represented a population of agents based on a single representative individual. This representative individual carries out his opinions making decisions according to a chosen knowledge rule, thus determining the population state for the next period. Nevertheless, if the expected representative individual is interpreted as the expected average of all the individuals, the best response to this expected average is not, in general, the same as the average of the best responses to the individual expectations. An important effect like this cannot be ignored if representative individuals are only considered instead of heterogeneous populations. In addition, the use of a representative individual only allows the knowledge of the population based on the reaction of the same individual to the observed variables of the system, and prevents a model to be formulated that considers the individual interaction between agents.

Current experimental research on the behavior of economic agents reveals that these deviate substantially and systematically from the ones with premises including formal rationality produce, at least in some areas. Hence, the use of a technique that could establish similarities with the real behavior of the individuals at the moment decisions are made seems to be the

most suitable. In this sense, the genetic algorithm is the computational technique that incorporates more evolutionary and adaptive theories in its code.

## **5. Genetic algorithms and their use to estimate internal composition and tourist demand**

Genetic algorithms (Holland, 1975) are considered models of adaptive knowledge and are of particular interest in economics. The interpretation of their different components and parameters from an economic point of view allows theoretical results relative to the behavior of the adaptation process of the agents and additional ideas to be obtained about the relationship between behavior in the model and the characteristics of the knowledge process (Dawid, 1996).

The genetic algorithm is a search algorithm for better solutions – not necessarily optimum ones –, and is especially useful for specific, large scale problems. According to Simon (1982), if this definition is used, the technique found in genetic algorithm is very useful in the economic context since each individual tries to satisfy their needs, and on occasion, can leave feeling satisfied with good actions that are not optimal. If the individual is satisfied he will stop searching for better solutions; otherwise, he will modify some of his actions. Thus, given the adaptive characteristic of the genetic algorithm, the most convenient way to analyze this adaptive behavior of the individual is to formulate a genetic model that allows it to be simulated and analyzed.

Sometimes a solution from a genetic algorithm is optimum and then they are included among optimization methods. Nevertheless, genetic algorithms differ from the traditional optimization procedures in four aspects: a) genetic algorithms work using a codification of the parameters that intervene, not with their own parameters; b) genetic algorithms, starting with a characteristic chain, do not look for only one chain as a solution, but instead a population made up of different chains; c) during their execution genetic algorithms use the information of an associated value for each individual chain; d) genetic algorithms use probabilistic transition rules, not deterministic ones, to guide in the search for solutions.

These four factors contribute to the robustness of the genetic algorithm in specific types of problems and provide an advantage not found in other techniques. Nevertheless, it is also necessary to admit that, in general, the robustness of a genetic algorithm and its efficiency in execution for a particular problem are inversely related, since the more degree of effectiveness of a genetic algorithm in a specific context, the more specialization in this context is necessary. This specialization requires the use of parameters and operators that are especially adapted to the problem at hand, but may not be so appropriate in other contexts (Davis, 1991).

The theoretical foundation of genetic algorithms is based on the genetic processes in training, learning, adaptation and the evolution of biological organisms, especially in the theory of natural selection –or survival of the fittest, according to the expression coined by Charles Darwin (*The Origin of Species*, 1859) –, and in the results of the genetic exchange and the generation of new genetic material by mutation. According to these guidelines, the genetic algorithm is a tool capable of transforming an original population whose artificially intelligent agents are identified by a characteristic vector, to another final population, made up of a specific number of components not necessarily coincidental with the original population, the majority of which have, as expected, similar characteristics to those that, in the original population, were best adapted to the environment and, consequently, most satisfied with it.

Genetic algorithms have been used in economic literature (Arifovic, 1994, 1995; Axelrod, 1984, 1987; Cohen, 1981; Dawid, 1996; Green & Smith, 1987; and Schrodtt, 1986, among others); in tourism literature with specific reference to the problem of tourism site location (Hurley et al., 1998); and with forecasting aims (Mahfoud & Mani, 1996). However, the evidence of their application to forecasting aims with real-world data is not as extensive (Hernández-López, 2004, Hernández-López & Cáceres-Hernández, 2007).

Specifically, the genetic algorithm as a method to forecast internal composition of tourist demand is based on the following assumptions: 1) Tourist seeks to maximize his degree of satisfaction obtained from his stay. Such satisfaction is a measure of the correspondence between his expectations before the stay and his final perception after the stay: the higher the level, the greater the degree of satisfaction. The degree of satisfaction is a dependent variable from his personal socio-demographic features such as age, country of origin, length of stay, number of visits, type of accommodation, and services hired. 2) If a tourist is satisfied with his stay –his degree of satisfaction is high– he will probably repeat his stay at the same destination, and he will probably communicate his positive experience. This fact can encourage other tourists with similar features and service needs to visit the same destination. 3) If a tourist is not satisfied with his stay –his degree of satisfaction is low– he probably will not repeat his stay at the same destination, and he will probably communicate his negative experience. This fact can discourage other tourists, whose features and service needs are similar to the first, from visiting the same destination. 4) The genetic algorithm must be redefined if the consumer preferences and the basic components of the tourism supply experience significant changes.

Therefore, the genetic algorithm describes the learning and evolution process which is undergone by the tourism population, where the first-visit of a tourist to a given destination is determined by the information received from a travel agency, publicity, or another tourist, and where the second-visit will be conditioned by the degree of satisfaction from the first-visit (Oppermann, 1998). A genetic algorithm application to an actual tourist population has been performed and has allowed for the forecast the specific features of satisfied tourists who will probably define the medium or long-term definitive tourism pattern of a particular destination.

The underlying idea of the genetic algorithm application is that, on a population of strings or individuals identified by a characteristics vector –initial population– with a certain average degree of adaptation to the environment, it generates another one –final population– with a greater average quality or degree of adaptation. Specifically, genetic algorithms are an effective method to describe as well as to explain the dynamic process that generates changing populations, focused on maximizing the theoretical fitness function. This function involves defining an objective against which each member is tested for suitability for the environment under consideration. In other words, the genetic algorithms fitness function measures the adaptation of any individual. Therefore, the most important problem-dependent aspect in applying genetic algorithms is finding a suitable function in order to determine the fitness of each one of the population members in the genetic population as a function of their characteristics.

Once each member in the initial population has been identified by a characteristic vector and their fitness has been evaluated, the question to answer is how the population can be modified with the objective of increasing its average fitness. Usually, the genetic algorithm modifies the

initial population by iterating through the following two phases. In the first phase, the selection procedure chooses individuals from the initial population according to their fitness values, where higher fitness values result in greater probabilities that an individual will be selected. Therefore, this probability determines the expected number of times this individual will be reproduced as a result of the relationship between the size of both the initial population and the final one. The selected individuals define the intermediate population.

However, if the transformation process described by the genetic algorithm adapts the changes occurring in the genetic population to the real ones, then an element of randomness must be introduced in the algorithm, inasmuch as it will permit both the survival of individuals without excessive fitness and the appearance of new individuals. In fact, in the second phase, this element of randomness is introduced by two operators which modify the characteristics of the individuals belonging to the intermediate population. The first one – the crossover operator – involves crossing the two selected individuals at a randomly chosen point. That is, once a point is randomly established in the string using a predetermined probability, the characteristics particular to the right of that point will be exchanged. This technique, the so-called one-point crossover, is the one applied in this research. The second operator – the mutation operator – creates new strings that are similar to current strings. With a predetermined probability, mutation randomly alters some of its characteristics into any of the other values of its rank. It should be noted that the action of the mutation operator could generate a final population with a lower fitness level than the initial one. In order to avoid this undesirable situation, the assumption for mutation probability value has to be sufficiently small.

Most of a genetic algorithms power derives from crossover operators and from simultaneous testing of the strings. The above phases are repeated until the algorithm is halted. The genetic algorithm proceeds for a fixed number of generations or when it satisfies some stopping criterion.

The genetic algorithm code proposed by Hernández-López (2004) is designed according to the simple genetic algorithm of Goldberg (1989) and is specifically adapted to the material in question. Thus, the code developed in this research is a C++ version of Goldberg's simple genetic algorithm with several innovations. Firstly, although genetic algorithms are usually applied to a randomly generated population, a suitable and specific heuristic had to be included in order to allow its application to actual data. Secondly, it was necessary to identify the tourists' features in terms of non-binary strings in order to make the code implementation easier, even though the fitness function was estimated using binary strings. In both cases, the strings were based on the explanatory variables. Finally, the use of the fitness function estimation is another innovation since it is unknown beforehand.

Suppose that a tourist population visits a specific destination and that its composition undergoes changes. An increase is expected in the percentage of individuals with similar characteristics to the tourists with highest utility level. The changes are guided by maximization or simply improvement of a hypothetical fitness function. In this case this fitness function could be defined as the tourist's utility level after the stay. Each tourist could be categorized according to a series of characteristics, such as origin country, length of the stay or type of accommodation. So, given a tourist supply, the utility level could be expressed as a function of these characteristics. Once the fitness function is fitted, the genetic algorithm is able to forecast changes in the internal composition of the population in terms of higher or lower presence of individuals with specific characteristics.

The first step in the application of the genetic algorithm consists in formulating a fitness function which provides a value for the utility of the  $i^{th}$  tourist,  $F_i$ , based on a set of  $k$  explanatory variables,  $X_i : \{X_{i,1}, \dots, X_{i,k}\}$ , which represent specific characteristics of such a tourist. Once the fitness function is obtained, the performance of the genetic algorithm depends on specific operators which specify change patterns in tourism population.

Individuals in the population are identified by structures or bit chains that indicate their characteristics. The algorithm modifies the original population or generation  $t$  in two phases. In the first phase, individuals from the original population are chosen using a selection operator and an intermediate population is obtained. The probability that an individual is selected is proportional to the value of the fitness function for such an individual. It is likely that the percentage of individuals with similar characteristics who showed a high utility level will increase in the next time period when compared to the previous time period. The expected number of times that an individual is replicated depends on the relationship between the sizes of the original population and the final one.

In order to obtain an intermediate population of size  $n$  the proportional selection operator applies the following procedure. If  $\Omega_1 : \{I_{1,1}, \dots, I_{1,r}\}$  denotes the set of individuals in the original population of size  $r$  and  $W : \{1, \dots, n\}$  is the set of  $n$  positions where the individuals copied from the original population are located, then the intermediate population  $\Omega_2 : \{I_{2,1}, \dots, I_{2,n}\}$  is obtained through the selection operator  $s(j) = I_{2,j}$ , and is defined as  $s : W \rightarrow \Omega_1$ , such that

$$P(s(j) = I_{1,i}) = P(I_{2,j} = I_{1,i}) = p_i = \frac{F_i}{\sum_{i=1}^r F_i}, \quad i = 1, \dots, r, \forall j = 1, \dots, n \quad (1)$$

where  $p_i$ ,  $i = 1, \dots, r$ , is the probability of copying individual  $i$ , that is, the quotient of the fitness of individual  $i$  and the sum of fitness of the  $r$  individuals in the original population.

The intermediate population is obtained by randomly generating the results of  $n$  multinomial tests of size  $r$  with probabilities,  $p_1, \dots, p_r$ . The copies of the individuals from the original population are completed according to a specified number and a new population is obtained with the desired size. If the selection operator is defined in this way it can be said that it modifies the original population by transforming it into a new population with the hope that this resultant population is characterised by a higher fitness level.

In a second phase, an element of heterogeneity should be incorporated in order to the described transformation process adapts to the observed dynamic adjustment in the population. This element of heterogeneity allows individual whose utility level is not so high to survive in addition to the possibility that new individuals will enter into the population. The crossover and mutation operators (Goldberg, 1989) are normally responsible for the resultant richer population because they allow the characteristics that identify the selected individual in the first phase to be modified. The transformation of the population from these two operators depends on the probabilities that are assigned to them.

However, it should be noted that the transformations that they produce are completely random and not in any way guided by economic statements. In known social settings the automatic application of these operators can lead to the generation of populations whose individuals are defined by incoherent characteristics. In addition, it is possible that

qualitative information exists that suggests greater likelihood in certain transformations as opposed to others. It would be interesting to introduce this information when the algorithm is being run. A good strategy may be to maintain the selection operator only to determine the intermediate population. Once the copies have been determined a new strategy should be considered. For example, take the case of a middle-aged English tourist who stays at a 5 star hotel. It is more likely that a middle-aged German tourist who stays at a 5 star hotel will replace him instead of a young French tourist who chooses apartments for his holiday. Qualitative information of this type can be explicitly incorporated into a transition matrix, but it will not be considered if the conventional crossover and mutation operators are used instead. It would be ideal to determine the values of probabilities,  $p_{ij}$ , in a hypothetical transition matrix  $M$  that indicates, for each individual  $i$  in the intermediate population from the selection, the probability that such an individual is transformed into individual  $j$  (Hernández-López & Cáceres-Hernández, 2007).

Suppose that  $m$  individuals exist whose representative strings or structures  $E_1, \dots, E_m$ , are different, that is, only  $m$  of the  $n$  individuals are different in at least one feature. It is assumed that each structure  $E_i$  from the original population, or generation  $t$ , can be transformed into another structure  $E_j$  from the final population, or generation  $t+1$ , with probabilities,  $p_{i,j}$ ,  $i, j = 1, \dots, m$ . Of course,  $p_{i,i}$  represents the probability that the features of the individual do not change. These probabilities can be placed in a matrix whose  $i^{\text{th}}$  row contain those values  $p_{i,j}$  that indicate the probability that the  $E_i$  structure is converted into each one of the possible structures,  $E_j$ ,  $j = 1, \dots, m$ . Now let me look at the process of determining the transformation probabilities,  $p_{ij}$ . Suppose that the qualitative information about the real population at moment  $t$  does not result in substantial changes for the next generation at  $t+1$ . In this case the transition probabilities can be established by assuming that  $p_{i,j}$  is inversely proportional to the number of different characters among  $E_i$  and  $E_j$ . So, if there is no difference between structures  $i$  and  $j$ ,  $p_{i,j} = \alpha$ ,  $i, j = 1, \dots, m$ , while  $p_{i,j} = \beta / \delta_{i,j}$ , if the differences between  $E_i$  and  $E_j$  structures are observed in  $\delta_{i,j}$  different features. Obviously, the value of the  $\beta$  parameter depends on the value assigned to  $\alpha$  parameter in

such a way that  $\sum_{j=1}^m p_{i,j} = 1$ ,  $\forall i = 1, \dots, m$ .

The transition matrix should, theoretically, be a square and symmetric matrix whose number of rows and columns coincide with the total number of different possible structures that can be observed in the initial population. Nevertheless, bearing in mind the available information on the population, some structures should not be considered in a real specific application of a large dimension. In the same sense, it could be advisable to exclude the presence of a distinct structure in the final population – period  $t+1$  – which was not observed at moment  $t$ . According to this hypothesis, the rank of the transition matrix is reduced considerably and the value of  $\beta$  changes for different rows in the matrix because it varies as a function of similarities between each observed  $E_i$  structure and the remaining observed structures. A formal definition of the transition matrix is then introduced during the execution of the algorithm as follows.

Let  $\Omega_2 : \{I_{2,1}, \dots, I_{2,n}\}$  be a set of  $n$  individuals from the resultant intermediate population from the copies and let  $E$  be a set of  $m$  structures in which each individual in  $\Omega_2$  can be transformed.  $Q : \{1, \dots, n\}$  is defined as the set of the  $n$  positions where individuals from the

final population can be placed. This final population  $\Omega_3 : \{I_{3,1}, \dots, I_{3,n}\}$  is obtained using the transition matrix operator  $\text{tm}(q) = I_{3,q}$ , defined as  $\text{tm}(q) : Q \rightarrow E$ , such that:

$$P(\text{tm}(q) = E_j) = P(I_{3,q} = E_j) = p_{q,j}, \quad q = 1, \dots, n, \quad j = 1, \dots, m \quad (2)$$

is the probability that the individual that occupies the  $q^{\text{th}}$  position in the intermediate population,  $I_{2,q}$ , is transformed or substituted in the final population by an individual whose structure is determined by  $E_j$ . If the individual that occupies the  $q^{\text{th}}$  position in the intermediate population has structure  $E_i$ , then  $p_{q,j} = p_{i,j}$ , that is, the term in the  $j^{\text{th}}$  column which corresponds to the row of individual  $i$  in the transition matrix. In this way a multinomial test of size  $m$  with probabilities  $p_{i,1}, \dots, p_{i,m}$  can be performed to determine which individual. The probabilities are taken from the  $i^{\text{th}}$  row in the transition matrix.

The forecasting of the new population from the designed genetic algorithm brings us to the next step. Participation percentages of the future tourist population for each group of identified tourists can be estimated by a given characteristic vector. If the individuals from the population are classified in  $m$  groups, the forecasting performance of the genetic algorithm can be evaluated with an adjusted goodness-of-fit test in terms of the difference between the observed frequency which corresponds to group  $i$  in the future population,  $e_i$ , and the forecasted frequency for the genetic algorithm that corresponds to the same group,  $o_i$ , for each of the  $m$  groups. In fact, the goodness of fit using transition matrix in genetic algorithm code increases (see Hernández-López & Cáceres-Hernández, 2007).

## 6. Conclusion

A mature tourist destination can support a regional economy. Thus, it is necessary to care for the tourist product that it offers to potential visitors and allows them to create emotional links with the destination instead of other competing destinations.

Potential tourists to the same destination are neither all alike nor their composition is stable. Thus, it would be more appropriate to consider them as a conglomeration of groups in constant evolution and with a very diverse demand. Then, given the rigidity of the tourist supply to adapt to eventual demands, private and public managers of this important economic activity could reap important benefits from fairly accurate knowledge of not just the number of tourists that are going to visit the destination in the near future, but the characteristics of this population related to different countries of origin, holiday length, type of lodging chosen or expenses during their visit. These characteristics identify the tourist and allow the tourist supply to serve them, in a differentiating way, and the demands from main groups.

In this sense, this chapter has shown that genetic algorithms are able to satisfy this need. Under the basic principle that the composition of a tourist population changes as a function of satisfaction with their stay, that is, higher satisfaction generates more tourists with specific features, the genetic algorithm simulates the evolution in the time that specific components appear or disappear from such a population.

A fitness function is therefore needed and defined which allows the degree of satisfaction of a tourist with its characteristics to be compared. The proposed genetic algorithm forecasts the changes in tourist demand of a destination in terms of the frequency that they are

representing individuals with a specific combination of characteristics. In this respect, Hernández-López (2004) offered a design of an adapted version of the well known Goldberg simple genetic algorithm (1989), adapted to the tourism context, which required using a real population of identified individuals by means of non-dichotomy natural attributes such as the initial population.

A genetic algorithm using this implementation contributes clear benefits to the forecast of the internal composition of the tourist demand, but the use of a transition matrix that facilitates the introduction of the economic arguments, such as a guide of the transformations of the chosen individuals in the first stage it has been observed that forecasted results improve. With this objective, Hernández-López & Cáceres-Hernández (2007) implement a genetic algorithm with a transition matrix where traditional cross and mutation genetic operators are substituted by a transition matrix whose elements are the probabilities that any of the structures, or a set of characteristics that define an individual, is transformed into another. In this way, the element of randomness stays in the transformation, however the correspondence can be attained among the expected transformations in a population and the knowledge that it has on it.

In order to conclude, genetic algorithms can be used as a statistic producing tool of a complementary forecast to those obtained with traditional econometric techniques. From a general point of view, the interaction between genetic algorithms and economic analysis presents an advantageous future. The relationship between both of research fields is assured because of the evolutionary theories in economic thought has certainly resurgence in the literature recently. The vision of economic agents that do not pursue optimization in all of its actions, but only in the majority of its cases, that pursue personal characteristics, wishes and objectives only while trying to evolve towards better situations, is something seen in everyday economics and also plays an important role in the basic structure of a genetic algorithm.

The idea developed in this chapter provides opportunities for future research. Firstly, it seems possible to obtain useful information so that the parameters that make up the transition matrix reflect with greater realism the transformation probabilities of some structures in others. This improvement in the transition matrix implies an improvement in the forecasting capacity of the algorithm, and in the measure in which the speed of the implicitly incorporated transformation in these adjusts to the speed of the observed explanatory change in the real population. Note that only the change in the structure of the population of potential tourist service demands have been considered from the tourist service that faces a fixed supply. However, if the supply changes parallel modifications in demand occurs. It is interesting, therefore, to research the formulation of a model that gathers the responses of the demand and the adaptive strategies used in the search for new clients. Along this line, it must be recalled that the change in supply will mean a change in the fitness function, given that the same tourist characteristics will not be associated, in general, to the same level of satisfaction if the environment has changed.

Research in this new area is still in its infancy. Its future could be well linked to the parallel development of statistics and surveys at the local level that propitiate a greater disaggregate understanding of the tourist population expected by tourism suppliers in a destination, without which these types of study cannot contribute meaningful information. More investigations of this type and the use of genetic algorithm in order to know the characteristics of potential tourists in mature destinations are expected in the future.



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# Security Measures on the International Tourism

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## 1. Introduction

One of the most important elements of the tourism industry are the cruises. All the vessels and specially the passenger ships are considered vulnerable to the incidents came from the intentionality of the humans. As of September 11- 2001, important changes have come about in security matters, especially for the Western Hemisphere. Ports and vessels, given their vulnerability due to internationalization they represent, are the target for all kinds of terrorist attacks.

For years now the International Maritime Organisation (IMO) has been establishing measures to prevent act of vandalism, such as piracy and attacks on vessels by insurgents in conflict zones.

However, to consider a port a high-risk location which could be used to perpetrate an attack on society or the port itself is a concept that has gained strength since 9/11.

## 2. Vulnerability & risk on board the vessels

When we are talking about security on board, we must consider that since 2004, with the come in to force of the International Ship and Port Facility Security Code (ISPS), as an amendment to the Safety of Life at Sea (SOLAS) Convention (1974/1988), the vessels and the ports must be prepared for "detect security threats and take preventative measures against security incidents affecting ships or port facilities used in international trade".

On board the passenger's vessels, the prevention must be sometimes, even stricter, due to persons have free movement for all around the vessel. The investigations regarding this matter, comments that the prevention must go to avoid that unexpected action take place during the voyage at sea or when in port.

On board the vessels, as all the transportation system, a big numbers of persons are coming on board, so the first measure is precisely avoid the access of a potential conflictive persons during the sea voyage, the problem suppose to be closed a shore before departure and attended by expert staff. (Marí R & Libran A,2003)

The problem starts when the next question came: how can be appreciated the intentionality of a person?

May be, with the experts some cases can be detected, but is impossible to control something that is just theory and the majority of the times, so it's really very difficult.

Talking about security, the protection must be for the passengers, vessel's crew, vessel, and also the personal items, that other people can damage, steal, or destroy. This risk increment when during the voyage is on board a famous or politician, due to sometimes, persons or organisations are looking for the way to affect their lives.

By other hand, the international net of terrorism, is also looking for any time to attack determinate interests, and the tourism Industry, has two main reasons for their intention:

1. The Quantity of persons on board, from different nationalities.
2. The very high economics impact that it has.

The prevention in all these cases, seeks to prevent any damage, making even be aborted during its planning, so they do not materialize, but once on board, should develop a comprehensive security device that protects both humans as the vessel of any threat.

All these efforts must go hand in hand with intelligence investigations, with the idea to reduce the risk to the minimum.

The vulnerability is the degree of disability that has a security system to detect incidents or threats, therefore, must be periodically reviewed and studied to provide the team in charge with the authentic information and avoid losing control at any time.

The vessels have already identified the risk on determinate matters:

- Danger at sea: damaged to the hull, stranding, sinking and collision.
- Dangers associated to the transport activity: fire, machinery's risk, marine pollution, cargo's risk and pests.

Relating to the security, the risks are determinate as follows:

- Violents actions: Terrorism, guerrillas, kidnapping, piracy.
- Antisocial Risks: robbery, theft, vandalism, robbery, fraud and scam. Attacks, assaults, sabotage, extortion, data manipulation, drug trafficking.
- Social's Problems: Stowaways, Illegal immigration..

## **2.1 Specifics risks for the passenger ships & ports**

According to statistics, most wanted merchant ships by the crime are, in principle, cruises.

Until the fateful September 11, these ships were the sector that was growing within the travel business.

The International Association of Cruise Lines in New York, represents the world's most important lines, which also has its central headquarters in the United States even do not bear American flag.

Since 1986, cruise lines and the security forces that protect them must comply with relevant legislation required by the International Maritime Organization. These regulations specify the security measures that such vessels must be met, which include security plans,

restricting access to areas of ships, systems identification and review of crew and passengers, and other measures intended to improve the security of people board.

In this vein, having in mind different forms of threats that may suffer ships such as:

- Threat to the ship from the outside, both sailing and in port.
- Threat to the ship from the inside.
- Threat of use of the vessel as an instrument of a terrorist act.

To prevent external attacks in port, port authorities and port logistics operators must assume the responsibilities of comprehensive port security, hand in hand with law enforcement authorities concerned and the Port Facility Security Officer (PFSO), taking into account the vulnerability of ports in terms of security.

Ports must have service attendants, guards at the docks, which are responsible for a second access control, and all appropriate measures, and to maximize the safety of the port's facilities and ships at berth.

It is important to understand that these measures, apart from meeting the minimum requirements by international and national regulations should be tailored to each port according to their uses and customs, as they may vary substantially.

As for insider threats, legislation on the subject also specifies the constant vigilance that must be on board, led by the Ship Security Officer, in collaboration with the captain and the rest of the crew, so of ensuring security along the journey.

The newly built ships and bring electronic devices installed first level, which serve to monitor different types of threats that can be found on board.

The shipping companies, shipowners and logistics operators can not cut corners on security, because security is not a cost but an investment.

Bases on the above, the author of this chapter had made an analysis on the vulnerable areas of the Ports, involved deeply on the activity of the tourism; where the visitors are passing the time when are visiting a city.

Considering all these aforementioned areas is vital to do a study about what is happening now with these port areas, we may have some questions:

- Do they have a protection plan in case you want to do a slaughter while the room full of visitors?
- Are there any chances of an attack such facilities how are you?
- Is the International Maritime Organization in the event that these places are also vulnerable to attacks?

These and other questions have been selected to design a consultation that had been passed to port authorities, port terminals and urban management of the Port, in order to establish:

- Criteria to identify if in fact these places are threats or not,
- If the port's infrastructure are already being considered in current PFSC or not,
- If people are enjoying the entertainment at these sites may rest assured that they are protected or not,

- And most importantly if the port can guarantee the operation of the themselves, and if can attached the existence of PFSC with the leisure activities of these places (if the application if needed- i.e figure 1)



Fig. 1. Port of Puerto Madero (Argentina) , Port's zone dedicated to the visitors.

With the main idea of show the real actual situation of the security on the ports, the main objectives to be met with this survey are:

- Evaluate the variables to consider in the analysis of vulnerability of the Port-Tourism relationship.
- Assess the degree of knowledge in the Ports in relation to the security of the areas in relation with the tourism.
- Evaluate the possibility of integration or cooperation between the ISPS and security of these areas.

## 2.2 Survey & consultation design

Based on the defined objectives and the geographical area to be covered, the design of the survey seeks to assess the information on vulnerable areas outside the ship-port interface, where tourists make life and carried out activities this important industry.

For the realization of the questions have been studied the most common vulnerabilities in ports, in order to identify and assess whether the port has identified in its security plan and especially the reality on the port facilities to avoid if possible, to carry out an attack and any other threat that endangers human life, facilities, and the environment, an end to the port and surrounding citizenship.

Given the great limitation, issues of confidentiality and secrecy in security issues, the sample of experts was relatively low, however, enables setting us geographic diversity to extract important information on the different regions under the study.

Experts to choose should meet the following characteristics:

- Knowledge of system and port business.
- Knowledge and mastery of the subject regarding Puerto & tourism.

- Port Security Knowledge
- Prestige in the maritime and port industries.

Following criteria and considering the limited number of experts in the area decided to contact area 13 experts covering the following regions:



Fig. 2. Map of Countries under study

Initially the study included only universe to European ports, however, thanks to the efforts made by contacting various American ports, has enjoyed the cooperation of Spain, Chile, Panama, Costa Rica, Colombia, Venezuela and Argentina, significantly expanding the geographical impact initially considered.

One aspect to consider is that the realization of this survey has been possible thanks to academic character research. Sensitive and confidential nature of the data is a major constraint when conducting surveys on impact issues such as this.

On the other hand, initially, the goal of this research aimed to survey staff crews of ships, but the non-accessibility, whether for security, political or business related to the subject, made to shift the topic applying the selection criteria outlined above experts in order to make a proposal to improve the current implementation of the ISPS (Martínez J. 2011).

Given these considerations, it is considered as the sampling unit each of the ports where it has been surveyed.

### 2.3 Consultation response

The response rate on the number of surveys sent was as follows: 80 % of response received.

To perform an analysis of the implications of the results shall be analyzed in detail the involvement of each of the responses.

A level of existence of the Port Facility Security Plan, the results indicate that all ports respondents have adopted a Security Plan for the protection for its port facilities in accordance with the ISPS.

This percentage would lose significance if not analyzed according to the following result, in which 90% recognize the existence of criteria for considering an area as vulnerable.

Additionally, 70% admit to turn that port areas related to the city have been considered as vulnerable according to the criteria defined by the Port Authority.

As for the Passenger Terminal 60% consider that they meet the security requirements defined by the ISPS Code, which does not necessarily indicate that compliance for the rest of the tourist areas of the port.

While it is true that 60% of respondents recognized that there is compatibility between the normal routine and port security duties required by the ISPS, the remaining percentage indicated. Given that security should be met for all situations in accordance with the requirements of the ISPS is to understand which are necessary to implement measures to improve this significant percentage trying to reduce or mitigate these risks and incompatibilities. i.e figure 3.



Fig. 3. World Trade Centre of Barcelona- Tourisyc Port Facility

Is important to highlight processes at when one is committed, and presents a risk, the potential field which can affect not only reduces the same but all the processes that relate to it either directly or indirectly, can be placed in a vulnerable position to the whole routine activities.

In considering whether the port areas related to tourism, can represent a threat for 60% of respondents believe they can pose a serious risk to port security. This implies that a high percentage agrees to consider such areas as high risk and likely to have incidents. Once verified that we proceed to analyze the risks inherent in that area.

Based on this study is demonstrated that a large part of the ports surveyed do not have control and monitoring mechanisms for public use spaces. This aspect increases the risk in all the possible actions that can be generated through the direct action of a human being, with all the consequences that are deducted.

This factor is increased to analyze the outcome of the question, in which 70% admitted that the security of port areas related to leisure (not including passenger docks but the other areas such as shops, restaurants, etc.) is not linked to the Integrated Safety Harbor.

This leaves an open space for research and that still does not relate the safety of commercial space port (with modal interchanges of goods) to the security of other spaces that belong to the port area (such as those related to leisure and tourism).

In the same vein, there is not any control to address recreational craft (they do sea's tour on the ports) leaving totally unprotected access to other port facilities. Comparing this situation with the airport security, a loophole is evidence relevant to the detriment of protecting the safety of persons, vessels, ports and cities.



Ironically and fortunately, the majority of respondents considered independently of the previous answers that there are criteria that guarantee the safety of citizens while in the port complex.

In this sense, it can be considered as a future line of research in order to identify the degree of knowledge, the real risks and possible implications of an impact on the security of visitors.

In the same context, it highlights the need for further training and knowledge about ISPS and PFSC, because none of its sections provides for the protection of the areas that are port that are intended for tourist purposes, but 80% of respondents stated that the PFSC includes contingency plans for those areas of recreational use in the event of a risk

When analyzing the risk may come from the surrounding areas, 90% believe they are vulnerable and risk focus of the port and its spaces.

Is important to emphasize the vast majority recognizes that there are surveillance cameras and security devices installed in the spaces of these spaces.

But when it comes to prevention, 80% recognized the absence of appropriate technological tools to prevent terrorist attacks. Considering the number of people who annually visit a port with leisure facilities, it follows that the risk in case of terrorist attack can be very large and affects a significant number of lives.

Given the existing security levels in the ISPS, realizing that the maximum level of protection enabled emergency determined in the ISPS (level 3), the response of respondents implies that 50% of the stores and recreational areas would not change their activity in the event of a terrorist threat; indeed, only 70% of cases recognizing the existence of a warning to visitors in case of a threat.

On the other hand it is encouraging that 100% of the claims that there is coordination with different agencies at the time to act in case of attack.

In most cases, the National State would be in charge the security forces followed by the port authority.

Additionally only 60% of cases, the development company or manager of the port city spaces, acknowledges to be doing staff training on port security. This aspect becomes once again highlight the weakness in the field of prevention.

In the case of unaccompanied baggage or packages left that could be considered suspicious, 60% confirm that measures are implemented to manage these cases immediately if they occur.

### **3. Important conclusions of the consultation carried on to the experts**

Attached are the main conclusions deduced from the survey:

- The existing limitation when conducting surveys on the issue of security and port security, given the sensitivity and confidentiality of the data. However the response rate case has been positive with 80% for the initial sample.
- All ports respondents have adopted a Port Facility Security Plan in accordance with the ISPS.
- Only 30% acknowledge a high level of compliance with the plan, while 70% admitted to a medium or poor compliance.

- 70% admitted to have measures on the level of surveillance and control in areas considered vulnerable. Additionally, 90% recognized the existence of criteria for considering an area as vulnerable.
- 70% said that the Port-city areas have been considered as vulnerable according to the criteria defined by the Port Authority.
- 40% of respondents recognized that there are inconsistencies between the normal routine and port security duties required by the ISPS, the same percentage recognizes not fulfill all the tasks set by the protection plan.
- For conducting drills and the existence of cooperation with state bodies, the answer is nearly unanimous. It is recognized that periodic drills and with the cooperation of state security's forces.
- In 70% of cases are considered that are protected:
  - Usage by land and sea.
  - Infrastructures.
  - Communications infrastructure and information systems.
- In terms of vulnerability / protection of areas of recreational use of the port, these are the main conclusions:
  - 60% of respondents felt that this type of port areas may represent a serious risk to port security.
  - 40% of respondents ports have mechanisms to monitor and control what people do at all times when in the port facility dedicated to recreation.
  - 70% recognized that the safety of recreational and tourist areas is not linked to Integrated Port Security.
  - 60% admit to not having control of access for people with weapons to pleasure boats moored in the harbor.
  - 90% considered that the surrounding areas are vulnerable and risk focus of the port and its spaces.
  - Paradoxically, the majority of respondents (80%) consider whether the previous replies that there are criteria that guarantee the safety of people while on this interface port and the city.
- In relation to the degree of knowledge about PFSC and ISPS requirements, a record of the need for further training and knowledge of both, since none of its sections provide for the protection of public use space and yet 80% of respondents said that the PFSC includes contingency plans for public use areas at ports in the event of an attack.
- When it comes to prevention:
  - is recognized by 80% in the absence of appropriate technological tools to prevent terrorist attacks
  - only 60% of cases, the development company or manager of the port city spaces, acknowledges to be doing staff training on port security
- With regard to the parameters required by the ISPS warning if:
  - In 50% of cases, shopping and recreational areas would not change their activity in the event of a terrorist threat at Level 3.
  - 30% of cases have recognized a warning to visitors in case of a threat.
  - 60% confirmed that measures are implemented to manage cases of unaccompanied baggage or packages left that could be considered suspects.
- In relation to the structural security of access and connectivity port structures, the conclusions to note are the following:

- Only 20% say that their land access are very well protected
- In terms of the anchorage and maneuvering areas Donsol 10% confirmed that they are well protected, and 60% say they are poorly protected or unprotected. The same pattern applies for the berthing areas.
- The following sections present the same pattern of results. Most find that they are "sufficiently secured". Only 20% believe they are under-protected or unprotected:
  - electrical distribution systems and computer systems
  - cargo handling equipment
  - commercial port facilities (specialized and multipurpose terminals)
  - container storage area
- In the case of bridges, roads and rail access, 70% do not consider there is a good level of security. Only 30% think that is quite protected and none of the respondents considered this as "Very Sheltered"
- In terms of service vessels and equipment and protective systems and surveillance, whose authority belongs to the maritime authorities of the countries despite evidence that a higher level of protection (60% and 80% respectively), cannot be that is at the level required by the legislation.
- In the waters adjacent to ports, 50% believe they are little or no protection, 40% consider a level of protection means and a minority of 10% is considered as very secure.
- It's very important to emphasize that analyzing information by geographic area to which the port belongs dispersion and disparity found in global responses are repeated to be analyzed geographically. That is, different aspects of different degrees of compliance according to the different areas however cannot be said that an area is "more secure" in general terms than another (Martinez, 2011).

#### 4. Preventing measures

One of the best ways to prevent more attacks and attacks on ships is precisely the training of personnel of both ships and ports, which is why the ISPS establishes the obligation to train in specific courses to the actors in this business.

Among them we have:

- Training course for Port Facilities Security Officers
- Training course for Ship Security Officers
- Training Course for Company Officers

These courses are instructed in basic standards of protection for each measured preventives and action in an emergency at different levels has been set in the ISPS.

Moreover, in the specific case of the cruise companies must have action protocols for any additional emergency, such as unaccompanied packages, suspicious people both in port and by ship, measures that allow the passage the crew report any approach that considers normal on board, review and inspection of security equipment.

One of the most important measures for prevention are the drills with This accomplishes several objectives:

- Passenger awareness of the importance of the security the ship
- Playing much like the real action protocols ruled the ship's security plan.

- Having the information of the reaction time and assess the possible implications and improvements to be updated immediately.
- To quantify the degree of knowledge of the crew to a contingency.

Of all the above points which I consider more important is the awareness by the crew and passengers of the importance of comprehensive security of the ship and her starring role on the detection of any possible threat.

## 5. Conclusion

When talking about security and the tourism industry, cruise ships take primary importance as vectors of a large number of people who enjoy the ports and cities.

Ironically port cities as models adapted from "port-city relationship" are not formally integrated in the ISPS, but on the contrary, its internal regulations are protecting these people who enjoy recreational activities in a port.

The threats are real; there is evidence of several bombings and attacks on the ports, as well as the intentions of terrorist networks to attack the port facilities.

The idea is not to create unnecessary alarm, but be on guard against any loophole that has the current security system, which could jeopardize the most important thing there is: human life.

There are many regulations, measures, policies to protect the comprehensive security of cruise ships, ports, tourist areas of port facilities, however, no regulation, all in accordance with the needs of each port.

The standardization of regulations, to create a sense of minimum protection, however, the commitment of local authorities as extremely important, as are the real connoisseurs of the manners and customs of this place.

Safety requires collaboration definitely unrestricted throughout the industry, all players are invited to contribute part of its mission to ensure security.

One of the factors that help and is very important in these cases is the existence of port and logistics communities strengthened, and that based on them, it is easier to create mechanisms of collaboration and rapid response to security forces, and regular training to help workers in the industry know how to react to any eventuality.

In short, security is of utmost importance and effort depends directly on the concatenated all businesses, law enforcement, but especially each person serving in any role, this conglomeration of the tourism industry.

This proposal, based on research, has the idea of precedent among other things, show that the academic-research can and should collaborate in developing proposals that will not only focus toward the traditional trading port, but also focused on new and modern opportunities of sustainable development represents a port for the cities that surround it, which are today known as "Port Cities".

Beyond the figures, the number of TEUs or tons per year, the ports, have a great interaction with people through the tourist industry, which undoubtedly comes from the same source port. As is well known, near the ports, were located the main squares of cities and the

commercial heart of time, being since ancient times, places vulnerable not only to the economies of those cities but for their people, since most daily activities of citizens were developed around the harbors.

With this concept of port cities, it takes the original sense, after the modernization of ports, resulted that these compounds develop purely commercial & logistics activities and gave him back to the city, shutting down their access, limiting visibility even of cities to the seascape.

In this sense a fundamental aspect to consider, which facilitates the proper treatment of the spaces of the tourist or recreational use of the port, is to understand the complexity and variety of conditions that have these areas for processing, which are advantageous to time for inclusion in the PFSC:

- Are limited and circumscribed,
- Not all ports have space for public use or are not qualified as such,
- Have severe restrictions
- They are marked by the topography of the sites,
- They have historical memory and architectural heritage quality and attractive to tourism.
- Meet two emblematic elements: earth and water.

With site-specific differences, worldwide socioeconomic these complexes seem to be moving toward awareness and the need to generate changes in the direction of urban policy to promote a new model of physical organization otherwise accompanying the complex conditions of social and economic development.

Thus, as port companies have led to complex social phenomena taking place transfers of activities between the city and harbor, including regional and international scope due to the nature of the tourism insight.

In this line and as a result of the transformation and modernization in the scale and technology infrastructure of these complexes and the greater importance to the economy of the international relationship between touristic cities, the port territory has become one of the most evocative of urban contemporary.

This space is now preferred, has become the venue in the cities for the location of business centers, shops, residences, hotels, museums and areas of recreational and cultural events, determining a trend that is accentuated and thereby permanently, which today can be considered one of the main causes of growth and development in a large set of cities, is the weight of the transformation of their port renewal areas, so that you can even say that the hope of many cities damaged, it is precisely in the conversion of the port areas.

However, after the fateful 11-S, the security measures in all aspects, were reinforced and become effective, international laws to ensure protection, first of all shipping to the United States, which immediately were taken by the most countries in the world.

With the entry into force of the ISPS, security measures are restricted only to commercial terminals, even we must recognize that higher priority is given to these measures in the traffic of any port in the world to the United States, and in some cases detracts from the Ports own security outside that territory.

If we talk about the initiative CSI (Container Security Initiative), launched in 2002 by the U.S. Bureau of Customs and Border Protection (CBP), an agency of the Department of

Homeland Security, in order to "increase security for containerized cargo shipped to the United States" is intended to "extend the area of external security that American borders are the last line of defense and not the first." (Martinez, 2011)

This assertion can extract multiple reflections, which confirms that these agreements were initially prioritized the protection of U.S. ports, and over time have been extended to the rest of the world so it is fair to point out that the European Union also made likewise creating the ESCS (European Supply Chain Security) and as an example, this initiative in Spain has been called the "Secure Logistics Community," which means not only bring security to the port areas but extend to all steps in the logistics chain, from supply plants to modal transfer points, as a platform for promoting and improving the security of the supply chain, which promotes trade and logistics and agile safe through compliance of international customs regulations and the application of international best practice safety in World Trade.

Understanding both the phenomenon of conversion of port, the various legislative initiatives in international port security and the results of the survey in this study, we should note the following:

- First, the great lack of knowledge beyond the Port Authority in Global Business Integration Port, i.e the entities that share services in the ports, not all know the implications and dimensions of a port as a whole, majority being the ancient doctrine that the ports were limited to commercial premises where the transfer occurred modal cargo or passengers.
- Second, all respondents felt it necessary to include public use areas in Port Protection Plans (PPP), extends the scope of the scenarios in case of increasing the level of security at the ports.
- Thirdly there were many deficiencies in the current application code itself, leaving open for future research, improvements in implementation thereof, and in particular in relation to visitor use areas, should devise mechanisms to integrate existing security plans to unify and standardize the protection of the entire port system.
- Fourth, and related to one of the questions on which further wanted to start this research has shown that the tendency of the Port-city: USOA entertainment, catering, passenger ships, considering the domestic tourism and outside, and the Safety and Security Port System they are compatible, as long as you start developing plans concatenated without affecting any other trend, i.e that the recreational use of certain port areas will not endanger the safety enclosure, and the protection of commercial space (terminal) do not leave the city without the possibility of converting obsolete spaces in modern socio-economic complexes, which are perhaps one of their few opportunities to generate employment and wealth.

To achieve protection of the port shall:

- Define all relevant areas for port security areas including tourism and recreational use;
  - Coordinate measures for areas with different characteristics from the point of view of protection.
  - Determine an organizational structure that contributes to improving port security.
  - Establish, on whether case varying measures of the different parts of the port, changing security levels and information obtained from the intelligence services.
  - Join the developers (restorations & leisure's companies) to the Port's plans drills for increase the security.

- Evacuation drills in port areas intended for public use.
- Provide all areas of security cameras and create (if not exist) a security team to allow monitoring at all times human movement in these areas, with the intention of ensuring peace and enjoyment of people, which keeps the flow of tourists and customers to these spaces.
- Placing warning mechanisms that allow citizens to inform authorities and enforcement authorities of the presence of suspicious packages or abandoned, because in these places is not always easy to access safety equipment, assessing the cooperation of citizens to prevent possible incidents.
- In the event that citizens have ports docks with yachts, or, on the other hand, harbor tour boats travel (example in Barcelona of the Swallows), find ways to prevent access to material or armed persons suspect in these vessels, preventing water mobility take advantage of any possible threat.
- On the other hand, we must maintain a permanent monitoring of the security of the port, based on strategic planning in order to get feedback, using their own experiences and alien to meet this objective.
- Based on the research of the author intends to create a study commission between the Maritime and Port Authority with recreation development company of the Ports, and the authorities of the port cities, to bring all the security measures they deem appropriate under the particularity of the region-specific ports, as this will allow each port integrated PFSC, according to its specific own security measures and protection that are useful and necessary.
- This fee must design study of specific plans added to the port facility security plan, taking a global view of the port facilities in order to achieve efficiency in following minimum security measures to protect human beings in the areas surrounding recreational or leisure of the ports.
- It is very important that these plans be developed in conjunction with national security agencies, states and / or municipalities, depending on the territorial organization and legislation of each country, and be under constant observation in these areas as well as providing areas farthest from the technological means to respond swiftly to any threat arising in the port city, given the number of lives that travel on it.
- In line with all previous initiatives should be developed and training plans covering all active figures involved in the port and city relations, with the aim of ensuring a proper process of prevention beyond the emergency action.

The idea is that this proposal should adhere to the Port Security Plans, being the most easily in its modification and implementation, as well as the last link in the security chain and in the face of users ports, which allows these adjustments have a direct impact on achieving greater security for citizen's ports.

It should also be included in the concept of interface to all areas within the port are being related to the enjoyment of human beings in their facilities and linked to the development of surrounding communities and the marina, and with this step legally protect these facilities, which would lead to the inclusion of various measures in the port security plan that can protect citizens ports.

To this must also update the entire platform technology security and protection of these areas, which would generate greater control of possible emergencies, and taking into account that

most respondents agreed that their ports do not have the ideal technological protection can be consider that this is also an important point to be agreed improvement in the system.

Moreover, taking advantage of the entry into force of the legislation governing the voluntary audit request by the member states of IMO Resolution: A974.4, adopted on 1 December 2005, at paragraph 19 of the order of day, this regulation will allow states to voluntarily request to audit their management systems (in general) and management of maritime and port security, so that the proposed improvements will help even these audits are overcome every day better conditions, highlighting the improvements in areas that present safety and security do not understand how the citizens port security, and these areas from which you can access port facilities if included, in this way, all that can be added to local marinas with space for public uses, can be evaluated through audits, generating a feedback and evaluation process, which will at all times ensure excellence in the system.

## 6. Acknowledgment

I would like to give a special recognition to the experts who have contributed to this study, thanks to them, the assumptions have a theoretical level, have been confirmed including the conclusions drawn from research, can have a real information, contact live with every day of those people that live in the premises for the attention of tourism, motor development of many port cities.

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## **Section 2**

### **Tourism Industry – Sustainable Development**



# Heritages and Transformations of Agrarian Structures and the Rural Tourism Dynamic in the Czech Republic

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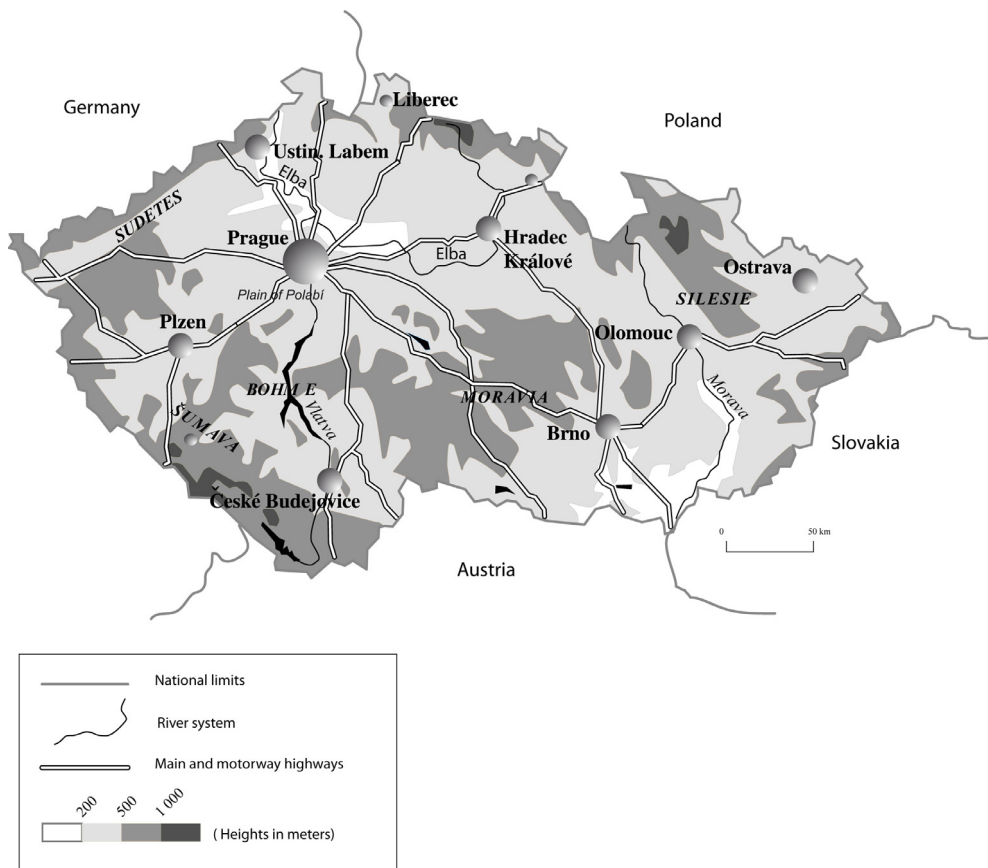
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## 1. Introduction

Since the early 1990s, understanding the evolutions of the countryside has been of central importance to an analysis of transformations in the economic fabric of the Czech Republic. The major political rupture of 1989 and the country's accession to the European Union in 2004 provoked a wide variety of responses to new market demands (Zrinscka, 1997). The deep social and cultural changes, partially legitimated and accompanied by domestic and European political projects, modified both the uses to which the Czech countryside was put – indeed, it was increasingly affected, to varying degrees depending on the region in question, to residential use, leisure and tourism – and society's views on rural areas themselves. The new uses of the countryside have, to varying extents, transformed local socio-economic systems by orienting a percentage of rural employment, previously dominated by agriculture, towards tourism. While tourism in the Czech countryside is not a new phenomenon, the socio-economic integration of rural areas by means of tourism is now reflected in a markedly increased capacity to accommodate visitors. This process goes hand in hand with improvements in communication infrastructure and the diversification of the offer of tourist products. It is based, particularly in the commercial sector, on a service economy which, at the same time, it helps to boost.

Today, at the national level, the tourism and leisure dynamic is marked by strongly contrasting spatial characteristics. Of course, while the differentials between the potential of the countryside and regional cultural heritages are often vital, they do not, on their own, constitute the answer to questions that must take into account other territorial factors (the proximity of the clientele; accessibility to markets; the specific nature of the social, cultural and economic structures of particular regions; the degree to which various actors are involved, etc.). Factors linked to the transformation of agriculture play an important role in a country in which tourism, seen as an aid to overcoming the farming crisis which followed the transition from Socialism in 1989, is closely linked to agriculture, which continues to serve as a pillar and a motor. Due to the strength of this link, tourism has been and continues to be highly sensitive to changes in the agricultural sector. The objective of this

article is to analyze the impact of these transformations on the way in which Czech tourism is now structured. Initially, a summary of Czech tourism will be presented in an attempt to understand the main factors on which it is based. Secondly, we will examine various agricultural and tourism dynamics with a view to analyzing the links between the two activities and understanding how they are articulated.



Map 1. Czech Republic

## 2. The function of tourism and spatial contrasts

In the Czech Republic, as in most European countries, leisure has become, along with health, one of the areas in which expenditure has increased most rapidly. In terms of volume, expenditure on leisure rose by a factor of six between 1989 and 2006,<sup>1</sup> significantly more than the 150% increase registered in most Western countries. At the same time, thanks to the fact that the buying power of Czech tourists has increased substantially since the fall of Communism and that many wealthy tourists, essentially from Germany and Austria, are now visiting a country which is cheaper than their own, the leisure industry has, on a year-by-year basis, grown significantly. Thanks to the current popularity of green issues, the Czech countryside is now able to position itself in a rapidly expanding tourist market. Examples of this trend include not only the relatively small increase in the number of traditional tourist facilities such as hotels, but also, and more importantly, to the sharp rise in the number of farms involved in agro-tourism and other forms of rural tourism.<sup>2</sup> That said, not all of the Czech Republic's rural regions are outstandingly attractive, and while these dynamics tend to be spatially extensive, they differ from region to region.

### 2.1 The number of tourists varies from region to region

The intensity of tourism is a very useful indicator in terms of gauging the degree of involvement of the Czech countryside in this sector of economic activity. The notion corresponds to the number of overnight stays per 10,000 inhabitants in a specific geographical area. That said, one must be certain of the kind of overnight stays in question: some statistics include non-hotel accommodation (*gîtes*, refuges, camping sites, youth hostels); while others do not. However, such official statistics often overlook various kinds of tourism. For example, in the Czech Republic, there are a large number of second homes – known as *Chalupas* – located in the countryside. In the Socialist period, such homes were generally small, rustic buildings with modest gardens, constructed by their owners, the equivalent to Russian *datchas*. Tourist intensity merely reflects official, national and international figures, which artificially accentuate differences between various regions. In effect, if tourist intensity appears to be very high in some of the country's western regions and very low in others, this is because official tourism, the only kind for which statistics are kept, is more concentrated than the kind of non-hotel-based family tourism characteristic of certain rural sectors.<sup>3</sup>

Tourist activities are articulated around certain extremely popular destinations, leaving vast tracts of countryside unexploited. This phenomenon reveals highly pronounced spatial contrasts emphasizing the marginalization of vast rural tracts in the eastern, industrial part of the country. In the Nový Jičín and Ostrava regions, where the old mining and manufacturing industries, which are now in deep crisis, have left their mark

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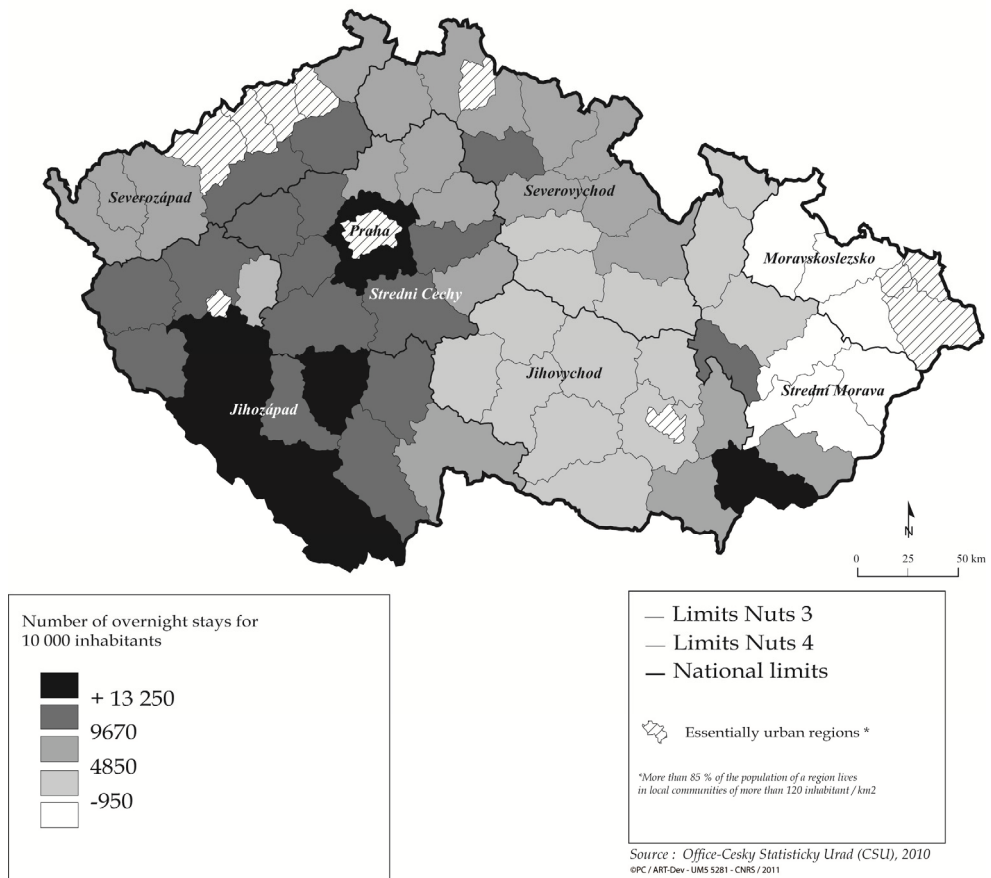
<sup>1</sup> Office-Cesky Statistický Úrad (CSU), Employment Dossier, 2006.

<sup>2</sup> Office-Cesky Statistický Úrad (CSU), Economic Dossier, 2006.

<sup>3</sup> While elaborating our initial map of tourist intensity, we have, in order to make up for this statistical deficit, modified official figures by using a decimal logarithm, in order to attenuate contrasts and take into account certain tourist sites which, although they attract less visitors, are nevertheless significant in regard to the national average. Here again, the context is very different from one region to another, and can be affected by the way in which statistical information is collected.

on the countryside, the number of overnight stays per 10,000 inhabitants is a little over 900 per year.

Elsewhere, while there is little tourism beyond traditionally popular areas, urban zones and a few outstanding sites (Bohemian Paradise Lake, for example), tourism increases in intensity the nearer one gets to the country's western borders. The regions around Prague, the veritable engine of the Czech tourist industry, have long attracted visitors. In the regions of Beroun, Praha-zapad, Praha-Vychod and Nymburk, tourist intensity is high, with occupancy rates often surpassing, in the communes with the best links to the Czech capital, 20,000 overnight stays per 1,000 inhabitants per year. The same is true for Moravia's traditional tourist areas which, with approximately 30,000 overnight stays per 1,000 inhabitants per year, have a comparable effect on the local socio-economic fabric.



Map 2. Tourist intensity in Czech Republic in 2010

In spite of their modest altitude, the Hercynian Mountains in the Polabí agricultural basin in the Liberec region were, largely thanks to their continental climate, developed as a winter sports destination by the Socialist regime. Indeed, they rivalled, and continue to rival, facilities in the snowier mountains of central Europe (the Polish Carpathians, the High Tatras in Slovakia). Of course, while the transition from socialism to post-socialism had a profoundly destabilizing effect on facilities less able to deal with the growing demands of the clientele, the substantial investments accorded by European and Czech institutions (the Ministry of Tourism and Development), local authorities (Regions, Municipalities) and large German industrial groups have created a range of modern hotels far better able to meet the standards of contemporary tourists, most of whom are from Austria and Germany.

## 2.2 A tourism offer in the process of diversification

With a longer history than winter sports, spas and climatism, which essentially date from the mid-19<sup>th</sup> century, continue to attract visitors to the north-west of the country (the Hradec-Kralové region) and to the southern part of the Czech-Moravian Highlands. As early as 1920, the Elbe Valley attracted over 80,000 visitors per year. Indeed, enthusiasm for these activities never waned, even during the Communist era, when Party leaders came to relax with their families at the Kuks and Dvur Kralové baths. Since the change in the political system – and partially thanks to EU pre-accession structural funds such as SAPARD<sup>4</sup> and the LEADER<sup>5</sup> European Initiative Programme – major development projects have transformed and modernized spa towns, considerably diversifying their tourist offer.<sup>6</sup> At Marienbad and Karlsbad in northern Bohemia, which boasts the country's oldest baths and the ones busiest during the Socialist period, demand from foreign tourists and an injection of Western capital has boosted the sector. In the Giant Mountains on the Polish border, it is baths specializing in the treatment of illnesses such as rheumatism, which, supported by domestic public-sector policy, have experienced the highest degree of development. In southern Moravia, market demands have obliged local actors (politicians, associations and entrepreneurs) to offer, in their establishments, mixed services (leisure and health) in order to develop parallel markets and boost their clientele. Lastly, in the south of the country and in the White Carpathians, where the country's oldest thermal baths have suffered long-term decline, a substantial architectural heritage and the availability of specialized labour has, thanks to public aid, made it possible to partially reorient services towards new health and social sectors (centres for handicapped people, specialized geriatric centres).

Green and nature-based tourism play a role of central importance in the Czech tourist industry (Majerová, 2000). As in many European countries, changes in consumer habits on the part of the clientele have provided new opportunities to develop forms of tourism more closely associated with the environment. A diverse range of services is offered,

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<sup>4</sup> One notable objective of the pre-accession SAPARD programme is to resolve priority problems linked to the long-term adaptation of the economies of candidate countries and to help them implement the Community *acquis* by emphasizing the Common Agricultural Policy.

<sup>5</sup> Liaisons Entre Actions de Développement de l'Economie Rurale

<sup>6</sup> As well as the LEADER programme funded by the European Union, there exists a Czech LEADER programme funded by the State and directly managed by the Ministry of Agriculture.

albeit with a clear emphasis on *gîte*-style establishments. Here again, according to a pronounced east-west gradient, the offer in *gîtes*, *chambres d'hôtes*-style guest houses, and other types of farm hostels is largely located in the west of the country (Šumava), and in a few scattered areas in Moravia and the Sudetenland. All these areas boast outstanding agricultural landscapes and picturesque natural sites, and offer a range of open air activities (rambling, cycling, equestrian sports, white water rafting, etc.). Teaching farms are also popular; indeed, almost one agro-tourist farm in five<sup>7</sup> has, over the course of the last few years, become involved in providing this type of service. Most such farms are located in the provinces surrounding Prague and Brno.

### 3. The links between tourism and agriculture dynamics

Since the early 1990s, rural tourism has been closely linked to agriculture, either directly, with farms being used for agro-tourism purposes,<sup>8</sup> or indirectly, by means of support and promotion for local products. Indeed, agro-tourism plays a significant role in rural tourism. Generally speaking, in 2005, agro-tourism accounted for over 40% of total occupancy in the Czech tourist industry. In the country's most westerly regions, the occupancy rate was well over 70%. Indeed, in the Klatovy region near the German border, agro-tourism accounted for 80% of the occupancy rate. Due to these close links, rural tourism has been and remains highly dependent on the evolutions of a rapidly evolving agricultural sector. Breaking with the collectivist system which had provided the framework for its development for almost fifty years, the agricultural sector underwent a process of decollectivization which impacted farms, production capacity and the diversification of rural activities in a brutal and sometimes destructive way (Majerová 2000).

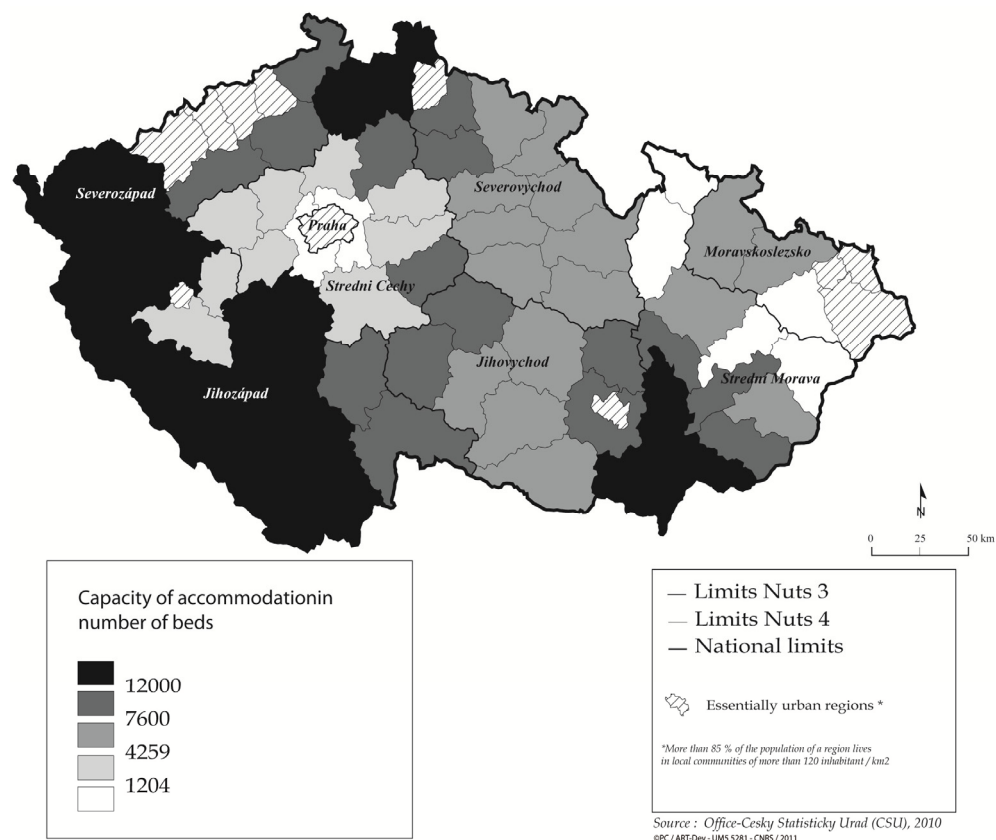
In the second part of the article, the potential links between agricultural and tourism dynamics will be examined with a view to understanding how they are articulated. A multi-variant analysis based on a series of tourism and agricultural indices will be applied to establish a map of the Czech Republic in function of the links (or lack of links) between agriculture and tourism. The ensemble of spatial analyses on the basis of which this typology has been developed combine the following criteria:

- The number of employees per agricultural and tourism enterprise (in 2005) and an evolution per 100 inhabitants between 1995 and 2005.
- Type of tourist structures (traditional hotels, agro-tourism structures) and farms (size in hectares) and their evolution between 1995 and 2005.
- Productivity of farms and areas in which they specialise.
- Agricultural and tourism revenue.
- Number of independent workers, entrepreneurs and employees, and whether the jobs in question are full-time or part-time.

<sup>7</sup> Office-Cesky Statistický Úrad (CSU), Agricultural Survey, 2006. In the Czech nomenclature, teaching farms are farms which have signed an agreement with schools and social establishments.

<sup>8</sup> In the Czech nomenclature, agro-tourism services refer to tourism and leisure services provided by one or more agriculturalists or members of an enterprise whose headquarters is based at a working farm (in the legal sense of the term). These services concern renting rooms (*chambres d'hôtes* and *gîtes*) and a range of services including teaching farms and catering.



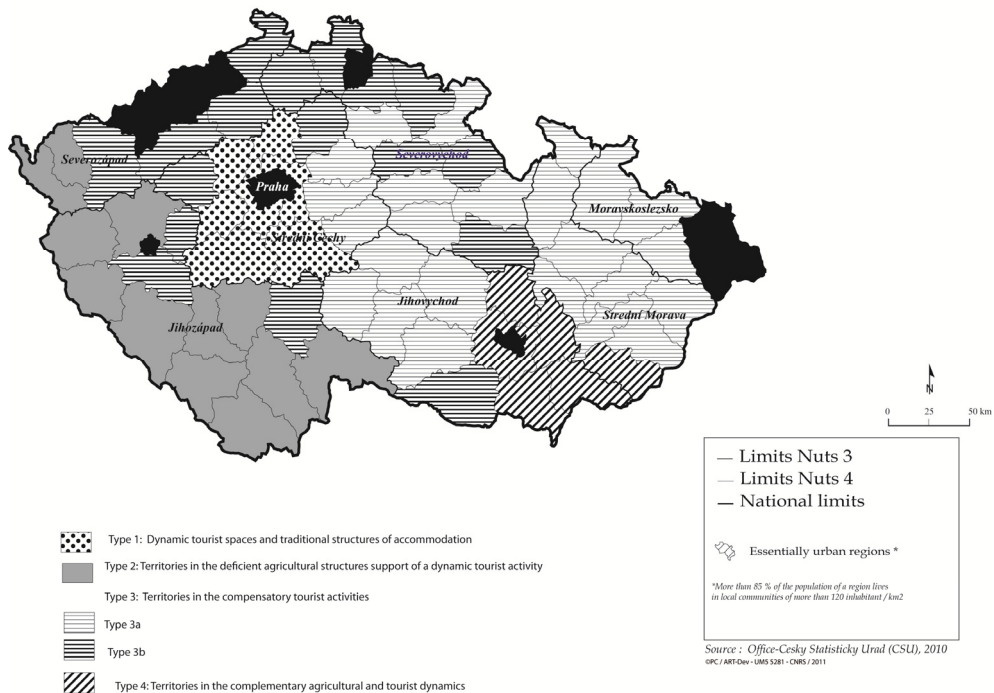


Map 3. Capacity of accommodation (hosting) of the establishments of agrotourism in Czech Republic in 2010

### 3.1 Central Bohemia: A tourist dynamic independent from agriculture

In **Type 1** establishments the correlation between the tourist dynamic (expressed in terms of occupancy rates) and the agricultural dynamic (expressed in terms of production value) is one of the lowest in the country (0.29). Tourism, largely independent of farms, is above all oriented towards leisure in relatively traditional establishments such as hotels and hostels, and in social tourism centres (youth hostels). In the highly fertile Polabí Basin, the agricultural sector, which has been modernized, has never provided any kind of service to the tourist industry. A highly profitable sector in which income has risen fourfold in the last ten years, agriculture in the region has never looked to tourism to boost its earning capacity.

Map 4  
Links agriculture / tourism



Map 4. Links agriculture/tourism

### 3.2 Sumava: Rural tourism replacing an agricultural sector in crisis

In 1998, tourism in **Type 2** establishment was the heart of economic activity for over 78% of farmers. Tourist services were introduced not so much to diversify agricultural activity with a view to compensating for lost revenue, but simply as a means of developing tourism *per se*. In effect, most farms function according to a commercial logic based on generating profit almost exclusively from tourism. Agriculture, a marginal activity deeply affected by the privatization of State farms, has been largely supplanted by tourism which. Indeed, tourism not only benefits from both natural and man-made advantages (mountainous regions, the wealth of local heritage and culture) but also from the proximity of Bavaria. The relatively unfertile nature of the land having forced farmers into systems of extensive cattle rearing, agriculture often serves merely as a status symbol or a shop window for tourist activities. With a correlation coefficient close to 0.80 between the evolution of the value of agricultural activity and the growth in value of tourism (in volume), agricultural productivity is inversely proportional to that of tourism. While 89% of intensive production units (which account for only 9% of farms) are not involved in agro-tourism, 92% of the most extensive holdings are taking an intensive approach to developing additional tourist services.

In peripheral areas emptied of their German minority populations after the Second World War and repopulated by Czech colonists, the State took it upon itself to promote regions which, while not blessed with areas of outstanding natural beauty, played an important role in controlling the border. In 1989, giant State farms were broken up and taken over by private companies which took on responsibility for managing real estate and non-real estate assets in a region in which there were few requests for the restitution of farm land (the former owners, of German origin, having been expelled). Relatively harsh environmental conditions militated against the creation of individual farms. A large number of companies (most of them specializing in rearing cattle for milk) rapidly fell victim to economic realities. From 1995, poor agricultural yields, financial difficulties and the limited possibilities of economic reconversion led to a large number of farms going bankrupt and selling their production tools to individuals more interested in the potential of architectural and real estate heritage (which had not been destroyed by the Socialist regime) and the region's proximity to Bavaria (a source of tourists), than by its agricultural potential. Today, this heritage, rehabilitated and transformed, partially thanks to the EU's LEADER+ programme<sup>9</sup> provides a range of tourist services, including accommodation, visits to teaching farms and catering.

### **3.3 The Czech-Moravian highlands: Rural tourism designed to make up for lost revenue**

Although a substantial number of farms are involved in tourism, an activity which can be decisive in terms of their survival, in Type 3 establishments, agricultural production is both their *raison d'être* and their main source of income. Here, farmers aim to generate additional revenue, either because income levels have dropped, or because the needs of households have increased. Generally speaking, farmers are primarily motivated by the need to generate fresh revenue enabling them to keep their money-losing farms in business. Sceptical in regard to the Common Agricultural Policy, which proved difficult to adapt to the intensive model after 1989 (a small decrease in the number of people working in agriculture, low added value in terms of production), destabilized by fluctuating yields, and in the absence of sufficient capital to invest in the most profitable production units, Type 3 establishments express a desire for autonomy vis-à-vis global economic approaches which escape them. Two sub-categories can be observed.

- *Type 3a:* While in the most efficient agricultural areas, modernization based on the dominant model of intensive production has been carried out at the price of a substantial decrease in the number of people working in the sector and a selective relocalization of production units, the weakness of natural yield and of substitute

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<sup>9</sup> Introduced in 1991-1993, the EU's LEADER 1 initiative, which, at the time, has 12 members, was initially renewed within the framework of the LEADER II programme for a further five years (1995-1999) in the form of pilot interventions designed to stimulate innovative approaches at the local level, and renewed again in 2000 with the name LEADER+. The programme was gradually rolled out to new member states as they joined the Union. The LEADER initiative takes an innovative approach to the development of rural areas in Europe. Its originality resides first and foremost in its decision-making processes and the projects which derive from them. Using a bottom-up approach, the LEADER method is based on principles of subsidiarity and partnership. Decisions concerning local development strategy and individual projects are taken by bodies located as close as possible to the sites in question.

activities in industry and services means that the problem of agricultural over-employment has only been partially resolved, and a large number of small farms, most of which function in a quasi-autarkic manner, continue to function. These small farms (of an average size of 8 hectares)<sup>10</sup> generate a relatively low level of income (less than €4,000 per year on average). Many of them are obliged to practice a form of relatively unprofessional agro-tourism benefitting from little external support. The objective of such establishments is to generate additional revenue from tourism, applying a development strategy based on the diversification of products and clients with a view to protecting themselves against the ups and downs of the agriculture industry. Sometimes designed to cater to the needs of the family, sometimes to generate additional revenue through tourism, these structures tend to function on the individual plot model developed under the Socialist system and to encourage very small-scale agro-tourism (Kučerová, 2004), the dynamic of which remains extremely limited.

- *Type 3b*: The regions adjacent to the country's northern border experienced the same series of events as Šumava: the expulsion of the German population, forced collectivization, and the introduction of State farms which marginalized independent farmers on a long-term basis and led to an increase in the number of part-time enterprises. In these last, a form of agro-tourism which, although relatively incoherent and unprofessionalized and only occasionally capable of taking the reality of local markets fully into account, seems, unlike Type 3 establishments, to provide the basis of an activity which, over time, has acquired a specific structure and the ability to diversify. In the regions benefitting from major amenities and a location nearer to the border than Type 2 establishments, occupancy rates have risen considerably since 2000. While the tourism dynamic is still relatively weak, accommodation services are increasingly viewed as part of an innovative strategy applied by agro-tourism entrepreneurs who no longer see agriculture as an entirely profitable business in its own right. At the same time, with the emergence of new localized extensive farms essentially raising cows and sheep, this form of tourism is part of the "re-activation" of a link between the territory and its products (by means of the development of qualitative strategies and the promotion of *terroir* products) which was undermined, during the Communist period, by State farms, but rendered possible by the collapse, in the liberal economic system, of the intensive agricultural model after 1995.

### 3.4 A strong correlation between agricultural and tourist dynamics in southern Moravia

**Type 4** establishments are characterized by a significant positive correlation (+0.67) between an agricultural dynamic (production value) which is relatively favourable in economic and social terms (a small decline in the active agricultural population and the maintenance of levels of productivity), and a development of rural tourism (in terms of the number of visitors) largely focused on agro-tourism. In this region, faced by problems of industrial standardization based on the intensive model, a technique frequently applied in the most fertile areas of the central part of the Morava Valley but not used in a large

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<sup>10</sup> In 2005, the average size of a farm in the Czech Republic was 26 hectares; however, more than half were under 10 hectares.

part of the region (foothills, central hilly areas), more original forms of production were implemented after 1989. Inherited from the few very small private farms that had avoided collectivization (and which already constituted, long before the events of 1989, an alternative to the cooperative, intensive agricultural model), these original approaches are often central to local tourism.<sup>11</sup>

In the context of economic globalization, both in terms of production and consumerism, in Type 4 enterprises, there has been a spectacular comeback of extensive agricultural production techniques. While in spite of the fact that, due to their still relatively high production costs, Type 4 enterprises have little hold on national and international markets, they are now part of the local tourism dynamic of which they constitute the foundation and from which they derive substantial economic benefits. In this context, local specificity is sought by means of a process of *co-development* involving both agriculture and tourism based on family smallholdings, local resources both human and material, the elaboration of competitive advantages associated with processes of reterritorialization, and the promotion of territorial externalities. This translates into a modification of the notion of the seal of approval, with a broader and more efficient territorialisation of local products. These new links with the territory can assume a variety of aspects ranging from a simple reference to the area in which products are grown, to a closer association with or even an integration into the geographical area in which goods are produced or services delivered. An example of this is the Wine Road in southern Moravia which has, on the one hand, helped to dynamize and professionalize the regional hotel offer, and, on the other, to relaunch wine production by reintroducing direct sales and wine outlets. In all these approaches, the notion of authenticity plays a central role, as it is associated by tourists with local Moravian culture, local people, local products, nature, etc. In this perspective, even if rural areas no longer automatically correspond to the agricultural world, in terms of image, agriculture nevertheless plays an important role in the way in which tourism and heritage are articulated. This context, theoretically favourable to agricultural diversification through tourism, places new demands on farmers, whose place in society has changed substantially.

#### 4. Conclusion

Rural tourism is not a new phenomenon. The socio-economic integration of rural areas by means of the development of tourism is today reflected in the increase in the number of beds available to tourists, the renovation of hotel infrastructure, and the rise in the number of *chambres d'hôtes*. Accompanying improvements in infrastructure and a substantial diversification in the offer of tourist products, it now provides a dependable support mechanism for a service economy which it simultaneously helps to boost.

The evolution of consumer habits in terms of choice of rural accommodation, occupancy rates and, above all, the growing interest of agricultural communities in agro-tourism – financially more remunerative than agriculture, a sector profoundly destabilized by the change in political system in the 1990s – have led to a partial conversion of village

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<sup>11</sup> Doucha (Tomáš), Divila (Emil) and Fischer (Michal), « Land Use and Ownership and the Czech Farm Development », in Floriańczyk (Zbigniew) and Czapiewski (Konrad) (eds), *Rural Development Capacity in Carpathian Europe*, Vol. 3, Rural Areas and Development, Warsaw, 2005, pp. 139-152.

economies to tourism and leisure. The rising number of *chambres d'hôtes* in country villages and the development of new forms of agro-tourism, linked in part to a significant increase in the numbers of foreign tourists, estimated at 30% of the total, and whose development factors are often characterized to a greater degree by a particular agricultural and social situation than by more traditional economic and environmental considerations, are today largely responsible for the growth of a kind of tourism marked by a distinct lack of professionalism. A large majority of actors in the agricultural sphere launch themselves into the tourist sector, managed and organized in an entirely different way from agriculture, with either little or no training.

The typology presented above makes it possible to analyze the links between agriculture and tourism. These links can be represented according to a clear east-west gradient; to regions whose dynamics are “independent” the one from the other (Silesia, the Central Moravian plateaux); and to areas in which the two sectors are closely associated with one other (Šumava, Sudètes). This typology, which highlights the existence of contrasting dynamics and relatively close links between the two sectors, is based on a series of different criteria. Some are environmental, concerned both with agricultural potential which, when it is relatively weak, can encourage the practice of palliative agro-tourism, and with the introduction of a whole series of improved amenities (landscapes, local cultures, etc.). The unequal distribution of these factors – or, in other words, nature, the quality and abundance of amenities that can be promoted by agriculture or tourism or both – logically generates a differentiation in the dynamic of various regions, not all of which have the same advantages. That said, the development of the tourist sector is equally correlated to the potential to highlight such factors by introducing adequate facilities and services. Generally speaking, what attracts tourists to a specific area is often a combination of the natural and the artificial, or, in other words, the activities potentially offered by a combination of different facilities. But all this should be addressed by means of a complex analysis involving a number of extra-recreational factors, both negative and positive (fashion trends in agro-tourism, for example).

Other factors are linked to the positioning of specific areas in relation to the rural-urban continuum and to how easily accessible those areas are. Based on “support” farms whose productive output is generally negligible compared to profits derived from tourism (notably in the west of the country), these benefit from the proximity of Bavarian and Austrian cities which provide a steady flow of tourists. Generally speaking, the further away from such cities, the less tourists there are due to factors such as distance and time, distance and price, and distance in terms of the (relatively poor) quality of transport infrastructure.

Other factors are linked to real estate. For example, even though the renovation of agricultural buildings and their conversion into *gîtes* is part of a drive to safeguard architectural heritage, its primary purpose is to increase their economic value. Here again, the unequal distribution of architectural heritage, sometimes conserved by the Communists in the least “agro-economically” profitable regions, and sometimes destroyed or transformed as part of the development of giant farms, also introduce an important differentiation in the Czech tourism dynamic, since it would not be true to say that all the country's regions possess an architectural heritage worth saving.

Lastly, other factors are linked to the social structures of rural territories, particularly those in the agricultural sphere. The 1989 transition and accession to the European Union had a profound, long-term effect on agricultural society which, in a new, liberal and competitive economic context was suddenly faced by the problematic of profitability. While in the most fertile areas – those best suited to the intensive model – agricultural production techniques could be modernized in a relatively short space of time thanks to EU funding, elsewhere, in the country's easternmost provinces, the issue of agrarian overpopulation and of the economic viability of farmsteads, which has still not been resolved, is partially occluded by the development of a kind of "default" tourism the future of which is often uncertain.

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# Using Weather-Related Derivative Products for Tourism and Hospitality Businesses

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## 1. Introduction

Weather risk is a crucial element of overall risk management for a wide variety of businesses (Cao, Li & Wei, 2003) in energy, agriculture, food, tourism and hospitality sectors. Particularly, hospitality businesses such as hotels, restaurants and cafes are highly vulnerable when faced with unexpected weather conditions. For instance in a major metropolitan city like Istanbul, a five-degree-drop in temperature in summer, may cause many city-break tourists to stay indoors rather than to go out and spend their money in restaurants and cafes.

In fact, the global economy is exposed to significant amount of unmanaged weather risks and recent data show that the growth in this market will be substantial in the future. The Meteorological Office in the United Kingdom estimates that 70% of UK firms may be affected by the weather (Met Office, 2001). According to Weather Bill (2008), over 25% of the world economy is weather sensitive, with exposure approaching 50% in a number of countries. According to this study the world output could grow by as much as \$ 258 billion per year if the 68 sampled countries actively hedged their weather risk, which is estimated to be about \$ 5.8 trillion.

Although the growth of the weather derivatives market is largely attributable to the deregulation of the energy sector, other businesses such as supermarket chains, leisure, tourism and entertainment industries, agriculture and even consumers are the potential users of weather derivatives, to hedge against the vagaries of weather.

By its nature the weather is local and non- traded phenomenon and the market for weather derivatives may remain local and illiquid. The weather derivative products also provide a protection based on the measured values of the weather itself, not on monetary values. In other words, they cover volumetric risks which stem from the weather conditions. These conditions are related to variables including temperature, humidity, rainfall, snowfall, frost or wind, particularly in non-catastrophic nature. Weather derivatives are different from insurance products. While standard insurance instruments insure against high risk low probability events and they require the proof of loss together with the existence of insurable risk, weather derivatives allow payoffs which are free from these limitations and hence

allow a much greater flexibility both for the seller and the buyer. In addition to that, weather derivatives allow to hedge business risks relating to externalities e.g., good weather conditions somewhere else may influence the crop prices in some other places irrespective of the local weather conditions (Campbell & Diebold, 2005).

Weather derivatives instruments include swaps, futures and options which provide certain pay-offs to its users. This empirical study covers only options on weather temperatures which are bought and sold OTC (Over the Counter) and also traded in organized exchanges.

## 2. Weather derivative instruments

The options and futures written on temperatures are primarily based on temperature indices like Heating Degree Days (HDD), Cooling Degree Days (CDD), Cumulative Average Temperature (CAT) and also some Asian indices based on averages, so called Pacific-Rim index. (See F. E. Benth & J.S.Benth 2007 for the details and definitions). In this chapter, HDD and CDD option pricing is particularly examined.

Let  $T_i$  be the average of daily minimum and maximum temperatures in degrees Celcius on a particular day at a specific location. Then, Cooling Degree Days, (CDD) is defined when the temperature is above some reference level (for example  $18^\circ\text{C}$  for many applications) as a number of the value of  $\max(T_i - 18, 0)$  and Heating Degree Days, (HDD) as a number of the value of  $\max(18 - T_i, 0)$ , when the temperature is below some reference level. Then, over a period say, one month or winter/summer season or for a period of 45 days etc., accumulated number of heating degree days and cooling degree days are defined as

$$X_T = \sum_{i=0}^T HDD_{T-i} \quad (1)$$

and/or

$$X_T = \sum_{i=0}^T CDD_{T-i} \quad (2)$$

where  $T_i$  is defined by

$$T_i = \frac{T_{\max} + T_{\min}}{2}$$

Assuming there is a predetermined number of days in terms of temperature,  $K$ , there might be derivative contracts on these accumulated numbers such as swaps, forwards and options with payoffs ( $Q$ )

$$Q(F) = \Theta(K - X_T) \quad (3)$$

or

$$Q(F) = \Theta(X_T - K) \quad (4)$$

for future and swap contracts and

$$Q(P) = \Theta_{\max}(K - X_T, 0) \quad (5)$$

$$\text{or} \quad Q(C) = \Theta_{\max}(X_T - K, 0) \quad (6)$$

for put and call options where the  $\Theta$  is the point value of the payoff and  $K$  is the predetermined price or strike price of the contract.  $P$  and  $C$  denote put and call options respectively. The value of a degree day index,  $\Theta$ , i.e. tick size, is accepted to be \$ 20 in the CME (Chicago Mercantile Exchange).

There are also contracts written on Cumulative Average Temperatures (CAT) over a predetermined period. This can be shown with the following payoff functions where

$$X_N = \sum_{i=1}^N T_i \quad (7)$$

$$Q(F) = \Theta(K - X_N) \quad (8)$$

$$\text{or} \quad Q(F) = \Theta(X_N - K) \quad (9)$$

for swaps and futures and

$$Q(P) = \Theta_{\max}(K - X_N, 0) \quad (10)$$

$$\text{or} \quad Q(C) = \Theta_{\max}(X_N - K, 0) \quad (11)$$

for put and call options respectively.

For instance assume that the level of temperature is over the seasonal average in a particular winter season in a particular location. This means that the HDD is lower than the average. In this case, most probably, gas or energy companies will fail to sell enough energy products and hence will not be able to make adequate profits in that season. Then, it may be a better policy to sell HDD put at strike levels equal to average or slightly above average level of seasonal temperature levels. At the very extreme case individual consumers may buy calls on HDD to protect themselves against inflated gas bills due to the harsh winter conditions causing high HDD. Then, consumers may require calls on HDD at a strike level which is equal to average or slightly below average. In the section 5 an example of HDD option is presented for a restaurant –cafe chain.

For the summer season the paradigm changes. When the temperature degree is close to 18 °C centigrade this will cause a lower CDD and the summer business requiring warmer days will face a decline. This may mean that hospitality businesses such as hotels and restaurants, and energy suppliers, etc. may demand puts on CDD at a strike level equal to average CDD or at a level slightly above average. Similarly, in an extreme case the individuals and energy consumers who are uncomfortable because of the hot weather may demand call on CDD at a strike level equal to average CDD or slightly below the average. In this case they may be in a position to pay higher energy bills due to warm weather, but having to compensate from CDD contract.

Then, the pricing relationship can be written as the present value of an expected value of the specific payoff, plus a risk premium, i.e.:

$$S = e^{-rt} [E(Q(.)) + \lambda]^1 \quad (12)$$

where  $S$ ,  $Q(.)$ ,  $\lambda$  denotes to price of the option, put or call function and the risk premium, respectively. Starting from the “0” lower bound for the integral a general formula can be stated as

$$S = e^{-rt} \left[ \int_0^{\infty} Q(x)p(x)dx + \lambda \right] \quad (13)$$

where  $p(x)$  is the density of the probability distribution function. The derivative security payoffs are presented in continuous setting in Benth and Benth (2007), and J.London (2007).

A standard weather option can be formulated by specifying the following parameters;

- a. An official weather station from which the temperature data are obtained
- b. The contract type (e.g., future, swap, call, put)
- c. The underlying index (e.g., HDD, CDD, CAT)
- d. The contract period
- e. The tick size,  $\theta$
- f. The strike level,  $K$
- g. The maximum payoff (if any)

In general, conditions (b) and (c) are determined together according to a risk position of which a business firm is exposed to. The condition (g) means that whether the payoff of the option is limited or capped by a certain amount. These types of contracts are called capped options. The type of weather derivative securities is not limited to the ones mentioned in (b). In addition to these, collars, option combinations like straddles and strangles and some binary options are also traded in the market. The detailed closed-form pricing formulae can be found in Jewson (2003) for various distribution functions of contract payoffs.

The Weather Risk Management Association (WRMA) which represents the weather market reports that the total value of derivative contracts rose to as high as \$ 45.4 billion in 2006, the year after Hurricane Katrina, and amounted \$11.82 billion in 2010. The readers are recommended to refer to [www.wrma.org](http://www.wrma.org) to keep up with various changes taking place in the market, discussions and composition of players in the market.

### 3. Weather derivative modelling

There are basically three methods used to estimate the weather behaviour and the parameters of pricing model.

- i. Actuarial Method
- ii. Historical Burn Analysis
- ii. Dynamic Models

There is also a deterministic method of forecasting weather which can be used to project weather changes up to 10 days in advance. This information can be used within the option or future period and there may be some possibilities to create arbitrage trading over some

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<sup>1</sup> Discount factor may only be used for the expectation term as another version of the formula.

intervals repeatedly, if /when the contract period is intentionally kept short. However, this line of reasoning is mostly out of scope for weather derivatives literature.

### 3.1 Actuarial method

Actually this methodology is used basically by insurance companies and the probabilistic assessment and statistical analysis is required for the events to be insured. Based on the statistical analysis on historical data a probability is assigned to the insured event, and the insurance premium is calculated accordingly. However, this method is less applicable for weather derivatives for the underlying variables such as temperature, rainfall, snowfall, wind etc. which tend to follow recurrent and predictable patterns (Cao, Li & Wei, 2003). Yet, there is still room for the use of the actuarial method. For instance in the case of weather derivatives, particularly for certain rare events the actuarial method could be used. In a situation where the contract is based on a rare case such as an extreme heat or chill, or snowfall, then the method may become applicable.

### 3.2 Historical burn analysis

The historical burn analysis method evaluates the contracts based on historical data and the average of realized payoffs in the past. The option premium can be calculated for any period / month / season as long as the one has the relevant data. The simple way of option premium is calculated by following the below sequential steps:

- a. The period is selected
- b. The historical data is gathered for the selected period
- c. The index values ( HDD or CDDs of the period) are calculated for the relevant period of each year
- d. Considering the prescribed value of  $K$ , payoffs are calculated for each year, e.g., for 20 years, the values of HDD call option payoffs as  $\max(HDD_i - K, 0)$   $i = 1, 2, \dots, 20$  are calculated
- e. Then the HDD call option premium is simply computed as the average value of the payoffs calculated in (d)
- f. In general, it might be thought that the more the data go back in the history i.e., the longer the time series used, the better and more reliable is the amount of the option premium. However, as the derivative security's payoff depends on the future behavior of the weather rather than the historical data, it may not be a good idea to use burn analysis in pricing of weather derivatives. Secondly, both methods do not take the risk element into account. The market price of risk associated with the temperature as an underlying variable can be incorporated in dynamic models with future prospects.

### 3.3 Dynamic models

As an underlying variable, temperature is forecast by deterministic and stochastic processes in dynamic models setting. Due to the mean reverting feature of weather temperatures, almost all models use Ornstein - Uchlenbeck (OU) process, in addition to stochastic Brownian (and fractional) motion.

The deterministic part of the model involves trend and seasonal terms and stochastic part involves stochastic term (Brownian motion) in most applications. The reason is that the

temperature shows strong seasonal characteristic and recurring patterns. In addition to the mean equation of the model many dynamic models contain the conditional variance term in order to take the changing volatility of temperature into account. These models are called GARCH type models.

Another feature of the weather is that the (average daily) temperature exhibits high autocorrelation i.e., short- term behaviour of the temperature will differ from the long- term behaviour.

Considering all these facts, the following mean and conditional variance equations (Campbell & Diebold, 2005) can be employed respectively;

$$T_t^m = c_0 + c_1 t + \sum_{p=1}^P \zeta_p \cos(2\pi p d(t) / 365) + \sum_{p=1}^P \gamma_p \sin(2\pi p d(t) / 365) + \sum_{i=1}^L \rho_{t-i} T_{t-i} + \sigma_t \varepsilon_t \quad (14)$$

$$\sigma_t^2 = d_0 + \sum_{q=1}^Q \delta_q \cos(2\pi q d(t) / 365) + \sum_{q=1}^Q \lambda_q \sin(2\pi q d(t) / 365) + \sum_{s=1}^N \beta_s \sigma_{t-s}^2 + \sum_{r=1}^M \alpha_r (\varepsilon_{t-r} \sigma_{t-r})^2 \quad (15)$$

$T_t, t, d(t), p, q$  represent the daily average temperature, trend term (total number of observations) and number of days in a year (365, showing periodicity), number of lags for mean and variance equations respectively. The other coefficients are the parameters determined by the model including autocorrelation coefficients  $\rho_{t-i}$ .

The estimation process can be decomposed into its sub-components as follows;

$$\begin{aligned} \text{Daily Average Temperature} = & \text{Trend } (c_0 + c_1 t) + \text{Seasonal } \left( \sum_{p=1}^P \zeta_p \cos(2\pi p d(t) / 365) + \right. \\ & \left. + \sum_{p=1}^P \gamma_p \sin(2\pi p d(t) / 365) \right) + \text{Autocorrelation part } \left( \sum_{i=1}^L \rho_{t-i} T_{t-i} \right) + \text{Noise term } (\sigma_t \varepsilon_t) \end{aligned}$$

After having the estimates of mean temperature for each day in a year, OU mean reversion process can be established by the following stochastic equation;

$$dT_t = a(T_t^m - T_t)dt + \sigma_t dW_t \quad (16)$$

where,  $a$  is the speed of mean reversion and  $W_t$  is the Brownian motion. The solution of the equation is

$$T_t = (T_s - T_s^m) e^{-a(t-s)} + T_s^m + \int_s^t e^{-a(t-\tau)} \sigma_\tau dW_\tau \quad (17)$$

(See Alaton, Djehiche & Stillberger, 2002 for the details and parameter estimation)

Then the option payoff and the premium can be calculated by discounting the expected payoff of the option based on the underlying index (HDD, CDD, etc.) accordingly as

$$X = e^{-r(T-t)} E[g(T_t, T_{t+1}, \dots, T_T)] \quad (18)$$

Another alternative is to use simpler autoregressive (AR) models (See Davis(2000) for the details). These models do not require a complicated variance process and they are faster compared with GARCH models. Campbell & Diebold (2005), and Benth & Benth (2007) apply GARCH method in their papers, Caballero, Jewson & Brix (2002) use Autoregressive Fractional Integrated Moving Average (ARFIMA), Zapranis & Alexandridis (2008) use neural networks and wavelets and Brody, Syroka & Zervos (2002) apply Fractional Brownian Motion (FBM) in estimation of weather temperature for derivatives pricing purpose. For the models based on AR and GARCH Monte- Carlo simulations are applied for pricing derivatives as a complementary tool.

However, Alaton, Djehiche & Stillberger (2002), Benth & Benth (2007), Jewson & Zervos (2003), and Jewson (2003) provide closed form solutions for the expectation in (18) with specific boundary conditions. Jewson (2004) uses kernel densities (normally distributed) as an alternative.

As an example, for calls and puts based on the specific underlying such as HDD or CDD, the formulae produced in Alaton, Djehiche & Stillberger (2002) are as follows respectively;

$$Q(C) = e^{-r(t_n - t)} \left( (\mu_n - K) \Phi(-\alpha_n) + \frac{\sigma_n}{\sqrt{2\pi}} e^{-\frac{\alpha_n^2}{2}} \right) \quad (19)$$

$$Q(P) = e^{-r(t_n - t)} \left( (K - \mu_n) (\Phi(\alpha_n) - \Phi(-\frac{\mu_n}{\sigma_n})) + \frac{\sigma_n}{\sqrt{2\pi}} (e^{-\frac{\alpha_n^2}{2}} - e^{-\frac{(\frac{\mu_n}{\sigma_n})^2}{2}}) \right) \quad (20)$$

where  $\mu_n$  and  $\sigma_n$  represent the average and variance of the underlying index for the relevant period which is shown by  $n$ ,  $\alpha_n$  is the parameter of the standard normal distribution  $\alpha_n = (K - \mu_n) / \sigma_n$  and  $\Phi$  is the cumulative normal distribution. These formulae in (19) and (20) are primarily for contracts during winter months which typically represents the period November-March. If the mean temperatures are too close or higher than the reference level, i.e. 18°C, which might be the case for summer months, Monte-Carlo simulations are recommended to be used, rather than these above formulae.

#### 4. Model, data and the research

This section presents an empirical work on CDD and HDD option pricing and aims to compute CDD and HDD prices in large metropolitan city, Istanbul. The data provided by the Turkish Meteorological Office for the periods of 1975 - 2006 covering 11680 (11680 for maximum and 11680 for minimum daily temperature degrees °C) observations over a thirty-two-year period have been used for analysis.

The particular reason for choosing Istanbul as the context of the study is due to its significance in terms of being the financial, cultural and tourism capital of Turkey. It is believed that tourism and hospitality establishments (hotels, restaurants, beaches, cafes, etc.) may significantly benefit from buying weather options for hedging themselves against the weather risk.

In this section, pricing issues are discussed, and various models are applied for computing CDD and HDD option prices. The section is divided into four sub sections. In the first sub section pricing is carried out through AR model accompanied by a simulation study, together with option pricing using ADS model as a benchmark.

Second sub-section uses time series for modeling the temperature with GARCH/ARCH features. In the last sub-section, considering the distributional nature of the temperature data, Edgeworth adjusted probability densities are used to compute the option prices.

#### 4.1 AR model and simulation

Davis (2000) assumes lognormal distribution for accumulated HDDs, and values the payoff function under the physical (objective) probability measure and in an equilibrium setting with reference to Lucas (1978). In this case the prices are Black-Scholes prices with modified drift and yield parameters and with the absence of trading involving both the risk free asset and underlying asset (weather). Davis' (2000) model is based on the relationship between the gas prices and the temperature degrees for HDD modeling.

The drift parameter is retrieved from the model arbitrarily by using the mean of HDD and assuming the option is at the money (Davis, 2000). Alaton et.al (2002) find the option prices as expected values after having computed the first and second moments of the data by using Ornstein - Uhlenbeck process and standard normal density function. Similar to implied volatility measure, Alaton et al. (2002) compute the market risk premium by replacing the market prices with the model prices.

Let's define  $D_i = T_i - \bar{T}_d$  as the difference between the daily average temperature and long term (32 years) daily average temperature for  $i = 1, \dots, 11680$  and  $d = 1, \dots, 365$ . When  $i = k \times 365$ ,  $k \in I$ , or  $k = 1, \dots, 32$ ,  $d$  returns to 1.

Then, an autoregressive model can be formed as follows;

$$D_i = \sum_{k=1}^n a_k D_{i-k} + b \varepsilon_i \quad (21)$$

	E1	E2	E3
$a_1$	0.794299	0.972473	0.986606
$a_2$		-0.224342	-0.285633
$a_3$			0.063032
$b$	1.839110	1.792365	1.788953
<b>R-squared</b>	0.630888	0.649464	0.650848
<b>Akaike info criterion</b>	4.056526	4.005120	4.001395
<b>Schwarz criterion</b>	4.057157	4.006382	4.003287
<b>Durbin-Watson stat</b>	1.643628	1.971726	1.999835

Table 1. A Summary of AR Model Equations for (14) with 1, 2, and 3 lags. All coefficients are meaningful at % 99 confidence level.

There is no material difference between the equations; however the last equation (third order) has lower standard error (1.789 vs. 1.7924 and 1.8391) and DW statistics (1.9998 vs. 1.9717 and 1.6436).



As for correlations, almost all the coefficients are in between  $\pm 2\frac{1}{\sqrt{T}}$ , (only 8.th order lag is greater than 0.019 which can be regarded as meaningless), so the residuals can be considered as *white noise*. However, E2 and E3 do not meet the positive variance limitations and for the sake of positive unconditional variance the first equation is adopted parsimoniously.

Then, assuming the distribution of the differences is normal with mean zero; unconditional standard deviation of the residuals is calculated as

$$\sigma = \frac{1.8391}{\sqrt{1 - 0.7943^2}} = 2.9299.$$

Then, the temperature differences  $D_i$  can be simulated over a certain period by using the equation (14) and the unconditional standard deviation 2.93.

Instead of annual data, had the computations been based on monthly data and monthly equations, which are more realistic when particular periods are considered, a different set of equations would have been computed. Here are the examples for the months of January and July, which are believed to represent the relevant winter and summer periods.

	January	July
$a_1$	0.760904	0.757173
$b$	2.196550	1.365194
<b>t-Statistic</b>	36.88670	36.53150
<b>R-squared</b>	0.578836	0.574026
<b>Akaike info criterion</b>	4.412662	3.461479
<b>Schwarz criterion</b>	4.417605	3.466422
<b>Durbin-Watson stat</b>	1.627530	1.883939

Table 2. A Summary of Monthly First Order AR Equations for (14) - (All coefficients are meaningful at % 99 confidence level)

Adding the long term averages to the simulated values according to the following equation

$$T_i = \bar{T}_i + D_i \quad i = 1, \dots, 31, \quad \text{mean } \sum_{i=1}^{31} T_i = 193.92 \text{ and standard deviation, } 69.9855 \text{ are computed}$$

by simulation for the month of January. The average which is very close to historical temperature degree justifies the simulation work.

Then, the mean HDD is  $18n - \sum_{i=1}^{31} T_i = 364.0795$  and standard deviation is the same (assuming no daily value higher than 18 degrees).

Accordingly, the unconditional standard deviation of residuals have been found as 3.385, 2.09, and 2.93 for three different periods (January, July and overall) respectively.

As stated above, due to the trade-off between the parameters, fewer numbers of parameters in the equations are preferred. This helps to avoid the possibility of negative unconditional

variance. As it may be easily noticed, the standard deviation of residuals in January is almost 61% more than that of July. This may be interpreted as one of the evidences of global warming effect which may have occurred over the period of 32 years in Istanbul.

The normality tests prove that the distribution of residuals of annual data and January, though not normal, can be considered as close to normal as the tails have more density weights compared to normal distribution. This occurrence particularly applies to January and July residuals (See Figure 1a, 1b and 1c). Because of this a special care needs to be paid to pricing particularly when it is for a summer period.

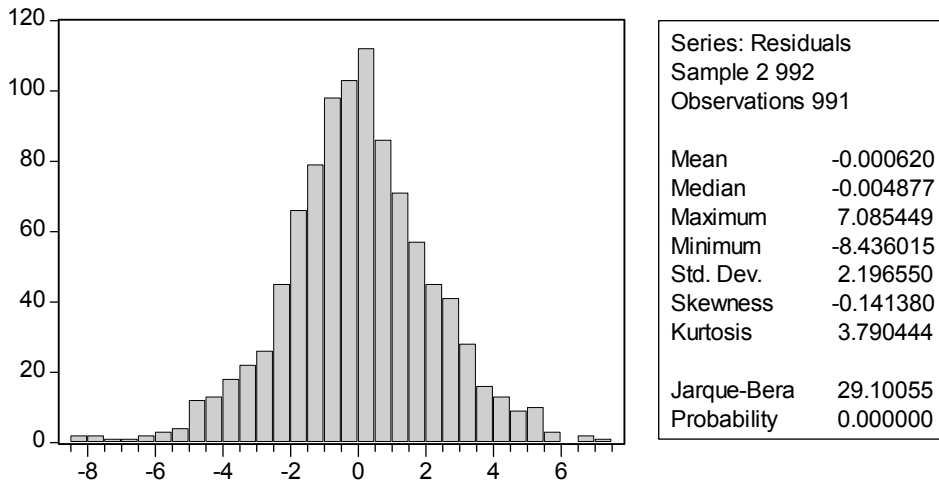


Fig. 1. (a) Histogram of residuals computed by using July data.

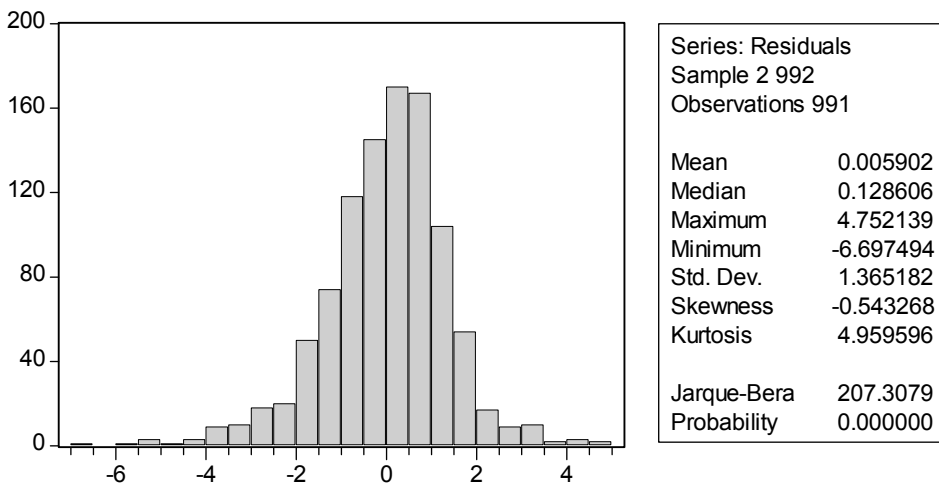


Fig. 1. (b) Histogram of residuals computed by using only January data.

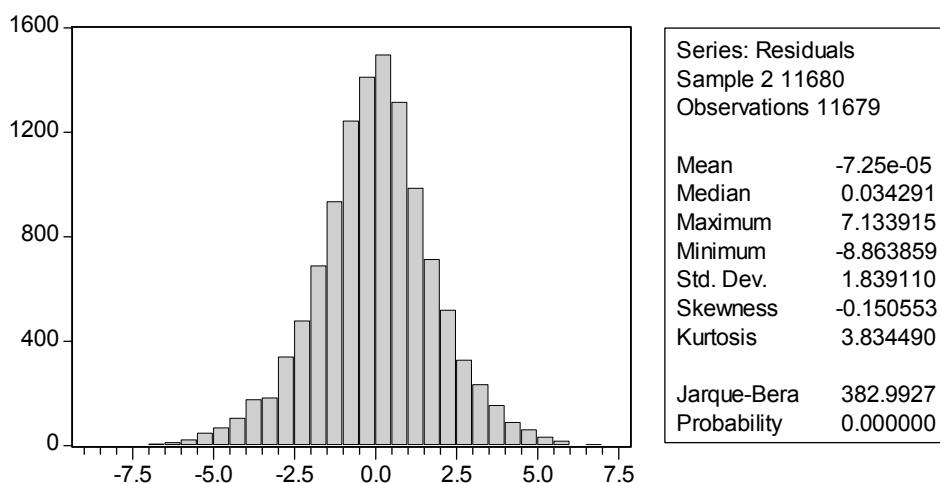


Fig. 1. (c) Histogram of residuals computed by using overall data.

The parameters used in simulation study are presented in Table 3 and Table 4 for two different periods.

Parameter	Number of Simulations: 20,000	Historical Long Term Average	Number of Simulations: 20,000	Historical Long Term Average
	unconditional SD of 2.93		unconditional SD of 3.3852	
Mean total degrees	193.92	193.53	194.02	193.53
SD of total degrees	69.99	40.37	80.44	40.37
HDD Mean	364.08	364.47	363.98	364.47
Log HDD Mean	5.88	5.89	5.87	5.89
SD of Log HDD	0.2023	0.11	0.2417	0.11

Table 3. Statistics of HDD for the Month of January by Using Unconditional SD of 2.93 and 3.385.

Parameter	No of Simulations: 20,000	Historical Long Term Average	No of Simulations: 20,000	Historical Long Term Average
	unconditional SD of 2.93		unconditional SD of 2.09	
Mean total degrees	742.35	742.84	742.55	742.84
SD of total degrees	69.88	36.90	49.60	36.90
CDD Mean	185.16	184.84	184.57	184.84
Log CDD Mean	5.1290	2.26	5.1797	2.26
SD of Log CDD	0.4903	0.086	0.3026	0.086

Table 4. Statistics of CDD for the Month of July by Using Unconditional SD of 2.93 and 2.09

As it is observed in the tables, the only distinguishing characteristic of the data is unconditional standard deviation incorporated into simulation work which is different from historical standard deviation. This figure *does* matter as well, between the summer and winter periods. The summer period shows less variability and has a lower volatility which may have implications for pricing. However, it is obvious that winter temperatures appear to be more volatile.

In conjunction with the above parameters, and considering the  $\pm 1\sigma, 2\sigma$  of average CDD and HDD as strike prices, the call and put prices are computed in the following table according to the following expectations:

$$Put = \exp(-rT)E^P[\theta(K - X_T)]$$

$Call = \exp(-rT)E^P[\theta(X_T - K)]$ , where  $X_T$  is CDD or HDD,  $\theta = 1$  and with  $E^P$  as objective probability measure.

As the simulation work shows for CDD options, the higher the strike prices the higher is the difference between the call prices (maximum difference is at strike in the middle), computed by the two separate residual standard deviations, in terms of absolute and percentage terms(except the highest strike).The reverse is true for puts. For HDD options the higher the strike prices the lower is the difference between the put prices (maximum difference is at strike in the middle) computed by the two separate residual standard deviations and also the reverse is true for calls. The reason for this occurrence is that while the strike increases and puts come closer to deep in the money, the difference between the standard deviations have no significant effect on the prices. However, if puts are deep out of the money, the difference between the standard deviations are important and slight increase in volatility makes a susceptible increase in put prices. The same type of argument can be obviously made for calls.

Option	Strike Prices	Call Prices $\sigma = 2.93$	Call Prices $\sigma = 3.3852$	Put Prices $\sigma = 2.93$	Put Prices $\sigma = 3.3852$
HDD					
	224.1	139.64	141.34	0.57	1.26
	294.09	75.20	77.76	5.58	8.58
	364.08	28.19	31.28	27.48	32.08
	434.07	5.79	8.68	74.72	78.25
	504.06	0.66	1.27	139.66	140.10
CDD		Call Prices $\sigma = 2.09$	Call Prices $\sigma = 2.93$	Put Prices $\sigma = 2.09$	Put Prices $\sigma = 2.93$
	45.4	138.85	138.26	0.04	0.61
	115.28	70.99	75.41	1.82	5.81
	185.16	19.33	27.22	19.88	27.64
	255.04	1.74	5.56	71.64	76.15
	324.92	0.02	0.53	139.00	139.48

Table 5. CDD and HDD Call and Put Options computed by simulation, with residual standard deviations ( $\sigma$ ) from the daily temperature model for the month of January (HDD) and July (CDD) using equation (14). Interest rate is  $r = 10\%p.a.$  (continuously compounded).

All these numbers are re-calculated by ADS formulae (ADS, 2002 p.15, equations 4.17 and 4.19) as presented in Table 6 below. Similarly, the difference is that the standard deviation and mean values of HDD and CDD are used in ADS formulae. The call and put prices of CDD and HDD options are almost the same with the ones computed in the simulation.

Option	Strike Prices	Call Prices SD = 70	Call Prices SD = 80.44	Put Prices SD = 70	Put Prices SD = 80.44
HDD					
	224.1	139.41	140.05	0.59	1.33
	294.09	75.19	77.79	5.78	8.48
	364.08	27.69	31.78	27.69	31.87
	434.07	5.78	8.44	75.20	77.95
	504.06	0.59	1.32	139.41	140.24
CDD		Call Prices SD = 49.60	Call Prices SD = 69.88	Put Prices SD = 69.88	Put Prices SD = 49.60
	45.4	138.06	139.19	0.32	0.03
	115.28	70.53	75.08	5.23	1.80
	185.16	19.33	27.65	26.82	19.90
	255.04	1.72	5.77	73.97	71.58
	324.92	0.03	0.59	137.81	139.19

Table 6. CDD and HDD Call and Put Options with Standard Deviations from the Daily Temperature Model and Historical Parameters for the Month of January (HDD) and July (CDD). Interest rate is  $r = 10\% p.a.$  (continuously compounded).

The reason why two separate standard deviations have been used is due to the different residual unconditional variances (standard deviations), one being for the whole period, and the other one being for that particular month as referred in Table 4 and 5. The different residual unconditional variances used in the simulation produce obviously two different standard deviations for HDD and CDD.

## 4.2 GARCH modeling

When AR model with GARCH/ARCH feature is used, the following equations are used for computing the mean temperature and conditional variances.

The mean equation is

$$T_t^m = c_0 + c_1 t + \sum_{p=1}^P \zeta_p \cos(2\pi p d(t) / 365) + \sum_{p=1}^P \gamma_p \sin(2\pi p d(t) / 365) + \sum_{i=1}^L \rho_{t-i} T_{t-i} + \sigma_t \varepsilon_t$$

and the conditional variance equation is

$$\sigma_t^2 = d_0 + \sum_{q=1}^Q \delta_q \cos(2\pi q d(t) / 365) + \sum_{q=1}^Q \lambda_q \sin(2\pi q d(t) / 365) + \sum_{s=1}^N \beta_s \sigma_{t-s}^2 + \sum_{r=1}^M \alpha_r (\varepsilon_{t-r} \sigma_{t-r})^2$$

as mentioned in 3.3, as (14) and (15).

The parameters are presented in Table 7 below. The equations are then selected from a set of equations which provide minimum value of Akaike and Schwarz information criteria. Then these parameters are applied to simulation study to compute the option prices.

When the GARCH/ARCH modeling is employed to calculate the option prices, the critical point is that the pricing period on which the mean and conditional variance equations are applied is the same as the period these equations are obtained. In other words, the parameters of GARCH equations found using the whole number of observations causes the smoothing of the data for particular months and periods when they are used in the simulation application. Since the volatility structure is completely different for different months, overall GARCH equations may give biased results for particular periods.

	Whole period (E1)	July E(2)	January E(3)
$c_0$	3.028411	6.763988	1.781583
$c_1$	2.39E-05	0.000709	
$\xi_1$	-1.837887		0.301731
$\xi_2$	0.099831		
$\gamma_1$	-0.817157	-0.1633	
$\gamma_2$	0.066656		
$\rho_{t-1}$	0.961559	0.829327	0.921731
$\rho_{t-2}$	-0.251754	-0.126386	-0.200927
$\rho_{t-3} \rho_{t-1}$	0.047640		
$\rho_{t-8}$	0.025915		
$\sigma_t$	1.818203	1.3385	2.186813
$d_0$	1.586820	-1.448273	1.322562
$\delta_1$	0.539787		
$\delta_2$	-0.127277		
$\lambda_1$	0.485618		
$\lambda_2$	-0.101007		
$\beta_1$	0.411079		0.559813
$\alpha_1$	0.111593	0.180305	0.171028
<b>Adjusted <math>R^2</math></b>	0.94	0.61	0.60
<b>Akaike</b>	3.96	3.38	4.38
<b>Schwarz</b>	3.97	3.42	4.41
<b>DW</b>	1.96	2.02	1.96
<b>F Statistics (Prob)</b>	10801.33 (0.0000)	219.60 (0.0000)	244.55(0.0000)

Table 7. GARCH Equations for the average daily temperature of Istanbul using data of 32 years minimum and maximum daily temperatures. The total observation number is 11,680 for the whole period. The January and July periods have both observation numbers of 992.

Table 8 presents the prices of HDD and CDD call and put option prices computed by GARCH modeling of weather temperature for two different periods, namely, July and

January for 31 days, where 365 days is replaced by 31 days as shown in equations (14) and (15) above.

Option	Strike Prices	Call Prices for January Simulation number:20,000	Put Prices for January Simulation number :20,000
HDD	224.1	136.97 (143.39)	0.00(0.00)
	294.09	67.58 (73.78)	0.00 (0.00)
	364.08	4.31 (7.41)	6.16 (3.01)
	434.07	0.00 (0.00)	71.30 (65.06)
	504.06	0.00 (0.00)	140.89 (134.29)
		Call Prices for July Simulation number:20,000	Put Prices for July Simulation number :20,000
CDD	45.4	127.15 (134.85)	0.00 (0.00)
	115.28	57.88(65.22)	0.00 (0.00)
	185.16	0.23 (1.39)	11.55 (5.48)
	255.04	0.00 (0.00)	80.76 (73.36)
	324.92	0.00 (0.00)	149.98 (142.65)

Table 8. Simulation with GARCH. Simulation step 20,000, CPU time: 20 .56 seconds as average. The numbers in brackets are the computations made with the parameters covering whole year.

The call and put prices in Table 8 can be compared with i) the previous computations made in models 4.1 and, ii) the computations shown in the brackets, which have been obtained by using the parameters corresponding to the whole period. In this case when the GARCH/ARCH models are compared with the model in 4.1, it is seen that almost all strike levels of CDD and HDD have produced lower call prices compared to the other models. The situation is different for the put prices at some higher strike levels.

The reason for these biased results is that the equations for calculating January and July prices cannot produce the monthly average standard deviations of 3.38 and 2.10 °C - on a daily basis - for January and July respectively. In other words, simulated temperatures are quite close to averages. Then, since the calls get out of the money and puts get in the money as the strike level increases, an asymmetry, in favor of put prices, occurs.

On the other hand, as the comparison (ii), when the July and January prices are computed by the parameters belonging to the whole period, slightly higher call and slightly lower put prices are found.

To overcome this problem the parameters of January and July in Table 8 have been replaced by the parameters of the winter (November-March) and summer (May-September) periods in the simulation application. However, when this happens the situation gets worsened and the asymmetry between the call and put prices increases<sup>2</sup>.

<sup>2</sup> The results have not been presented here. They may be obtained from the authors.

### 4.3 Edgeworth density adjustment

The option prices for CDD and HDD have also been calculated using Edgeworth adjusted historical densities. There might be some situations requiring the changes in the prices due to the distributional characteristics of the data, particularly temperature data.

Due to non-normality the pricing needs to be modified by taking into consideration of moments of distribution higher than second order. This is the technique called “Generalized Edgeworth Series Expansion” and has been applied to option pricing by Rubinstein (1994 and 2000) and Jarrow and Rudd (1982). In this chapter Rubinstein’s (2000) approach has been adopted. In the model  $a(x)$  is the density of normal distribution function which is extracted from historical distribution of temperature data by using first two moments. Then, by using skewness ( $\xi$ ) and kurtosis ( $\kappa$ ) measures of the historical data the densities can be modified and adjusted according to the following formula (Stuart & Ord, 1987):

$$f(x) = \left[ 1 + (1/6)\xi(x^3 - 3x) + (1/24)(\kappa - 3)(x^4 - 6x^2 + 3) + (1/72)\xi^2(x^6 - 15x^4 + 45x^2 - 15) \right] a(x) \quad (22)$$

where  $x$  and  $f(x)$  denote, standard normal variable and Edgeworth density of  $a(x)$  respectively.

Accordingly, the adjusted (Edgeworth) densities can be calculated as weights of the put option payoffs during the selected period for the specific strike levels. The skewness and kurtosis adjusted call and put prices can be calculated according to the following formula:

$$C(E) = \exp(-r(t_n - t)) \frac{1}{\sum_{j=1}^N f_j(x)} \sum_{j=1}^N f_j(x) \max\left(\sum_{i=1}^D X_i(t_n) - K, 0\right)_j \quad (23)$$

$$P(E) = \exp(-r(t_n - t)) \frac{1}{\sum_{j=1}^N f_j(x)} \sum_{j=1}^N f_j(x) \max\left(K - \sum_{i=1}^D X_i(t_n), 0\right)_j \quad (24)$$

In the above formula  $K$  is the strike price,  $N$  is the number of observations ( $N=32$  years),  $D$  is the number of days in a particular period which are January and July as example ( $D=31$  days) and  $X_i$  is  $\max(T_i - 18, 0)$  for CDD and  $\max(18 - T_i, 0)$  for HDD.

As it is observed in Table 9 January/July data is left/right skewed as expected. Additionally, it is observed in Table 9 that CDD call and put prices computed by adjusted densities are lower than the prices computed by the equation (14). The reason for this difference is that, the weights or probabilities used in Edgeworth technique become lower at lower temperatures and higher at higher temperatures (strikes) due to its skew and kurtosis values. Since the calls get out of the money and puts get in the money as the temperature degree /strike level increases, this creates an asymmetry in favor of put prices and CDD put Edgeworth price is more than the others at the highest strike.



Option	Strike Prices	Call Prices (January) $SD = 40.38, \xi = -0.086$ $\kappa = -0.72$	Put Prices (January) $SD = 40.38, \xi = -0.086$ $\kappa = -0.72$
HDD	224.1	140.36	0.00
	294.09	71.04	0.09
	364.08	16.94	15.39
	434.07	0.13	67.99
	504.06	0.00	137.27
		Call Prices (July) $SD = 36.90, \xi = 0.452,$ $\kappa = 0.121$	Put Prices (July) $SD = 36.90, \xi = 0.452,$ $\kappa = 0.121$
CDD	45.4	132.74	0.00
	115.28	63.44	0.00
	185.16	9.58	15.44
	255.04	0.10	75.26
	324.92	0.00	144.46

Table 9. CDD and HDD call and put option prices by using Edgeworth adjusted densities for July and January.

As for HDD prices an opposite asymmetry is observed as expected. Only the deep in the money call has higher price than the prices computed by equation (14), and HDD put prices are lower at all strikes. The reason again stems from the fact that Edgeworth densities give more weighting to lower level of temperature degrees due to its skew. Since the low strikes are more in the money than the higher strikes, this causes an asymmetry in favor of calls.

Due to the continuous feature of the closed form formulae, the positive probabilities attributed to deep in the money and deep out of the money options there are positive prices whereas, in GARCH and Edgeworth density models there is no probability assigned to, for instance, strike levels 504.06 and 324.92 and no positive prices are available.

After having found the slightly different prices for different models and different standard deviations, there might be the question of *whether the computation of calls and puts should be seen as part of an ad hoc study*". This is partly true. It is highly recommended to estimate the unconditional standard deviations of residuals of temperature data and, in turn, estimate the standard deviation of CDD and HDD other than the historical ones at first. Then simulation with simple AR model and closed form formulas produce very close values for both contracts. On the other hand, sophisticated GARCH models may produce biased results and cause longer CPU times in simulations. The average CPU time is about 20 seconds per simulation for 20,000 steps. As pointed out by Jewson and Brix (2005) and Dorfleitner and Wimmer (2010) practitioners in general have a tendency to use index models not only because they require not so many parameters but also they are easy to understand and implement.

As a final check, the third and fourth moments of the data can be taken into account to fine-tune the option prices by transforming the historical probabilities through the Edgeworth expansion. This may not be so crucial in the context of temperature data, for the temperature data present strong seasonality and long term persistency which particularly may cause less weight in the tails. (Fat tails may be more common for some other weather variables such as rainfall and snowfall.) This is justified with moderate skew and kurtosis parameters as referred in Table 9. As a result of this, Edgeworth adjustments produce higher call prices compared to GARCH model but lower calls compared to AR and closed form formulas. As for puts, Edgeworth prices are always lower than the prices computed by all models except at the very high strikes for CDDs, e.g., 324.92 due to the unique characteristics of the data.

## 5. Example and the results

In this section, the financial implications of hedging is presented from the viewpoint of a restaurant-cafe chain purchasing a HDD January call option based on the temperature data of past 32 years.

It is assumed that restaurants or cafés in with a number of restaurants and cafés at various locations is exposed to weather risk and its outdoor business is rather susceptible to the changes in temperature degrees.

Another assumption is that a 1°C decrease in weather temperature in January may cause a proportionate decrease in the number of people demanding the services of this particular restaurant or café chain. It is also assumed that this decrease may, in turn, cause \$750 decrease in net operating income based on the supposed value of  $\theta$ . ( $\theta = \$750$ ) Then to hedge against the changes in net operating income, the restaurant chain decides to buy a call option on HDD with a strike of 364.08 (historical average). The idea behind the call purchase is, if the winter gets colder than usually expected, i.e., HDD is above the strike, in spite of lost business due to the harsh winter conditions, the chain compensates the loss with the option payoff, which is the difference between the HDD at the maturity and the strike times \$750 conditioned on the payoff being positive. In case the January HDD is just at the strike or below this level, restaurant chain loses the premium. In Table 10, it is assumed that the chain has bought a HDD January call with the strike of 364.08 during all these 32 years. The prices used in Table 10 are simulation prices (Table 5) and Edgeworth adjusted (Table 9) call prices. Accordingly, the restaurant or the café chain would make an overall loss with simulated (and with very close ADS prices as well) HDD call prices and make a very small profit with Edgeworth adjusted prices over the period. Assuming the risk hedgers are willing to make a loss to a certain extent, the example justifies the employment of such a hedging tool in order to smooth the possible fluctuations in net operating income. However the gap between the overall costs (-\$266,453 and \$3,547.5) points out two important facts. The first one is that there may be opportunities for the business to find better prices in the market. The firm may reduce the total cost by getting quotations between the “model prices” and “(Edgeworth) adjusted” prices depending on the value of  $\theta$ <sup>3</sup>. Secondly, there have been years, providing the firm with significant amount of positive payoff from the HDD contract which would make the firm close the period with \$ 3,547 profit from \$266,453 loss once again subject to the value of  $\theta$ .

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<sup>3</sup> Note that the value of  $\theta = \$750$  is an assumed value.

Call Prices and $\theta$	Annual Premium (\$)	Number of years that the Firm makes profit	Net Hedging Gain/(Cost) for the Firm during 32 years (\$)
$\theta = \$750$			
$HDDCall = \$28.19(\text{Simulation})$	-21,142.5	10/32	-266,453
$HDDCall = \$16.94(\text{Edgeworth})$	-12,705	11/32	3,547.5

Table 10. HDD example for a restaurant chain hedging against the weather risk in the month of January.

## 6. Discussion and vision for the industry

According to the World Tourism Organization (2009) Turkish tourism industry represents 2.5% of world tourism market, in terms of tourist arrivals and tourism revenues earned. As the second largest industry tourism plays a major role in the economy of Turkey. Between 1986 and 2006, tourism industry's contribution to the Turkish Gross Domestic Product (GDP) increased from 2.1% to 5.2% (TURSAB, 2008). Tourism also plays other significant roles in improving Turkey's other macroeconomic indicators. For instance, together with its direct and indirect contribution, tourism represents 17.9% of total employment in Turkey. Additionally, tourism revenues helps close the balance of trade deficit in Turkey, a country with one of the highest balance of trade deficits in the world. Turkey has the seventh largest balance of trade deficit in the world (World Bank, 2010), used to be the third in 1990s, and the contribution of tourism industry in Turkey towards closing balance of trade deficit ranged from 77% in 2001 to 56% in 2003. Moreover, Turkish tourism is important as it has the highest tourism multiplier value in the world (Fletcher, 1995). This means that any development in Turkish tourism may have significant implications for the whole economy.

However, alongside these above strengths Turkish tourism industry faces fundamental problems too, which may jeopardize its sustainable development. For instance, Turkish tourism is highly seasonal with about 70% of tourists visiting Turkey between April and September for sun and sea holidays (Koc & Altinay, 2007). On top of seasonality, which requires skills to manage both the peak season and off-season, weather risk creates additional burdens in terms of the sustainability of hospitality businesses such as hotels, restaurants, cafes, etc.

According to Culligan (1992) the tourist's increasing desire for more novel, adventurous, and 'authentic' forms of tourism experience is a function of the decline in utility associated with a decision to simply replicate previous experience. This implies a move away from General Interest Tourism (GIT) towards Special Interest Tourism (SIT) (Brotherton & Himmetoglu, 1997). Krippendorf (1987) argued that fundamental changes occurring in the tourism market in general are in line with the developments of new patterns of tourism consumption. He maintains that in the near future there will be a substantial decline in those tourists for whom hedonism is a dominant travel motive, e.g. as in the case of sun and sea holidays, and for whom tourism is seen purely as a mechanism for recovery [rest] and liberation [escape from the ordinary]. Instead, the travel market will place more emphasis on the environmental and social context in which tourism occurs, and the humanization

of travel activities (Krippendorff, 1987). In other words Krippendorff (1987) argues that there will be a move from GIT to SIT with decreasing utility in hedonistically motivated holidays. Zauhar's (1994) view also supports this trend pointed out by Krippendorff (1987). Zauhar (1994) claims that future projections, with reference to tourism trends, indicate a tendency pattern of breaking free time into a series of blocks, thereby permitting a variety of experiential stays within a single year (Zauhar, 1994). Therefore, based on the above explanations it may be suggested that there will be a decline in the numbers of organized mass tourists who visit Turkey primarily for sun and sea holidays. This means that the growth of Turkish tourism may not be sustainable unless corrective measures are taken both at macro level in terms of public policy and at micro level in terms of effective marketing and activities financial management. From an effective marketing management diversification of tourism products can be suggested for sustainability in future. However, sustainability also requires financial robustness of tourism and hospitality businesses (Chang, 2009; Beyazit and Koc, 2010).

According to research carried by Haktanir and Harris (2005) there are six key themes in evaluating a hospitality establishment's performance. These are business dynamics, overall performance measures, employee performance measures, customer satisfaction measures, innovative activity measures and financial performance measures. In Turkey financial performance is especially an important issue, particularly due to strong seasonality and low profit margins. Especially coupled with the perishability nature of services (Zeithaml, Parasuraman, & Berry, 1985), tourism businesses usually find it difficult to sustain their existence, yet alone grow.

The particular reason for choosing Istanbul as the context of this study lies in its significance in terms of being the financial, cultural and tourism capital of Turkey. According to World Tourism Organization (2010) in terms of tourist arrivals Istanbul is among the top ten destinations in the world. It is believed that tourism and hospitality establishments (hotels, restaurants, beaches, cafes, etc.) may significantly benefit from buying weather options for hedging themselves against the weather risk.

This study has proposed a mechanism whereby hospitality establishments operating in Istanbul may reduce their vulnerability against the vagaries of weather. Especially, hospitality businesses such as restaurants, cafes and bars are extremely fragile not only due to high levels of seasonality and availability of rather low profit margins, but also due to the extensive adoption of all-inclusive pricing system by hotels and hotel chains.

The findings of the research may be used by hospitality businesses not only in Istanbul, Turkey, but also in other cities in the world as reference. Additionally, apart from tourism and hospitality establishments, many other businesses in various sectors, e.g. in energy, may benefit from the findings of this study.

In the pricing process of CDD and HDD options closed form formulae is recommended due to its simplicity and traceability. However, to be on the safe side AR models provide unconditional variances which may yield higher standard deviation parameters for CDD and HDD than the historical ones, which in turn produce better (higher) prices for the seller. The other model (GARCH) has not produced consistent prices for CDD and HDD options and hence is not recommended. The calculated prices have to be compared with the

(Edgeworth) adjusted prices to take into account the distributional characteristics of the HDD and CDD data.

The key point in pricing of weather derivatives is that the market is incomplete and it is impossible to buy or sell the underlying asset for hedging purposes. For that purpose sellers will try to charge maximum premium in their prices and quotations to avoid potential surprises regarding fluctuations in weather. In weather derivatives markets a ten to twenty percent addition can be made to the premium provided in (12) just like insurance premium mark-up, in the light of past experience gained over a period of time.

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# Tourism Life Cycle Assessment (LCA): Proposal of a New Methodological Framework for Sustainable Consumption and Production

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## 1. Introduction

International tourism has become an important part of modern life styles, while it is now one of the largest and fastest growing economic sectors worldwide, even though it appears vulnerable to the occasional economic or global socio-political shocks over the last decade (UNWTO, 2010). Tourism's contribution to the worldwide gross domestic product (GDP) is estimated at some 5% (ibid). However, this strong growth also implies an increase of undesired environmental impacts. Tourism is globally responsible for 5% of all carbon dioxide emissions, the most important greenhouse gas causing climate change (UNWTO UNEP WMO, 2008). However, in terms of radiative forcing, the direct measure for contribution to climate change, tourism could even have a share of up to 12.5% (Scott et al., 2010). Also, the greenhouse gas emissions of tourism are estimated to grow at a rather large rate, although global emissions should be reduced up to 80% by 2050 (e.g. Scott et al., 2010). Finally, it has been shown that the eco-efficiency – the economic contribution per ton emissions – of tourism is rather low (Gössling et al., 2005). These data contradict the rather common view among many researchers in the past, according to which tourism is a low environmental impact industry (McCrory, 2006). Now, it is a shared concept that tourist activities are strongly related to the environment, since, on the one hand, the natural environment itself may be considered as a major input resource to the processes of tourism industries and, on the other hand, the development of tourism as a mass industry may severely increase its overall impact on the environment (Raggi & Petti, 2006a; Romeril, 1989).

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Given the predictions of an increased role of tourism industries in the world economy, the environmental aspects of, and impacts generated by tourist activities should be accurately considered according to a Life Cycle Thinking (LCT) perspective. This concept has been extensively advocated as the proper way of addressing the challenges linked with sustainable development, and, in particular, with those measures for enhancing sustainable consumption and production. In the framework of sustainable development policies, the “Sustainable Consumption and Production and Sustainable Industrial Policy (SCP) Action Plan” (European Commission, 2008) is a building block in the EU.

In line with this policy, a wide range of environmental instruments have been developed for assessment and labelling/certification purposes of travel and tourist services. This ongoing proliferation of different initiatives shows a high degree of diversity in terms of scope, assessment methodologies and means of communication. Although this proliferation reflects the vast variety of travel and tourist products as well as their complicated nature when it comes to the assessment of the environmental performance, these environmental instruments seem to suffer from a lack of integration and standardisation or quality control. This situation has the potential to confuse or even mislead travellers and the stakeholders within the industry.

This implies three questions we seek to answer in this chapter. Firstly, what environmental instruments and initiatives are currently supporting the application of the European Sustainable Consumption and Production (SCP) Action Plan in the travel and tourism industry? Secondly, what are their key characteristics and how do they stand in relation to Life Cycle Assessment (LCA) principles? And thirdly, how can these instruments be combined into a general framework capable to render this industry low carbon and more sustainable from an environmental point of view?

In this chapter, the topic will be introduced in the first sections. In particular, the key concepts of LCT and its supported methodologies are illustrated in section 2. More information on the application steps of the LCT-oriented environmental assessment methodology (i.e. LCA) is outlined in section 3. The meaning of life cycle in the tourism sector will be investigated in section 4. In order to answer the research questions, a review of the existing environmental instruments in the European travel and tourism industry was made. The review method applied and overview of the existing instruments and initiatives are the subjects of section 5 and 6, respectively. Possible methodological improvements are also outlined for each instrument and initiative in section 6. By proposing linkages among the existing instruments, we finally present in section 7 a new methodological framework for sustainable consumption and production in the travel and tourism sector. This framework includes, *inter alia*, a new platform enabling travellers to plan eco-friendly holidays in Europe.

## **2. Life Cycle Thinking: Key concepts and methodologies**

Life Cycle Thinking (LCT) is a quantitative approach which aims at taking into account all life cycle phases of a product (e.g. extraction of the raw materials, pre-production processes, production, consumption, end-of-life) in a broad range of methodologies and instruments for sustainability assessment and management (Azapagic & Clift, 1999; European Commission, 2010; Finnveden et al., 2009; Heiskanen, 2002; Hunkeler & Rebitzer, 2005;



Maxwell et al., 2006; Rebitzer & Buxmann, 2005; Rebitzer et al., 2004). Although LCT was initially conceived for products, it can also fit for services (De Camillis et al., 2008; Graedel, 1997; Petti & Tontodonati 2002; Raggi et al., 2008a, 2008b; Raggi & Petti 2006a; Raggi et al., 2005; Rosenblum et al., 2000). One of the major strengths of LCT is its comprehensiveness. This characteristic makes LCT a unique perspective to detect potential shifts of economic, environmental and social burdens from one phase of the life cycle to another, from a certain geographical area to another, and from one sustainability issue to another (European Commission, 2007; Finnveden et al., 2009).

Several LCT-based methodologies and instruments for sustainable development have already been developed so far. One of the most known is Life Cycle Assessment (LCA), a methodology to assess the potential environmental impact of a product/service in terms of individual environmental impact categories (e.g. global warming, human and environmental toxicity, natural resource depletion, ozone layer depletion, summer smog, etc.) and along its life cycle phases (Pennington et al., 2004; Rebitzer et al., 2004). In fact, all activities involved in a certain product's life cycle result in environmental impacts that in most cases are negative due to consumption of resources, and emissions of harmful substances into the natural environment. The LCA methodology has continued to develop and has become to some extent mature during the last decades. From the first conceptualisations (Heijungs et al., 1992; Consoli et al., 1993), LCA is now an internationally standardised methodology (ISO 14040:2006; ISO 14044:2006) recognised by the European Commission (2003) as the best tool for assessing the life cycle environmental impacts of products. While general guidelines for LCA have been issued by the European Commission (2010), many initiatives have been developing ad hoc sector- and product-specific methodologies.

Besides LCA, ecodesign is another LCT-based method. Ecodesign – also generally known as Design for Environment (DfE) or Life Cycle Design (LCD) – aims at preventing pollution by supporting product designers during the entire development process of products/services with regard to environmental choices (Fitzgerald et al., 2007; Vezzoli & Sciama, 2006). This method has been also standardised (ISO/TR 14062:2002).

Regarding environmental labelling, three types of options are regulated in international standards (ISO 14020:2000). In this context, considerations from LCA case studies are to be taken into account in setting up criteria for Type I environmental labels (ISO 14024:1999), such as e.g. the EU eco-label. A closer reference to LCA is found in those performance-oriented schemes enabling to come up with Type III environmental declarations (14025:2006), such as e.g. the Environmental Product Declaration (EPD) scheme (EPD, 2011). In these schemes, LCA is the methodology chosen for calculating the environmental performance of products. Finally, findings from LCA case studies might be used for self-declared claims, or Type II environmental labels (ISO 14021:1999).

In addition to product labelling options, pieces of information from LCA studies may be used for setting up and maintaining the Environmental Management Systems of those organisations certified or on the way to be certified according to ISO 14001:2004 or EMAS. Equally, findings from LCA case studies may be used for Integrated Management Systems (PAS 99:2006).

Regarding the economic pillar of sustainability, Life Cycle Costing (LCC) is the reference methodology to investigate costs along the life cycle of products and services (Krozer, 2008; Norris, 2001; Rebitzer & Hunkeler, 2003; Rebitzer & Seuring, 2003; Spengler & Stolting, 2008). Recently, significant efforts to create an LCT-based methodology to assess some social issues have been made by several researchers (Grieffhammer et al., 2006; Hauschild et al., 2008; Hunkeler, 2006; Jørgensen et al., 2008; Weidema, 2005; UNEP, 2009). Yet, if compared with the current maturity level of LCA, we must admit that a Societal LCA is still in its infancy. Finally, an overarching LCT-methodology to assess the overall performance of products against the issues related to the three dimensions of sustainability has been conceived by Kloeppfer (2008).

### 3. Life Cycle Assessment: Stepwise application

According to ISO 14040:2006 and ISO 14044:2006, the procedure to apply LCA is composed of four steps: goal and scope definition, Life Cycle Inventory analysis (LCI), Life Cycle Impact Assessment (LCIA), and Life Cycle Interpretation.

The goal and scope of an LCA study identifies, *inter alia*, the objectives and provides a comprehensive description of the system analysed in terms of “functional unit” and “system boundaries”. According to ISO 14044:2006, a “functional unit” is a quantified performance of a product/service system for use as a reference unit of the analysis, and “system boundaries” are unit processes linked each other to perform one or more defined functions. In addition to this, the environmental impact categories and assessment methods are selected in this LCA step according to the purpose of the study.

Right after the goal and scope definition step, LCA practitioners compile an inventory of the environmental loads potentially occurring along the product life cycle phases. These environmental loads basically consist of: consumption of resources, waterborne and airborne emissions, releases into the soil, and waste streams. In this context, such an inventory is called Life Cycle Inventory (LCI). Collecting and elaborating data in LCIs, and fine-tuning LCIs form the second LCA application step called Life Cycle Inventory analysis (LCI).

On the basis of the LCI of the product system analysed, practitioners run the Life Cycle Impact Assessment step (LCIA) to come out with indicators expressing the potential environmental performance of the overall system analysed. More specifically, LCIA includes the following steps: associating environmental loads to the selected impact categories (classification step); calculating figures of the impact category indicators selected in the goal and scope definition (characterization step).

Besides the above-mentioned steps, the following steps are optional:

- normalization step - the results of the characterization step are normalised to certain reference values (e.g. average environmental pressure of a typical European citizen);
- grouping - normalised results are sorted according to the characteristics of the impact categories (e.g. global versus regional scale) or/and ranked according to their relevancy;
- weighting step - normalised results are weighted by some importance scores associated to each environmental issue by a certain body.

Finally, the Life Cycle Interpretation step aims to evaluate the outputs of the LCI and the LCIA steps along the LCA application procedure. This step basically comes up with considerations in relation to the goal and scope of the study, highlights the study limitations and provides some conclusions.

#### **4. Tourism Life Cycle Assessment in a nutshell**

According to a preliminary survey on the use of LCA in the tourism industry (Raggi et al., 2005; Raggi & Petti, 2006b), LCA is still uncommon within the tourism industry and for researchers in the field of Sustainable Tourism (Bramwell & Lane, 2008; Hunter and Shaw, 2007). In order to gain a better understanding of the reasons for such a limited diffusion of LCA and to evaluate the need of specific LCA guidelines for the tourism sector, a critical review of the existing LCA case studies in the sector was carried out by De Camillis et al. (2010a). Furthermore, a case study was conducted on the services provided by an Italian hotel by De Camillis et al. (2010b). In the following section the findings of such efforts are reported to highlight the object of tourism LCA studies, and what life cycle means in this context.

##### **4.1 Identifying the object of the analysis: The tourist product**

According to the United Nations World Tourism Organization (UNWTO, 2008), "tourism comprises the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes". Even if in the scientific community there is no general consensus on the definition of tourism as a distinct industry (Leiper, 2008; Chadwick, 1994), it can be argued that tourism is a conglomerate of products distinguishable from other industries (Lew et al., 2004). In fact, tourism output is not a simple product but, rather, a wide range of goods and services interacting to fulfil a tourist experience that comprises both tangible parts (e.g. hotel, restaurant, airline) and intangible aspects (e.g. sunset, scenery, mood) (Debbage & Daniels, 1998). The actual purchase and consumption/production of tourist services (e.g. airline ticket, meal, admission ticket) may often be incidental to "non-market" activities, such as independent sightseeing, hiking, or sunbathing (Lew et al., 2004). According to Judd (2006), the actual product of tourism is the tourist's experience which is generated by several social and economic actors. Middleton (1989) observes that the term "tourist product" is used at two different levels: the "specific" level (i.e. a discrete product offered by a single business, such as a sightseeing tour or an airline seat) and the "total" level (i.e. the complete experience of a tourist from the time one leaves home to the time one returns). From these considerations, it can be deduced that a tourist's experience is the outcome of a tourist product at a "total" level. Such a product can be seen as a system whose components (products and services) are the tourist products at a "specific" level, which are provided by different actors and may be incidental to "non-economic" activities.

Such actors can vary according to the specific forms of tourist experience concerned (e.g. coastal, urban, cultural, winter, rural). If a tourism form is considered to be a type of tourist experience commoditisation (Graburn, 2004), or in other words a tourist product at a "total" level, several categories of tourist operators can be identified for each tourism form. An inventory of tourist products in the context of certain tourism forms have been created by De Camillis et al. (2010d). For instance, those services delivered by the following organisations can be indexed as tourist products of the cultural tourism form: museum, art

gallery, exhibition, theatre, concert hall, fair, souvenir shop, tourist organisations involved in sightseeing and guided tours, restaurant, fast food, snack bar.

Apart from the actors mentioned additionally some intermediaries are involved in the tourism production and distribution. Buhalis and Laws (2001) recognise three different types of intermediaries, i.e. outgoing travel agencies (retailers), tour operators (wholesalers) and incoming travel agencies based at destinations (handling). In particular, an outgoing travel agency serves as sales channel for tourist specific activities and wholesalers, generally transport tickets, accommodations and packages from tour operators. Tour operators buy individual tourist services (e.g. transport and accommodation) from their suppliers (e.g. carriers and hotels) and assemble them into holiday packages (Ujma, 2001). Finally, incoming travel agencies plan tour packages on a destination level and act as intermediary between tour operator and specific tourist activities (Buhalis & Laws, 2001), but also sell to individual tourists that do not travel through a tour operator. Indeed, nowadays, also thanks to the Internet, travellers may buy various transport and tourist products at a “specific” level directly from producers or through intermediaries. Tourists also often use various distribution channels for one holiday. For example, they could use an outgoing travel agent for a ‘seat only’ charter product, and autonomously book accommodation, restaurants and other tourist services (Buhalis & Laws, 2001).

#### **4.2 Understanding the life cycle of tourist products**

From the previous section we learnt that tourism is a complicated system due to the large number of goods and supporting services involved in it. Furthermore, describing the sector is complicated as, scientifically, there is an on-going debate about the definition of tourism. Therefore, applying LCA to calculate the environmental performance of tourist products is often problematic. In particular, these drawbacks have major implications in the “goal and scope definition” step.

As far as holidays are concerned, the boundary of the system to be analysed has been set up in a similar manner across LCA case studies (Chambers, 2004; Corsico, 2007; Sisman, 1994; UK CEED, 1998), ecological footprint studies (Hunter & Shaw, 2007; Peeters & Schouten, 2005), and researches on greenhouse gas (GHGs) emissions (Becken & Hay, 2007; Peeters et al., 2009; UNWTO UNEP WMO, 2008). In particular, Chamber’s “door to door” approach (Chamber, 2004), which includes all steps from departure to return back home, was adopted in many cases. Still, the system boundaries of an entire holiday should be defined on a case-by-case basis by considering a tourist experience life cycle (see Figure 1). According to Middleton (1989), a tourist experience generally starts, right after a process of information acquisition, with a booking phase. Before departure, a number of pre-departure activities may take place (e.g. vaccinations, purchase or rental of goods – e.g. clothes – for the holiday). The transport phase includes all movements carried out by tourists from departure to their return home. At destinations, accommodations receive guests for one or more nights, restaurants offer food services and leisure enterprises offer tourist activities. Public services and other supporting services should also be considered to be part of the tourist experience. After the return at home, a final phase includes all the activities to restart the everyday life.

Even if the tourist experience life cycle presented in Figure 1 can be a useful template to study some tourism forms, further considerations are needed for package holidays. In fact, travel agencies and tour operators may be found quite similar to manufacturing companies.

Both these tourist operators and manufacturers assemble “specific” products as components of “total” branded new products. Like those manufacturing companies which are asked to be in line with the principle of Extended Producer Responsibility (EPR)<sup>1</sup>, travel agencies and tour operators are also increasingly responsible for the impacts of all components of the tourist products they sell, including use of raw materials, processing and production, as well as impacts from transport and distribution (Tapper & Font, 2004). In other words, all “specific” tourist products that contribute to the tourist experience should be included in the system boundaries whenever the assembled product named package holiday is studied.

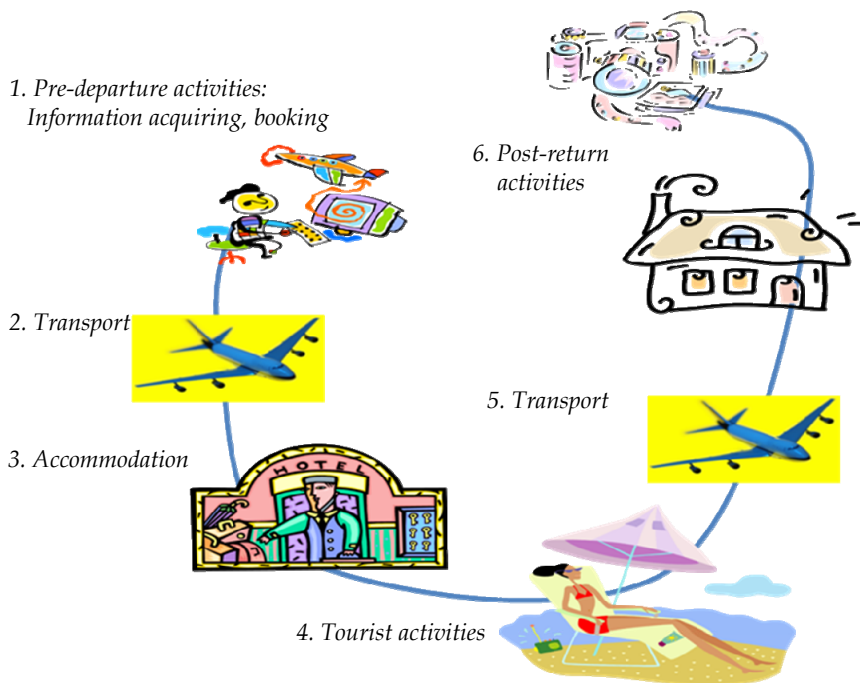


Fig. 1. Life cycle of tourist experience

When the system boundary of specific tourist products is studied individually, the following elements should be considered:

- Consumables and services needed to run the business. For example, when accommodation services are analysed, consumables such as soap, shampoo and other amenities available in the bedrooms for guests should be included in the system boundary. Moreover, supporting services such as e.g. surface cleaning, energy and water supply, and waste treatment should be also included;

<sup>1</sup> EPR focuses on products, and makes producers responsible not only for their own production stage, but also for the whole life cycle of a product. This is based on the assumption that producers have the capacity to (re)design their products to avoid or reduce the related environmental impacts (Li & Geiser, 2004). EPR has been adopted in many OECD countries, as well as in the European Union regulation for packaging waste, end-of-life vehicles, and electrical and electronic equipment waste (Mayers, 2007).

- Capital goods such as e.g. furniture and buildings (e.g. construction, operation, maintenance, demolition/renovation) should be included within the system boundary if their impact is non-negligible. For instance, data concerning the life-cycle-based GHGs emissions of hotel buildings (Florida, 2007; Sesartic & Stucki, 2007) suggest that the building-related environmental loads should be considered in the LCA of accommodation services;
- Those tourist products along the tourist experience life cycle (see Figure 1) on which the tourist organisation analysed may have a certain influence. For instance, transport services should be included in the system boundary when accommodation services are studied. Hoteliers, in fact, may induce their guests to reach their own structures by offering discounts when eco-friendly transport modes are chosen.

Given the large number of services and goods involved in delivering a certain tourist service, simplifications of the system boundary are often needed. Each time a system boundary is simplified by excluding some goods and services from the life cycle of the tourist product analysed, the environmental significance of the excluded unit processes should be assessed case by case by using estimations and extrapolated data.

## 5. Method

As the scope of this research was bounded to Europe, sector-specific instruments for sustainable consumption and production in the travel and tourism industry were searched by consulting:

- EU-funded projects (e.g. LIFE+ project registry) and linked scientific literature;
- Web-sites of networks for sustainable tourism development, such as the Tour Operators Initiative ([www.toinitiative.org](http://www.toinitiative.org)), Ecotrans – European Network for Sustainable Tourism Development ([www.ecotrans.org](http://www.ecotrans.org)), and the DestiNet portal – UN Partnership for Sustainable Development (<http://destinet.eu/>).

The environmental instruments and initiatives found relevant for the purpose of the research have been screened according to their focus and scope, current dissemination, and how they stand in relation to the LCA principles. On the basis of this screening review, key elements of the methodological framework used as well as limitations and envisaged improvements were detected for each instrument/initiative. Major results of this analysis are shown in the overview reported in section 6. Potential synergies amongst instruments and initiatives were identified with the aim of coming out with a general methodological framework. Section 7 presents the results of this analysis by showing, *inter alia*, how a new platform enabling travellers to plan eco-friendly holidays in Europe could look like.

## 6. Overview of environmental instruments and initiatives

The following sector-specific environmental instruments and initiatives were screened because found relevant to build up a new framework for sustainable consumption and production in the travel and tourism sector.

### Travelife

*What it is:* A sustainability management system for tour operators which includes an eco-labelling scheme to qualify tour operator's suppliers (e.g. hotel, holiday village, restaurant);

*Users:* Tour operators and their suppliers: accommodation structures, restaurants, other tourist companies (e.g. providers of tourist activities, such as excursions, leisure, sightseeing, etc.);

*Final stakeholder:* Those tourists who use to book tourist services and whole holiday packages through tour operators and travel agencies;

*Current dissemination:* Pretty widespread amongst tour operators (e.g. TUI, Thomas Cook, Kuoni, First Choice, Virgin Holidays, Cosmos);

*Websites:* [www.its4travel.com](http://www.its4travel.com), [www.travelife.eu](http://www.travelife.eu);

*Reference:* Kusters, 2004;

*Project funding detail:* EU LIFE programme, LIFE04 ENV/NL/000661, Tour-Link project -

Demonstrating how an integrated eco-labeling and tour operating supply chain management strategy can foster sustainability in tourism;

*Key limitations:*

- Environmental qualification criteria of tour operator suppliers are not based on the findings of LCA studies. Therefore, there is a significant risk to qualify structures which do not actually address the main environmental hot spots;
- The transport phase has not been included in the management system;
- There is no GHG accounting and reporting within Travelife system;
- No audit is required for Travelife qualification of tour operators.

*Major improvement proposals:*

- Choosing the environmental criteria for qualifying tour operator suppliers by taking into account the findings of a representative number of LCA case studies;
- Suppliers of passenger transport should be included in the scope of the initiative;
- Reporting the environmental performance of the labelled services may facilitate the continuous improvement of suppliers' environmental performance;
- Tour operators should be audited in order to monitor their improvement path.

## **EU eco-label**

*What it is:* Type I Environmental label (ISO 14024:1999) eco-label for accommodation structures and camp sites;

*Users:* Accommodation structures and campsites;

*Final stakeholder:* Those tourists who use to book tourist accommodation autonomously; Travel agencies and tour operators;

*Current dissemination:* More than 300 accommodation structures and 70 campsites have been labelled so far in the EU. In several European Countries, many tourist eco-labels different than the EU scheme have been disseminating;

*Websites:* [http://ec.europa.eu/environment/eco-label/index\\_en.htm](http://ec.europa.eu/environment/eco-label/index_en.htm), [www.eco-label.com](http://www.eco-label.com)

*Reference:* European Commission, 2009; European Parliament, 2008;

*Project funding detail:* ANPA (The Italian Environmental Agency, now called ISPRA) was appointed by the European Commission;

*Key limitations:*

- Even if inspired to LCA principles, no LCA study seems to have been carried out to define, validate and revise the mandatory and optional criteria of the EU Eco-label schemes;
- In several European Countries, many national based tourist eco-labels, different from the EU eco-label scheme, have been disseminating. This phenomenon, which practically represents an entrance barrier for the EU eco-label, clashes with the European harmonisation of EU standards and, therefore, with the recognisability of labels by tourists. The Visit initiative tried to overcome this limitation.

*Major improvement proposal:*

- Criteria of the existing EU eco-label schemes should be set up according to the findings of a representative number of LCA case studies to be conducted in the travel and tourism sector.

**Blue Flag**

*What it is:* a voluntary award for tourist destinations such as beaches and marinas;

*Users:* Municipalities;

*Final stakeholder:* Tourists;

*Current dissemination:* According to the Blue Flag web-site, in 2011 approximately 3650 beaches and marinas in 46 countries (across Europe, South Africa, Morocco, Tunisia, New Zealand, Brazil, Canada and the Caribbean) were awarded the Blue Flag;

*Websites:* [www.blueflag.org](http://www.blueflag.org) ;

*Reference:* FEE, 2011;

*Project funding detail:* The Foundation for Environmental Education in Europe (FEEE) presented in 1987 the concept of the Blue Flag to the European Commission, and it was agreed to launch the Blue Flag Programme as one of several "European Year of the Environment" activities in the Community;

*Key limitations:*

- The Blue Flag seems to be a quality label rather than an environmental one because its criteria seem to be more related to quality issues;
- The scope is too narrow (only beaches and marinas are covered).

*Major improvement proposals:*

- Additional environmental criteria may be introduced by deriving the key environmental issues and drivers from a representative number of LCA case studies;
- Further schemes may be used for labelling the environmental performance of tourist resorts other than beaches and marinas.

**Other tourist environmental labels**

*What it is:* Environmental labels and declarations of tourist services. Most labels are "Type I Environmental labels" (ISO 14024:1999) and are characterised by a regional scale



dissemination (e.g. Viabono, Legambiente Turismo, The Green Key, Milieubarometer, Ibex label, and many others);

*Users:* Tourist accommodation structures;

*Final stakeholder:* Those tourists who use to book their own holidays autonomously; Travel agencies and tour operators;

*Current dissemination:* slightly widespread at the regional scale;

*Websites:* Viabono - [www.viabono.de](http://www.viabono.de); Legambiente Turismo - [www.legambienteturismo.it](http://www.legambienteturismo.it); The Green Key - [www.green-key.org](http://www.green-key.org); Milieubarometer - [www.milieubarometer.nl](http://www.milieubarometer.nl); Ibex label - [www.oe-plus.ch](http://www.oe-plus.ch); and so forth.

*References:* Buckley, 2002; Font, 2002; Font & Buckley, 2001; Sloan et al., 2009;

*Project funding detail:* Many regional scale projects have been carried out so far;

*Key limitations:*

- Eco-labels in the tourism industry are many and their excessive proliferation clashes with their recognisability by tourists;
- Even if inspired to LCA principles, no LCA study seems to have been carried out to define, validate and revise the mandatory and optional criteria of the eco-label schemes;

*Major improvement proposal:*

- Criteria of the existing environmental labels should be set up according to the findings of a representative number of LCA case studies to be conducted in the travel and tourism sector.

## **Visit**

*What it is:* The Voluntary Initiative for Sustainability in Tourism (Visit) is a technical standard setting up the framework according to which credible tourism eco-labels should operate in Europe. The purpose of this initiative was, therefore, to put together tourist labeling under a unique umbrella, also to increase the label recognisability by tourists. Visit is also the name of the association which manages such a standard.

*Users:* Tourist accommodation structures;

*Final stakeholder:* Those tourists who use to book their own holidays autonomously; Travel agencies and tour operators;

*Current dissemination:* Twelve eco-label schemes have joined the Visit initiative so far;

*Websites:* [www.visit21.net](http://www.visit21.net); [www.ecotrans.org/visit/index.html](http://www.ecotrans.org/visit/index.html);

*Reference:* Hamele et al., 2004;

*Project funding detail:* LIFE00 ENV/NL/000810, Visit project - Eco-labels for Sustainable Tourism in Europe: demonstrating how eco-labels can move the European tourism market towards sustainability;

*Key limitations:*

- Even if the 6<sup>th</sup> criterion of the Visit standard states that, to be qualified by Visit, a tourist eco-label has to consider product life cycle issues in setting product related criteria, it is a bit obscure how environmental hot-spots have been identified so far;
- No accreditation scheme has been defined for tourist eco-label schemes to assure competence, credibility, integrity and independence from market stakeholders.

*Major improvement proposals:*

- Running a significant number of LCA case studies to come up with robust criteria should become a mandatory requirement in the Visit standard;
- Eco-label scheme programmes should be accredited by a third party body before letting the schemes to get in Visit;
- More efforts are needed to make the Visit's logo more and more visible by combining the existing eco-labels with Visit's logo.

### **TourBench**

*What it is:* A free European monitoring and benchmarking online tool to reduce the environmental burden and costs of tourist accommodation organisations;

*Users:* Hotels and campsites;

*Final stakeholder:* Hotels and campsites;

*Current dissemination:* Unknown;

*Website:* [http://destinet.eu/tools/measurement\\_instruments/tb-01-en-pub.pdf](http://destinet.eu/tools/measurement_instruments/tb-01-en-pub.pdf);

*References:* Hamele & Eckardt, 2007; Hamele & van der Burgh, 2006;

*Project funding detail:* LIFE programme, LIFE03 ENV/NL/000473, European Monitor and Benchmarking Initiative for Environmental Impacts and Costs in Tourist Accommodation;

*Key limitations:*

- The environmental assessment stage of TourBench is not based on a Life Cycle perspective;
- The scope of TourBench is too limited, including only hotels and campsites;
- Solutions for environmental improvement are suggested to users, but neither potential providers nor related prices are included in the tool;
- No considerations on quality are associated to environmental improvement solutions, thus jeopardising traveller satisfaction.

*Major improvement proposals:*

- Broadening the TourBench scope to other tourist services and covering their entire life cycles.

### **EcoPassenger**

*What it is:* A user-friendly internet tool to cross-compare energy consumption, CO<sub>2</sub> and other airborne emissions of alternative transport modes (e.g. planes, cars and trains) for travelling all around Europe;

*Users:* Travellers;

*Final stakeholder:* Travellers;

*Current dissemination:* Unknown;

*Website:* [www.ecopassenger.com](http://www.ecopassenger.com);

*Reference:* Knörr, 2008;

*Project funding detail:* Project funded by the International Union of Railways (UIC);

*Key limitations:*

- Even if LCA principles have been adopted, this instrument considers only the following transport modes: railway, car and airplane;
- The LCA methodology, on which EcoPassenger is based, did not include any LCA data on the following LCA phases: construction, maintenance, and disposal of infrastructures and vehicles;
- No booking is possible through the EcoPassenger's website;
- No link has been provided on Eco-Passenger web-site for eco-friendly tourist activities and destinations.

*Major improvement proposals:*

- The scope of Ecopassenger might be enlarged to additional transport modes and environmental indicators;
- Data should be in line with the European rules for LCI datasets in the ILCD Handbook (European Commission, 2010).

## 7. Proposal for a new methodological framework

To figure out if instruments are able to support each other and gain mutual benefits, potential synergies were investigated amongst: the existing sector-specific environmental instruments shown in section 6, an eco-design methodology for services (De Camillis et al., 2010c), and environmental performance-based declaration schemes (e.g. the forthcoming European Commission's Product Environmental Footprint, and the International EPD System). On this basis, a new methodological framework for sustainable consumption and production in the travel and tourism industry was developed (see Figure 2).

Key elements of this framework are:

- *Revised eco-label schemes* (i.e. Travelife labels, EU eco-label, other eco-labels in the Visit initiative). These labels, conceived for awarding those tourist products whose environmental performance is supposed to be more beneficial to the environment than on average due to the fulfilment of a set of criteria, are expected to be accompanied with the potential environmental performance of tourist products in terms of environmental footprint. This footprint may be calculated through an LCA-based calculator to be integrated in TourBench. Another major change concerns the procedure to derive eco-label criteria. More information are given below in the Core LCI database paragraph.
- *An improved version of TourBench*. In this context, the TourBench scope ideally is broadened to all travel and tourist activities, specifically transport to the destinations. In

this way, all tourist organisations are able to quantify the environmental performance of their own tourist products in terms of environmental footprint, and to detect options for improvement by comparing the environmental performance of their own products against a benchmark representing the average environmental performance of the whole product group. This is the product environmental footprint calculator that we proposed above for eco-label assessments. If developed according to a common set of methodological guidelines, this calculator may produce data for environmental labels to compare the environmental performance of tourist products and destinations in a consistent and scientifically sound manner.

- *A core LCI database.* When tourist organisations calculate the environmental footprint of their own products, the TourBench calculator may be used for this purpose. This calculator is envisaged to be linked with a central LCI database. This database aims at supporting any assessment to quantify the environmental footprint for eco-labels. The core LCI database may be composed of unit processes from the ELCD database (i.e. the European Commission's LCI reference database for energy carriers, transport, and waste management) (European Commission, 2011) and from other data sources. In addition, the core LCI database is expected to include the average LCI datasets of the tourist products covered by eco-label schemes. This is also needed to provide benchmarks to TourBench. For this purpose, representative average LCI datasets per tourist product concerned are expected to be regularly calculated from those product-specific environmental performance data coming out from the TourBench calculator. To come out with average LCI datasets, data need to be documented and reviewed e.g. for issuing eco-labels. The crucial environmental aspects of a certain tourist product's life cycle (i.e. the so called environmental hot spots) can be derived by analysing the findings of the tourist product datasets from the core LCI database. These environmental hot spots may be used for coming up with scientifically sound criteria for Type I eco-labelling schemes, and for feeding eco-design processes with regard to the key environmental requirements and technical specifications. Pre-requirement to derive scientifically sound criteria are to document in depth the LCI datasets of the tourist products labelled, and to follow international LCA guidelines (European Commission, 2010).

If the changes proposed above were implemented, the newly developed methodological framework would be able to support sustainable production and consumption instruments and initiatives in the travel and tourism sector.

In particular, if Figure 2 is read from the top, tourist organisations have the potential to:

- Assess and improve the environmental performance of their own existing tourist products by using the environmental footprint calculator included in TourBench. On this basis, options for improvement may be identified and implemented. If eco-label criteria are fulfilled, the tourist products assessed can then be labelled.
- Develop novel tourist products by using an eco-design tool. This tool may be a version of TESPI (Misceo et al., 2004) adjusted to the rules of the eco-design methodology for services developed by De Camillis et al. (2010c).

If Figure 2 is read from the bottom, the sustainable consumption side of the methodological framework can be identified. In particular, a platform to plan eco-friendly holidays is

envisaged. This instrument has the potential to help travellers in planning eco-friendly holidays “from door to door” by indicating the most environmentally-sound destinations, organisations and solutions (i.e transport modes, accommodation services and other tourist services). This might be possible if:

- The environmental footprint of package holidays can be calculated by summing up the environmental footprint figures of the tourist products that compose the holiday package (i.e. environmental footprint calculators in Ecopassenger and TourBench are combined);
- Booking platforms and web-sites add the environmental performance of tourist products to their general quality information and feedback, thus allowing users to sort out results according to their environmental performance.

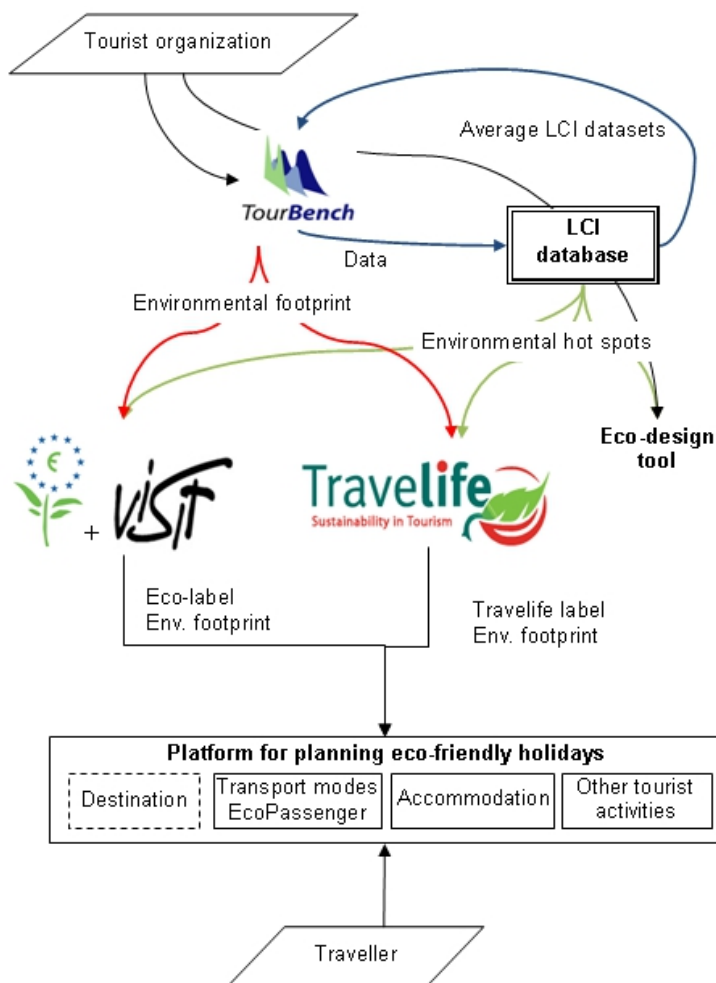


Fig. 2. A possible suite of LCA-based tools for eco-friendly holidays

## 8. Conclusion

In this chapter we outlined a new methodological framework for sustainable consumption and production in the travel and tourism industry. This framework includes, *inter alia*, a proposal for a new platform enabling travellers to plan eco-friendly holidays in Europe.

Learning from the experience of the European Food Sustainable Consumption and Production Round Table co-chaired by the European Commission and food supply chain partners (Peacock et al., 2011), significant improvements of sustainable production and consumption can be achieved if key stakeholders are equally involved in developing and fine-tuning a harmonised framework methodology for the assessment and communication of the environmental performance of products. A similar initiative would be advisable for the travel and tourism industry because the on-going proliferation of environmental assessment methodologies and communication tools has the potential to confuse or even mislead travellers and other stakeholders.

Integration of instruments, synergies among initiatives and general consensus across supply chain partners on methodological and communication aspects are needed to come out with consistent and stronger measures for sustainable consumption and production in the travel and tourism industry.

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# Economic Impact of Tourism – A Review of Literatures on Methodologies and Their Uses: 1969-2011

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## 1. Introduction

Tourism-based economic growth and development, a recent strategic phenomenon, has been attracted the attention of government, businesses, policy makers and other stakeholders of world economies. Tourism-based development is playing a pivotal role by contributing significantly to the GDP of developed and developing economies. Besides, it also receives a wide-spread recognition because of its ability to eliminate the disparities in the balance of payment (BOP) conditions by contributing positively to the services account of the BOP. The continuous expansion of the tourism sector made it possible to recognize it as the largest and fastest growing industry, considering either in a country specific or an aggregate global perspective. According to Eadington and Redman (1991), tourism industry is one of the largest and fastest expanding sectors of the world economy, and is thus experiencing an expansion faster than any other industry, exposing a post-industrial society. The economic repercussions of tourism are occurring in extensive latitude, within the evolution of the globalization process (Sugiyarto, Blake & Sinclair, 2003) that is, in turn, helping the acceleration of this industry's expansion around the globe.

Tourism industry is experiencing tremendous expansion over the years as results of its inclusion into the national economic plan of develop and developing economies of the world. Developing economies have been enacting policies to expand tourism as a source of reliable foreign exchange earnings when traditional foreign exchange earnings sectors contribution becomes limited in GDP. The previously unexplored developing economies are experiencing higher growth in expanding tourism than develop economies. However, the expansion is occurring due to its ability to generate substantial economic impact into economies of the world. Therefore, the objective of this chapter is to review the literatures

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on estimating economic impact of tourism, the methodologies used, and their uses held at several locations of the world. In order to attain the objective, papers on economic impact of tourism were collected from all renowned databases, such as, web of knowledge, science direct, proquest, emerald, ebsco premier etc. It was found that a variety of methodological approaches have been practiced by researchers to estimate the economic impact of tourism. To a large extent, these methodological approaches have been chosen to explain elaborately the primary objective of the chosen study and the related purposes of the primary objective. A summary of literatures on economic impact of tourism has been depicted throughout the chapter in order to explore the methodologies used and their uses in estimating the economic impact of tourism.

As tourism generates significant economic impact to an economy, the industry is gaining growing importance from all stakeholders of tourism. There are plethoras of studies attempted to address tourism industry's contribution to an economy. While academic literatures concerning the significance of economic impact of tourism are on the rise, tourism's contribution to the economy and impacts upon the local communities is not satisfactorily acknowledged (Vaughan, et al. 2000) maintaining either industrial classification as a single industry (Fletcher, 1989a) or the system of national accounts. Since the industry is not identified as a single industry and its contribution to the development of economies is not precisely derived, there is a need to conduct economic impact analysis of tourism – as tourism activity cannot be regarded as an isolated economic activity. To estimate and analyze the economic impact of tourism, a number of authors employed several methodologies covering input-output model, Keynesian multiplier model, social accounting matrix model, computable general equilibrium modelling, tourism satellite accounting modelling.

This section introduces several reviews about economic impact related literature on tourism economics. With respect to supporting the overall objectives, there is a need to investigate and gather considerable knowledge and information of what previous studies have covered in estimating economic impact of tourism. In doing so, this chapter reviews economic impact analysis of tourism related literature into five distinctive sections. The first section represents empirical evidences of measuring the economic impacts analysis of tourism that employed input-output technique. Empirical evidence of estimating tourism's economic impact using social accounting matrix is depicted in section two. The third and fourth sections represent the related literature on computable general equilibrium model and Keynesian multiplier model consecutively. The last section discusses the economic impact of tourism using tourism satellite accounting model.

## **2. Empirical evidence on the economic impact analysis of tourism**

The available literatures on estimating the economic impact of tourism has been delineated in the following section. A number of methods were employed to estimate the economic impact of tourism, such as, input-output model, general equilibrium model, social accounting matrix model, tourism satellite accounting model etc.

### **2.1 Input-output model**

One of the prominent studies that employed input-output model in estimating the economic impact of tourism was performed by Harmston (1969) using 1963 input-output table of

Missouri state economy. To identify the economic significance of secondary effects (indirect and induced effects) of expenditure made by tourist on the Missouri state economy for the year 1967 was the primary objective of the study. The results showed that the indirect effect of business and industrial activity generated per dollar of tourist expenditure was 23.22 cents, while the induced effect was 76.39 cents. This indicates that the induced effect was over three times the size of the indirect effect. The importance of measuring the induced impact was emphasized by the author as induced impact generated major portion of the secondary impact. Total amount of money generated by the secondary effect of tourist spending amounted to \$562,312,000 in which the induced effect accounted for almost 77%.

The particular interest of the next study was to estimate the tourist regional income multiplier conducted by Archer and Owen (1971). In fact, this is the first study attempted to estimate regional tourism multipliers. The input-output model was used in measuring various income multipliers of tourism considering the types of tourism sectors as well as different categories of tourists. Archer and Owen argued that the regional economic benefits accruing from different categories of tourists vary due to differences in leakage components. This model allowed the regional leakages in two ways: (1) when local business purchases goods from outside the region; and (2) when consumers spend money outside the region. This model was applied in the county of Anglesey and Gwynedd in North Wales. The income multipliers were estimated as (1) 0.25 for hotel and guesthouse visitors; (2) 0.14 for caravaners; (3) 0.58 for bed and breakfast and farmhouse visitors; and (4) 0.35 for camping visitors.

The tourist regional multiplier model to examine the economy-wide impact of tourism was first developed by Archer and Owen (1971). Later, it was modified by Liu and Var (1982, 1983), Liu et al. (1984), and Liu (1986), Henry and Deane (1997), Fretchling and Horvath (1999), Yan and Wall (2002). In their studies, the basic input-output model was the foundation of deriving sectoral multipliers. Differential tourist multipliers were estimated using the model to gauge the contribution of tourism industry at state, regional or country level.

Liu and Var (1982) analyzed differential income and employment multipliers of accommodation industries in terms of their organization characteristics, i.e., location, size, scale, affiliation, and ownership in Victoria, BC., Canada in 1977, using the modified input-output model developed by Archer and Owen in 1971. It was hypothesized at the outset that the observed multipliers varies in inverse magnitude with types of industrial organization characteristics mentioned above. In testing whether there are any significant differences between lodging industries and their organizational characteristics or not, ANOVA (One-way analysis of variance) was employed in the study. The tests revealed that the regional income generation effects were statistically significant at the .01 levels by type of ownership. The regional employment generation coefficients and transactions multipliers also appeared to be statistically significant by different type of facilities (e.g., licensed and non-licensed establishment). Liu and Var emphasized that a multiplier analysis should be employed cautiously, taking into account the framework of regional objectives that comply with tourism planning guidelines, as it only explain a part of the total context. They concluded that domestically controlled and possessed lodging establishments ought to be promoted if the objectives were to optimize income. Furthermore, the smaller scale lodging establishments had to be given development priority through some supporting policy implications if the aims were to support more employment.

Liu and Var (1983) used provincial surveys and the modified input-output model to analyze the economic impact of tourism on the Metropolitan Victoria B.C. state of Canadian economy for the year 1977, in terms of output, income, job, import and government revenue. The modified input-output model employed in the previous study was used on the basis of a 13x13 input-output transactions table of the state economy. The multipliers carried out by the study were 1.504 dollar worth of output multiplier, 0.65 cents worth of income multiplier for each dollar of tourist expenditure while the employment multiplier was found to be 0.10 for tourist expenditure per thousand dollars. The estimated government revenue multiplier was 0.21 and the estimated import multiplier was 0.34 per dollar of expenditure made by tourists. Income and employment multipliers were also analyzed for two tourist categories- overnight visitors and day-trippers reflecting that overnight visitors (non-residents) generated a little more household income than the day-trippers did by a slight difference of 1.5% in regard to the income multiplier. However, the former appeared to create less employment than the latter by 12%. It was also found that the overnight non-resident visitors generated \$71,225 income and 11,114 jobs, while the day-trippers created \$3,183 income and 568 jobs in terms of total tourist expenditure. The income multiplier of the locally-owned hotels and motels was found to be higher than that of outside-owned accommodations. But, the findings indicated that the locally-owned hotel and motels contributed only 26.8% of income generated by total tourist expenditure, while outside-ownership contributed largely by 73.2%.

Liu et al. (1984) measured tourist income multipliers of Turkish economy for the year 1981 generated by different types of tourists. The service sectors were found to be yielding high direct but low indirect multipliers, indicating the high wage-intensive nature but low backward linkages. On the other hand, the manufacturing sectors in general yielded high indirect but low direct multipliers, indicating capital-intensive nature and strong inter-sectoral linkages. The tourist income (value-added) multipliers showed that the domestic excursionists had the largest multiplier (2.03), followed by that of overseas Turkish tourists (2.03) and foreign excursionists (2.02). The income multipliers for the domestic overnight visitors and foreign overnight visitors were found to be 1.97. The results revealed that foreign and domestic excursionists and overseas Turkish tourists generated the high-income multiplier against overnight domestic and international visitors. The study described that this difference in multipliers had occurred due to the expenditure variety of tourists where the earlier tourists had the tendency to make additional spending on purchasing retail goods while these tourists made lower expenditures on hotels and restaurants than the later.

Archer (1985) analyzed economic impact of tourism on the Mauritius economy in 1980. The results showed that the total output multiplier was 0.9639 and the employment multiplier was 49 per 1 million Rs (Rupees). The variation in impacts generated by tourists of each inbound countries indicating that tourists from West Germany, Switzerland, South Africa and the UK made a extensive impact on the economy per visitor. Among the tourists' origin markets, the lower impact was found to be generated by tourists from France. Archer asserted that the high rank in total number of visitors did not necessarily mean the largest economic impact. For instance, visitors from Reunion occupied the largest proportion of total visitors (about 23%), but they generated the lowest income per visitor except Malagasy. Archer concluded that target markets generated reasonably higher economic impact through higher expenditure on tourism related businesses in Mauritius. Therefore, the study



suggested that tourism should be promoted in maximizing income, supporting more employment, and generating significant foreign exchange earnings from international inbound tourism.

Ruiz (1985) employed input-output technique to investigate tourist expenditures economic impact on Puerto Rican economy in 1980. The study used 110X110 transactions matrix developed by Puerto Rico Planning Board in 1972. The results showed that the output multiplier was 2.08 resulted from per dollar tourist expenditure and the employment multiplier was found to be 142 per million dollar of tourist expenditure in 1980. It was noted that the number of employment declined from 88 full-time jobs in 1972 to 59 full-time jobs in 1979 for the hotel industry. Ruiz mentioned that this reduction was due to an increase in worker's productivity or the substitution by a more advanced technology.

Liu (1986) used the modified input-output model to estimate the significant economic contributions made by different groups of tourists in generating multipliers for the Hawaiian economy in 1980. Sector multipliers were obtained by using a 63x63 transactions table for 1983. A survey questionnaire of tourist expenditures was prepared to estimate income multipliers yielded by various groups of tourists. According to the findings of the study, income multiplier generated by tourists for Hawaiian economy in 1980 was 0.80; indicating about 80 cents of local household income were generated per dollar of tourist spending. In addition, about 80 jobs were created per one million dollars of tourist expenditures.

The largest household income multiplier of 0.84 per dollar expenditure of tourists appeared to be generated by Japanese tourists which was 5% more than average income multiplier. The result also showed that the Japanese tourists had the largest income multiplier which was contrary to common belief that the Japanese tourists were likely to generate the least income multiplier for households from per dollar of expenditure. The ground of that belief was due to leakages resulting from purchases of imported luxury goods and businesses controlled by Japanese owners. Japanese tourists made proportionately higher expenditure on retail goods and lower on hotels and restaurants as most of the Japanese tourists were visiting friend and relative (VFR) type of tourists. The findings of the study indicated that Japanese tourists were responsible for the highest direct and induced income multipliers. The employment multiplier was found to be 0.08 indicating that about 80 jobs were created per one million dollar of tourist expenditure. The Japanese visitors and VFR type of tourists appeared to be generating higher employment multiplier than the average by 7% and 12%, respectively. The break-down of the visitor expenditure showed that the Japanese visitors spent about three times as much as did other visitors per day, but less per visit due to the shortest length of stay. Although the Japanese and Canadian tourists contributed largely to the economy in terms of average tourist expenditure, the greatest impact and contributions were made by domestic tourism (mainland USA), accounting for 62% of receipts, and 59% of income and employment.

Fletcher (1989) attempted to improve some limitations over a conventional input-output model. It was argued that imports should be categorized into competitive and non-competitive imports. This is because competitive imports are considered as substitutes to the domestic production. Fletcher made an adjustment on the basic input-output model by deducting imports content column from the final demand. The modification was

accomplished in order to exhibit the real output of each sector. However, the elastic supply assumption of the input-output model revealed that the supply should be elastic for all economic sectors under study. Fletcher argued that when there were capacity constraints, this assumption might overestimate the true impact of tourism if there was any change in final demand. Fletcher asserted that when some sectors were unable to comply with a certain increase in final demand, an increase in imports of goods and services would result to meet up that increase in final demand. Fletcher further modified the input-output model to avoid this problem. A matrix of capacity constraints was developed and used to the respective processing sectors.

Fletcher claimed that any attempt to modify a basic input-output model might require increases in data requirement. Therefore, he recommended the construction of “hybrid” models which enable researcher to only disaggregate tourism sectors and aggregate the rest of the sectors of the economy into a single processing sector. The model should be utilized when the lack of reliable data prevented the researchers from building a full input-output model though it might decreased the accuracy of the results. Therefore, the author concluded that these models might be suitable only for a small-scale economy.

Fesenmaier, Jones, Um and Ozuna (1989) estimated the economic impacts of outdoor recreation activity on local economies as they were related to freshwater inflows into each of the six estuaries (Sabine-Neches, Trinity-San Jacinto, Lavaca-Tres Palacios, Guadalupe, Nueces and Mission-Aransas, Laguna Madre) which covered the Texas Gulf Coast region. The direction of the study was to analyze the economic impacts of sport fishing, hunting, picnicking, swimming, camping, pleasure boating and sightseeing on the economies of the Texas Gulf Coast region and the state of Texas in the generation of output, employment, income, and state local tax revenue. The state-wide Texas Gulf Coast economic impacts were estimated by using the state-wide expenditure data collected from the entire Texas Gulf Coast and a 1986 input-output model of Texas was developed for this study.

Data were collected following a two-step-strategy which incorporated both telephone and mail surveys. The focus of data collection was based on typical or average tourists' visit(s) to the Texas Gulf Coast during 1986 on each particular place along each estuary. The total expenditure of a typical tourist was grouped into six categories of goods and services (overnight lodging, transportation, grocery store purchases, restaurants and other eating establishments, rental of recreation equipment, and fees for entrance, participation, and guided tours). Their study postulated that tourists' expenditure generated positive impact and the expenditure were found to be varied according to income, occupation, age, date of visitation, and tax revenue over the gulf coast region. Total visitation and resulting expenditures were estimated and processed through input-output analysis. The results showed that the total output impact in 1986 amounted to \$1.19 billion for the Texas Gulf Coast and \$1.91 billion for the state. Also, the results showed that 59% of these impacts resulted from fishing-related travel to this area.

Heng and Low (1990) conducted an input-output study to estimate tourism's economic impacts in Singapore emphasizing on exhibiting the differences between Leontief and Leontief-Keynes multipliers. Differential sectoral multipliers were estimated based on tourists' countries of origin and their purpose of the trip. The 176 input-output sectors were aggregated into 46 sectors with regard to the availability of reliable data, such as

expenditure patterns of foreign visitors, sectoral employment etc. The total output and income multipliers of tourism industry were estimated to be 1.96 and 0.98 per Singapore dollar of tourist expenditure. Trade (shopping) sector retained the highest income multiplier, while transport sector retained the lowest multiplier for each of the tourism related sector. Heng and Low compared the relative economic contribution of tourism industry against manufacturing and export substitute industries. When comparing the income multipliers of different industries, it was found that the income multiplier of tourism industry exhibited the highest income multiplier of 0.98 against 0.57 and 0.40 per Singaporean dollar for the manufacturing and export substitute industries respectively. The employment multiplier was found to be 0.033, implying that tourism supported 33 jobs per million dollars of tourist spending, which was more than doubled and tripled of what the export and manufacturing industries supported. The tourism import leakage appeared to be the lowest with 0.27 compared to the export and manufacturing industries. The results also revealed that tourism promotions should not ignore tourists from low-income countries because there were no significant differences between tourists from developing and underdeveloped countries. Overall, they found that tourism contributed significantly to the economy and tourist earnings were more potent than manufacturing and other export sectors.

Khan, Chou and Wong (1990) also utilized input-output analysis using 1983 input-output transactions table in an attempt to measure the impact of tourism on Singapore economy. Khan et al. argued that treating shopping items equally would be misleading since high value items, such as jewellery, cost several times as much as low value items like books. Therefore, the shopping items were categorized into most expensive, moderately-expensive, and the least expensive in nature according to the expenditure pattern of tourists. The study revealed that the contribution of tourism to GDP was 12.5%. The tourism income multiplier appeared to be 0.94, which was lower than the multiplier obtained by Heng and Low (1990) but higher than Bahamas, Fiji, and Cayman Islands. The estimated tourism employment and output multipliers were 33 jobs per million of Singaporean dollars and 1.96 per Singaporean dollar respectively which appeared to be similar to the findings of previous study of Heng and Low. The import multiplier was estimated to be 0.38 per Singaporean dollar.

Rashid et al. (1993) conducted an inter-sectoral analysis on Malaysian economy concerning tourism impact analysis in which static input-output analysis was the basis of analysis. The study used 1983 input-output table to estimate the impact of tourism on Malaysian economy for the year 1991. Tourist and non-tourist components were categorized from private consumption expenditure column and export column of the final demand sectors of 1983 input-output table. The direct and indirect impacts on sectoral output, employment, commodity taxes, and non-competitive imports were estimated resulting from tourist expenditures which were generated following questionnaire method in 1991. Tourist expenditures were categorized into domestic, Singaporean, and other foreign tourists. It was found that all sectors of the economy were receiving benefit from tourism directly and indirectly. The contribution of tourist expenditure in influencing output, employment, and commodity taxes was found to be varied but still small. The contribution of tourism on the generation of value-added, employment, and commodity taxes was found to be less than 5% of the total but steadily expanding. The Wholesale and retail trade, Hotels and restaurants, Land transportation, Air transportation, and Business and personal services sectors were benefiting largely from tourism. The study concluded that other sectors did have strong technological linkages with other domestic supply sectors; therefore, it required to give

simultaneous emphasis to the development of these strategic and non-strategic tourism sectors when designing tourism policy.

Archer (1995) used input-output model to translate the importance of tourism for the Bermudan economy. A summary of visitor arrivals and expenditures illustrated that Barmuda's tourism receipts were declining in the early 1980s until 1992 due to worldwide recession. Input-output models were developed for 1985, 1987 and 1992 where impacts on import, income, employment, and government revenue were measured for specific tourist sectors for overnight and cruise passengers. The study findings revealed that tourism became the principal source of employment although this sector was no longer the main source of foreign exchange and income for the Bermudian economy. The tourism income multiplier rose from 1.095 in 1985 to 1.257 in 1992 and supported 11,500 employments. Archer concluded that Bermudian government should give emphasis on strategic measures to improve the tourism product.

Archer and Fletcher (1996) analyzed the impact of tourists' expenditure's contribution on the generation of income, government revenue, and supporting employment and the balance of payments using input-output model to the Seychelles island economy. The input-output transaction table was disaggregated into 18 sectors. While analyzing the economic impact of tourism by different country of origin tourists, they found that impact varies by visitors' origin. Visitors from Germany, Italy, Switzerland, Ireland, the UK and other European countries were the highest spenders and contributed significantly in generating income and employment.

Andrew (1997) conducted a study in the UK periphery, Cornwall to examine the relationship between the economic development of Cornwall and tourism. The study pointed out that tourism is particularly suitable in places where there was an existence of high unemployment in association with relatively lower wages. Cornwall tourism industry was found to be significantly accommodation-centred and UK tourists account for about 3 millions of tourists annually. A linear programming framework was employed where Leontief coefficients were estimated from an adjusted 1984 input-output table of Cornwall economy. The study's empirical results suggested that if the target was to develop the peripheral economy, and then tourism expansion might not be the right strategy where tourism was led by accommodation-based tourism. The study revealed that in implementing such tourism attitude might affect indigenous industries negatively. The author suggested increasing tourism while simultaneously supporting indigenous industries would be the right choice to favour tourism. The study showed a relationship between the generations of positive external balances and economic development where tourism was contributing significantly to the generation of these external balances. The study asserted that Cornwall's portfolio industries should be given priority when preparing strategic policies for the regional development.

Stynes, Nelson and Lynch (1998) used IMPLAN input-output model in assessing the economic impact of snowmobiling to the state and regional economies in Michigan. They found that the direct income impact of snowmobilers was \$48 million and employment impact was about 2,500. The secondary income impact was \$93 million and 3,800 employments. The study also categorized the expenditure pattern of snowmobilers according to region. The findings of the study showed that Out-of-State snowmobilers generated about one-third of the total impact.

Huse, Gustavsen and Almedal (1998) analysed the economic impact of tourism among nine Norwegian small municipalities in terms of sales and employment effects by estimating multipliers of four small municipalities and the results obtained in previous studies for other five small regions. The direct industry, direct spine-off, and secondary effects were estimated to show comparison of multiplier effects on local and regional levels. The secondary effects of tourism were found smaller than direct effects as the study was held for the core municipalities only. The authors found that the magnitude of multipliers were varied resulting different types of impacts depending on the stage of development of the local tourism industry, leading types of tourist attractions, types of tourism product attributes, and nature of investments in tourism industry.

Mistills and Dwyer (1999) assessed the value-added and employment impact of MICE (meetings, incentives, conventions and exhibition) industry between Australian tourism gateways and non-gateways using input-output analysis. Their study revealed that economic impact of MICE tourism was expected to be larger in gateways than in non-gateways of Australia.

Frechtling and Horvath (1999) conducted a study on Washington D.C. economy, assessing the economic impact of tourism by employing regional Input-output Modelling System (RIMS II). The estimated implicit final demand output, earnings, and employment multipliers were found to be 1.1841, 0.3478, and 18.0 (jobs generated by per \$1 million of output delivered to final demand) respectively. A total visitor expenditure of \$2,396.4 million generated a total output, earnings, and employment impact of \$2,837.7 million, \$748.6 million, and 38,685. The ratio (or direct-effect) and normal multipliers (or final demand) multipliers were measured to compare the relative contribution of tourism with other sectors of the economy. The normal earnings and employment multipliers were found to be higher than other local industry aggregations. The authors concluded that the use of ratio multipliers was more precise than normal multipliers in observing the inter-industrial linkages with tourism sector. Based on the study, it was found that tourism sector employees tend to spend more of their income on local goods and services or a mixer of both. The magnitude of ratio and normal multipliers of tourism sector represented that linkages of this sector with local suppliers were higher than the average industry.

Tohamy and Swinscoe (2000) assessed economic impact of tourism in Egypt using input-output model to estimate how tourists' expenditure flowed in different economic sectors using input-output tables of 1991/92.. The study revealed that tourism revenue only included earnings from hotel and restaurant services. Therefore, the study unable to provide a complete figure of economic impact of tourism as it did not take into account the expenditures of tourists on other goods and services that tourists purchased during their trip. The estimated primary and secondary impact of expenditure made by international tourists was US\$ 9.6 billion in 1999 which was 11.6 percent of GDP. Total value-added contribution of tourists' expenditure was about 7.5 percent of GDP. In 1999, the direct and secondary employment supported by international tourists' expenditure was 1.2 million and 2.7 million of employment respectively which was representing 7 and 15 percent of total employment respectively. The direct and secondary income effect of inbound tourists' expenditure was US\$670 million and US\$1.4 billion respectively. And, inbound tourism generated LE 3.6 billion of sales and income tax revenue in 1998/99 contributing 5.1 percent of total direct and indirect taxes of that year. Finally, the study translated out that the

amount of foreign exchange earnings from inbound tourism could be compared to alternative export competing products of Egypt. The study pointed out that inbound tourism in Egypt was still below potential level, and coordination and effort should be given by both public and private parties to raise international tourism to its potential level.

Kweka, Morrissey and Blake (2001) conducted a study in Tanzania using input-output analysis to identify whether tourism was the key sector for the Tanzanian economy. Direct and indirect impacts of tourism on income, output, employment, and tax revenue were examined. Kweka et al. argued that the growth of tourism industry did not only depend on the productivity level of this industry alone but also on the level of productivity level generated by other industries or sectors. The study emphasized that sectors that benefited from tourism expansion should be identified for policy purpose, as they were likely to enhance the growth impact of tourism. In assessing the interdependence of tourism with other sectors in Tanzanian economy, the study first used static multiplier analysis. Then, the analysis of intra-sector and inter-sector linkages of tourism was carried out through linkage analysis. Finally, the study used a Multi-criteria approach to identify whether tourism can be identified as a key sector.

In addition, the findings of the study revealed that tourism was more import-intensive than other sectors. The study elicited that tourism benefited little from other service sectors compared to linkages with agriculture and manufacturing. This was further evident from its significant output impact. The direct output effect of tourism expenditure amounted TZS (Tanzanian Currency) 21,930 million in 1992 which was 1.7% of total GDP. Total output impact (direct and indirect) was TZS (Tanzanian Currency) 74,012 million which contributed 5.8% on GDP. Intra and inter sectoral impacts resulted from almost zero to 3.2% and from 1.7% to 2.6% of GDP respectively. The results showed that there was an increased output impact of tourism if indirect effects were added. Intra-sector effects were significant when considering indirect effect.

The above study revealed that the employment impact of tourism was insignificant. The differential income multipliers were estimated to represent that tourism had insignificant impact in terms generating income. Tourist spending generated TZS9471.2 millions of direct labour income in 1992 accounted for 0.7% of GDP. The total (direct and indirect) impact created TZS16, 247 millions of labour income which was 1.3% of GDP. The study suspected that lower income resulted from lower wages prevailed in tourism sector. Indirect tax revenue generated by tourism was found to be the second most important sector. Tourist expenditure generated TZS2, 126.5 millions of direct government tax revenue (2.7% of net indirect tax).

The amount of tax revenue reached 3,149.3 million which was 4.1 percent of total net indirect taxes when indirect effects were taken into consideration. The direct and total impact on import was TZS6, 291 million representing 1.6% of total import and 8,410.2 million representing 2.1% of total import. The net foreign exchange earning was 79 cents per tourist at the direct and indirect level as 21 cents went out from the economy through import leakage. At the direct level, 85 cents was generated as the net foreign exchange earnings as 16 cents leaked out of the economy through import leakage. In nominal terms, US\$ 120 million of tourism receipts generated the direct tourism net foreign exchange earnings of US\$102 and the amount increased when indirect effect was to be taken into consideration. The study's overall results implied that the tourism contributed significantly to the Tanzanian economy not only as a foreign currency earner but also acted as an avenue

through which important structural changes made possible. The study was unable to precisely measure the economic impact of tourism since only hotel and restaurant sector was considered. The estimation of total economic impact of tourism was not represented as the household sector was not included into the model being an endogenous sector.

Yan and Wall (2002) studied the prospects of domestic and international tourism using a traditional type I input-output model of Chinese economy for the year 1992. The authors excluded the impacts on domestic consumption expenditure from the employed input-output model. Multipliers were derived to represent the impact of tourism in the generation of output, income, employment, value-added, and import. The size and diversity of the Chinese economy were the causes of why tourism had an insignificant impact on its economy. This study estimated the impact of tourism on other sectors of the economy and revealed that tourism had insignificant impact on the results of primary sectors as a consequence of weaker linkages of tourism with the primary sectors of Chinese economy. Finally the study concluded that the availability of secondary commodities created constraints on tourism development in China.

Chhabra, Sills and Cabbage (2003) used input-output model to estimate the impact of Scottish highland games in the economy of North Carolina to represent the significance of festivals to rural economies. Multiplier effects on output, value-added, and labour income were estimated by incorporating tourist survey data to an input-output model for two Scottish festivals held in rural North Carolina. Type I and SAM multipliers were calculated to capture the interdependencies of sectors and the effects of household expenditure induced by changes in labour income. It was found that although increased tourist expenditure generated significant benefits for direct festival related businesses, the total economic impact was found to be insignificant when comparing the festival related activity to total economic activities in two regions. The authors indicated that lack of information and admission fees and leakages out of the region limited the study to estimate the output impact accurately.

Kim, Chon and Chung (2003) used input-output analysis to measure the economic impact of convention tourism in South Korea on the generation of output, employment, income, value-added and import. The authors found that the amount of about \$66 million and \$73 million were born by the total expenditure made by international convention participants and by the providers of conventions respectively. The estimated output, income, employment, tax, and import multipliers were estimated to identify the convention industry's economic contribution against other major export substitute products. Estimated economic impact of convention industry was found to be very significant.

Sun and Stynes (2004) conducted a study on estimating the economic impacts of visitor expenditure at Pictured Rocks National Lakeshore, Michigan for the year 2001. Input-output analysis was carried out to measure visitor expenditure impacts on personal income, employment, and value-added. The authors found that park visitors spend \$14.8 million in the park which generated \$5.6 million in total as personal income, \$9.2 million as value-added and generated 470 employments. The estimation biasness and errors, resulting from inconsistent responses and unrepresentative sample data, were elucidated in their study.

Rashid and Bashir (2004) used partial inter-industrial analysis or an open input-output model on measuring impacts of changing tourist profile on Malaysian economy. The basic

purpose of their research was devoted to explain the importance of West Asian tourists' economic contribution to tourism industry resulted from the change in the geography of tourist arrivals and their expenditure patterns. The study revealed that the economic impact on changing tourist profile had an impact on domestically produced goods. Through primary impact, tourism activities benefited the businesses and industries that served tourists directly but all sectors of the economy were experiencing benefit from secondary impact. The inbound tourists' expenditure patterns of all types of regional tourists were found to be very similar - spending the biggest proportion of their expenditure on two items namely: (i) hotel and restaurants and (ii) wholesale and retail trade. Tourism expenditure impact on output, import, tax revenue and value-added were measured for Malaysian economy through deriving partial multipliers. The results revealed that there was no direct effect on output of some sectors, and service sectors benefited largely from tourism activities. But the products and manufacturing sectors were getting indirect benefit from tourism activities. In terms of expenditure component, hotel and restaurants as well as wholesale and retail trade were the dominant component. When considering output multipliers, hotel and restaurants sector generated the largest multiplier. According to Rashid and Bashir, strategic planning needed to be adopted in improving the multiplier of hotel and restaurant through inter-industrial linkages so that this sector could be able to meet its requirements from within the domestic economy.

Wiersma, Morris and Robertson (2004) analysed the variation of tourism multipliers using input-output analysis to New Hampshire economy. The authors found that multipliers of tourism vary from region to region. The regions of the state with larger population generated higher output multipliers whereas the regions with lower population generated higher employment multipliers. The output multiplier of tourism at state level was 1.5 and employment multiplier was about 30.07 per million dollars. They concluded that state-level tourism multipliers should not be applied to sub-state level since they vary from region to region. Finally, they suggested paying attention to the misuse of tourism multipliers that might lead to an inefficient distribution of state resources.

Martin (2004) analyzed the role of imports and tourism consumption effects on GDP on the Canary Island economy, Spain. Keynesian Multiplier model and input-output analyses were employed to estimate direct, indirect and induced multipliers impacts of tourists' spending on generation of imports. The study revealed that import leakages from the circular flow system had impacted the economy negatively. The author claimed that his study was unable to determine the inter-sectoral relation of the economy due to the limitations of Keynesian multiplier model. This inability made it impossible to detect the indirect import impact tourism consumption on imports. The study used more efficient input-output model to represent the import impact of tourists' consumption as a replacement for Keynesian method to overcome the main disadvantage of this method. In doing so, input-output model multipliers were determined to represent inter-sectoral relations existed explicitly within the framework of economic system. In Canary Island, tourism consumption was 615 billion Pesetas in 1992. A total of 755 billion Pesetas of output and 484 billion Pesetas of value-added were generated from tourism consumption which was about 22.8% of GDP. 21.4% GDP of this economy was attributed by the tourist spending. Per unit of expenditure made by tourists generated 1.23 Pesetas of output and 0.79 Pesetas of value-added in the year 1992. Of the total value-added, direct value-added multiplier contributed 0.56 while indirect



value-added contributed 0.22. The estimated multipliers were medium-lower than multipliers found in other regions.

It was translated that the demand for intermediate input was found lower because of the weak inter-sectoral linkages between tourism and other sectors of the Canary Island economy which resulted in lower indirect multiplier impact. There were other features that were identified as the reason for lower indirect multiplier impact. Firstly, lack of structural strength, and secondly, tourists spent more on service sectors. The total import multiplier was found to be 0.430 where the direct, indirect, and induced impacts were 0.104, 0.109, and 0.216 respectively. The household consumption direct import multiplier was 0.265 which was two times greater than consumption of non-residents. The study suggested that enhancing the output and income multiplier impact would reduce the leakages generated from import of goods and services that was used to satisfy tourist demand.

Daniels (2004) developed occupation-based input-output modelling to assess the effects of tourist spending in the sporting events of Girls Fastpitch World Series, to the income of different job categories, in Mecklenburg County, North Carolina, USA. Input-output model was applied to estimate employment impact. The estimated employment represented the amount of needed new labour over a year due to a change in final demand. The estimated input-output employment was modified through occupation based modelling to rationally reproduce how much human hours and corresponding wages were generated from occupation because of short-term demand for tourism. The author also identified the occupations that were likely to be affected by a change in the final demand and concluded that full time equivalent salaries of \$15,000-\$40,000 of jobs were most likely affected by the event.

Albqami (2004) estimated output, employment, and income multipliers of the Saudi Arabian economy from the economic impact analysis of tourists' expenditure using input-output model. The input-output transaction table of 1997 was disaggregated into nine sectors where tourism sector was included as one of the sectors. The impacts of tourist expenditure on output, income, and employment were measured at direct and indirect level. The share of output, income, and employment was found to be 5% of gross output, a total SR8690 million of income and the service sector received 33% of income from tourism receipts, and the total employment generated from tourism expenditure was 507,114 which was about 12% of total employment. The study concluded that service sector received highest income and employment impact although output impact was relatively lower compared to transportation sector.

Lee and Taylor (2005) conducted a study on the economic impact of 2002 FIFA World Cup in South Korea using input-output model. The output, income, and value-added impact of tourists' expenditure were determined excluding non-event related tourists. The output, income, and value-added impacts of FIFA World Cup in South Korea were \$1.35 billion, \$307 million, and \$713 million respectively. They found that international tourists who visited World Cup in South Korea contributed more to the economy than those who visited for other purposes. The event related tourist expenditure was estimated to be 1.8 times. The authors also concluded that inclusion of non-event inbound tourists' expenditure would result significant overestimation of economic impact of an event.

Bashir and Ahmad (2005) investigated the impacts of West Asian tourists' expenditure and analyze the profile of tourists using static closed input-output model. The study found that hotel and restaurants, entertainment, wholesale and retail trade and business services

sectors received greater economic gains from tourism. The objective of this study was to examine the impact of inbound tourists' compositional shift from the contiguous countries to West Asian economies tourists. In order to attain the objective 300 survey questionnaires were distributed to tourist's in the Klang Valley region. The response rate was found to be 71 percent. The results from the statistical analysis also revealed that accommodation, shopping, and food and beverages were the three sectors where West Asian tourists made larger expenditure. Based on the findings the study suggested that West Asian tourists would revisit Malaysia if they had the opportunity to explore the emotional and experiential aspect of tourism. Cultural and heritage background, i.e. Batik, should be the unique brand characteristics for Malaysian tourism to expand as well as education tourism. The study also suggested conducting research in identifying the major short and long-haul inbound markets for the betterment of Malaysian tourism industry.

Contini, Scarpellini and Plidori (2009) analyzed the economic impact of agricultural based tourism on the progress of a community, Low-Valdelsa, Italy. Input-output analysis was employed to estimate the income and employment effects of agriculture-based tourism. The authors applied an appropriately modified regional accounting matrix to obtain the objective of the study. The prevailing constraints of agriculture-based tourism's economic impact in obtaining socio-economic development were pointed out and argued. Data were obtained from direct investigation. The authors concluded that the absence of product suppliers' coordination with the service providers was weakening the local product visibility. The authors suggested extending and strengthening particular activity actions along with lifting up the product quality to realize amicable benefit. As a result, agro-tourism would have higher impact on the economic development of Low-Valdelsa, Italy.

Schubert and Brida (2009) employed input-output analysis to examine the macroeconomic effects of an increase in the demand for tourism as a result of exogenous inflow of visitors' income and marketing promotion activities of tourism products in a small destination. In addition, a dynamic general equilibrium model was utilized to represent the effects. It was found that there would be a rise in the domestic production and price of services provided to tourists if there was an increase in demand for tourism. The economy would be experiencing a higher stock of capital along with a decline in net foreign possessions since dynamic change takes into account the current account deficit and accumulated capital. Increase in visitors' income would be leading to an increase in wellbeing effect of locals while uncertain changes were appeared to be occurring on the wellbeing and consumption of locals. In addition, the study also concluded that a short-term increase in tourism demand would generate strong changes in real foreign benefit status and agents' consumption.

## **2.2 Social accounting matrix (SAM)**

Several research fields have used social accounting matrix (SAM) in quantifying the economic impact, such as ecological economics, agricultural economics, economic modelling, development economics, and tourism.

West (1993) used a combination of social accounting matrix with econometric analysis in measuring the significance of tourism in Queensland State economy of Australia. The study results showed that there were sizable economic impacts of tourism on both gross state product and employment. Tourism in Queensland was estimated to generate \$2.1 billion of the gross state product, in addition to \$3 billion initial expenditure made by tourists. It was

estimated that 80,000 jobs were directly or indirectly related to tourism in 1990-1991 period. The author simulated 15% increase of international tourists and 2.5% increase of domestic tourists with the potential to increase the Gross State Product (GSP) to \$5.6 billion and 235,000 employments in 2000-2001. Recreation sector, followed by trade, manufacturing, and transport sectors were identified as the major employment providers. The study concluded that more investment in improving the infrastructure would provide additional stimuli in the economy.

Wagner (1997) estimated the economic impact of tourism in Guaraquecaba, north-eastern State of Parana, Brazil using SAM. The finding of the study concluded that the economic impact of tourist expenditure was small due to high import leakages since businesses imported most of their inputs to satisfy tourist demands. Average expenditure of a tourist was \$15.12 per day. The study asserted that a formal employee effort to obtain one minimum salary required 214 tourist-per-days. Approximately 7,500( $\pm 2,500$ ) visitor arrivals were estimated to generate \$244,575 value of additional output, 32 fulltime jobs, and a total wage of \$19,425.

Daniels, Normans and Henry (2004) utilized social accounting matrix (SAM) to estimate household personal income and three other variations of occupation-based model to estimate the effects of a sports tourism event on individual wage in Charleston, South Carolina, USA. The authors argued that social accounting matrix was inappropriate in assessing personal income effects for different households during sports tourism events because of its limitations to weight income by sector. Personal income coefficients were found favouring high income households. Since social accounting matrix did not allow for any particular occupations, wage variations by job category were unable to be measured. Therefore, their study used average full-time equivalent wages which were most precise for sports tourism. The most impacted full time equivalent wage occupations ranged from \$15,000 to \$40,000.

Oosterhaven and Fan (2006) employed social accounting matrix along with input-output technique in estimating the international tourism impact on Chinese economy. The study developed an extended input-output model and related this with Tourism Satellite Account (TSA) and finally aggregated SAM data. The objective of using Type II input-output analysis was to determine direct, indirect, and induced impact of foreign tourist expenditure. The study combined the economy into 17 sectors from input-output table where employment statistics of 9 sectors were adjusted. The findings of the study showed that foreign tourism contributed a small percentage (1.64%) of GDP to the economy. The income and employment impacts were found to be 1.40% and 1.01% respectively which constituted a smaller percentage than GDP of Chinese economy. The authors concluded that foreign tourist expenditure contribution to the economy was insignificant though there was high value-added impact indicating future potential of international tourism.

### **2.3 Computable general equilibrium (CGE) model**

Researchers have used computable general equilibrium (CGE) models in tourism impact studies based on availability of data from different countries, such as Hawaii, USA, Spain, Australia and some other countries.

Adams and Parmenter (1995) analysed the economic impact of tourism in Australia by simulating a 10% growth of tourism using computable general equilibrium model for 117-sectors of Australian economy. The results of the study showed that a 10% increase in

tourism would result in exchange rate appreciation, increase in import and decrease in the traditional export sectors production, and declining balance on trade. The authors stated that expansion of tourism in Queensland State would result in negative impact from international tourism. Furthermore, the study suggested that the Queensland State economy should be depended on traditional export sector which was experiencing a declining trend because of an expansion of international tourism.

A study by Zhou, Yanagida, Chakravorty and Leung (1997) estimated visitor expenditure impact on the economy of Hawaii from a 10% reduction of tourist expenditure. The study compared the results generated from computable general equilibrium and input-output model. They stressed that the distribution of a sector's product would be traced through input-output modelling framework using a system of linear equations, whereas computable general equilibrium (CGE) model represented sectoral complex interdependencies unrestricted by the constraint of linearity, which allowed for resource allocation. Social accounting matrices (SAMs) were employed as the primary data requirements for constructing computable general equilibrium model. The authors referred that the findings which were based on input-output model were similar in magnitude to that of the results of computable general equilibrium, however, generally higher for a hypothetical 10% decrease in tourist spending. Their study found that the sectors directly related to tourism represented statistically the largest effects in terms of economic loss. Output reductions in the input-output model were found to be larger than computable general equilibrium model because latter model allowed reallocation of resources. The study illustrated that computable general equilibrium model would represent price effect and variation in output which had a positive relationship with domestic and composite prices.

Blake (2000) estimated the effect of 10% expansion of tourism in Spain using CGE model. The author estimated that a 10% increase in tourism would result in a 0.05% increase in GDP, 0.61% increase in real exchange rate, and a slight increase household consumption, investment and domestic tourism.. The author found that the benefit received from a 10% tourism expansion would offset an increase in imports and decrease in the value of other exports.

Dwyer, Forsyth and Spurr (2005) assessed a special event's economic impact generated from the Qantas Australian Grand Prix in Australia for the year 2000. They employed computable general equilibrium model and compared the result with input-output model. They found out that input-output model represented a greater impact on real output (\$120.1 million) as compared to computable general equilibrium model (\$24.46 million). They also found that the value-added multiplier and employment multipliers were different in undertaking two models which was 0.844 from input-output analysis and 0.267 from CGE model for value-added. On the other hand, employment multipliers were 11.548 using input-output analysis and 2.5 using CGE model. The study concluded that funding agencies could benefit from such study as the approach would allow them to decide the economic benefits that would outweigh costs and proper utilization of limited funds under the prevailing alternative opportunities.

#### **2.4 Keynesian multiplier model**

Keynesian model was used by several studies although the version of multipliers derived by this model did not consider any leakages from the economy. The studies that employed Keynesian model were limited in numbers compared to input-output analysis.

Eriksen and Ahmt (1999) employed Keynesian income multiplier model under an input-output framework to assess the regional tourism effects for each of 16 Danish counties. Different tourism policies were evaluated in terms of employment, GDP and expenditure pattern of tourists. The measurement of tourism impact was conducted by tourist expenditure surveys. The authors found that foreign tourist generated approximately over 47,000 employments which were one half of the employment derived from one-day tourism. The study also estimated the economic impact of domestic tourism by considering foreign and domestic tourism in terms of substitutes of each other and non-substitutes of each other. When foreign and domestic tourism were assumed to be substitutes, the economic impact of tourists generated 61,652 employments where foreign tourists generated 47,271 jobs and domestic tourists 14,381 jobs.

Vaughan et al. (2000) analysed the economic impact of “agro” and “non-agro” tourism in Exmoor National Park, UK, by employing proportional multiplier analysis which was a combination of input-output and traditional Keynesian model. Three surveys had been conducted to collect the data on operational characteristics of businesses, visitors’ expenditure and residents’ expenditure in the study area. Tourism impacts on the generation of output, income, employment and their distribution among different sectors of the economy were assessed. The study found that Agro-tourist had an impact of £1.7 million in income, £5 million in output, and 230 employments.

## **2.5 Tourism satellite account (TSA)**

In recent years, several researchers used tourism satellite accounting (TSA) model in estimating the economic impact of tourism. Of these studies, Blake et al. (2001), Kuhback and Herauf (2005), Dwyer, Forsyth and Spurr (2007), Smeral (2006), and Ahlert (2007a and 2007b) addressed the issues related to the TSA model that was considered as an extension of input-output model. The latest literature on economic impact on tourism using TSA has been discussed in this section.

Ahlert (2008) employed the results of TSA to analyze the significance of increased inbound tourism on the German economy on GDP, employment, and tax revenue generation. The study asserted that the options for estimating the economic impact were offered within model-based macroeconomic analysis where structural information could be obtained from tourism satellite accounting framework. TSAs had the ability to show maximum linkages to input-output models as well as to represent results originated from product-specific records. The study emphasized on formulating and using dynamic macroeconomic structural models along with trouble-free input-output approach. Some simulation results were obtained by using INFORGE model in determining the total effects of inbound tourism in generating GDP/income, employment, and tax revenue.

Studies that assessed the contribution of tourism through economic impact analysis are increasing over the years which started in 1960’s. The literature is evolving as a consequence of government’s stressing the importance to develop the economy by means of developing the tourism industry as tourism injects foreign exchange earnings, helps eliminate balance of payment disparity, generates income for the households, and supports employment generation. The studies that were devoted to estimate impact of tourism on different macroeconomic variables held in different locations around the world have been summarized in table 1.



Studies	Year/ Study Area	Nature of Analysis	Output	Income	Employment	Value added	Import	Govt. Revenue	Linkages Analysis	Balance of Payment	Type of Tourist	Type of Sector
Archer	1995 (Bermuda)	Static I-O		x	x		x	x			x	x
Archer, & Fletcher	1996 (Seychelles)	Static I-O		x	x			x			x	
Andrew	1997 (Cornwall)	Static I-O & LP		x								x
Wagner	1997 (Parana, Brazil)	SAM	x	x	x							
Zhou et al.	1997 (Hawaii)	Static CGE & I-O	x									
Stynes, Nelson & Lynch	1998 (Michigan)	Static I-O		x	x				x			
Huse et al.	1998 (Norway)	Static I-O	x		x							
Mistilis, & Dwyer	1999 (Australia)	Static I-O			x	x						
Frechtling & Hovath	1999 (Washington, DC.)	Static I-O (RIMS II)	x	x								x
Eriksen & Ahmt	1999 (Denmark)	Keynesian Multiplier	x		x							x
Tohamy & Swinscoe	2000 (Egypt)	Static I-O	x	x	x			x				
Blake	2000 (Spain)	CGE	x									
Vaughan et al.	2000 (UK)	Keynesian & static I-O	x	x	x							x
Kweka et al.	2001 (Tanzania)	Static I-O	x	x	x		x	x	x			x
Yan & Wall	2002 (China)	Type I Static I-O	x	x	x	x	x					
Chabra, Sills & Cubbage	2003 (North Carolina)	Type I Static I-O & SAM	x						x			x
Kim et al.	2003 (South Korea)	Static I-O	x	x	x		x	x			x	x
Sun, & Stynes	2004 (Michigan)	Static I-O	x	x	x							

Studies	Year/ Study Area	Nature of Analysis	Output	Income	Employment	Value added	Import	Govt. Revenue	Linkages Analysis	Balance of Payment	Type of Tourist	Type of Sector
Rashid, & Bashir	2004 (Malaysia)	Static Open I-O	x			x	x	x			x	x
Martin	2004 (Spain)	Keynesian & Static I-O	x			x	x			x		
Daniels et al.	2004 (South Carolina)	SAM		x								
Wiersma et al.	2004 (New Hampshire)	Static I-O	x		x							
Daniels	2004 (North Carolina)	SAM		x	x							
Albqami	2004 (Saudi Arabia)	Static I-O	x	x	x							x
Lee and Taylor	2005 (South Korea)	Static I-O	x	x	x						x	
Bashir & Ahmad	2005 (Malaysia)	Static I-O	x	x	x						x	x
Dwyer et al.	2005 (Australia)	Static CGE/I-O	x		x	x						
Oosterha-ven & Fan	2006 (China)	Static I- O/SAM	x	x	x							
Gerd Ahlert	2008 (Germany)	TSA	x		x			x				x
Contini et al.	2009 (Italy)	Static I-O		x	x							
Schubert & Brida	2009 (Small Destination)	Static I-O & Simple Dynamic CGE								x	x	

Table 1. List of Literatures on Assessing the Economic Impact of Tourism



### 3. Critical assessment of economic impact literatures of tourism

The above literature survey translated that most of the studies employed input-output framework in assessing the economic impact of tourism whereas only few studies utilized SAM, CGE, and Keynesian model. The construction base of these models heavily relied on input-output table that also acted as the main requirement of Leontief input-output analysis. Assessing the magnitude of tourism impacts on employment, income, and output was the primary concern of most of the past studies (Tyrrell & Johnston, 2006). Although the determination of multipliers on a wide range of macroeconomic variables could be accomplished through economic impact analysis, most tourism studies focused on estimating output, total value-added, employment, and income multipliers (Kim, Scott, Thigpen & Kim, 1998; Burgan & Mules, 1992; Var & Quayson, 1985; Crompton 1999). Besides, several studies evaluated the contribution of tourism in the balance of payment account of economies while some of the studies were devoted to measure the contribution made by types of tourists. The economic impacts on different sectors of the tourism industry were the subject matter of a number of tourism studies, although not many, whereas only few studies, such as the study of Wiersma et al. (2004), Huse et al. (1998) discussed a comparative tourism economic impacts on several locations. It is also evident from the literature survey that input-output model is an ever-present model in conducting economic impact analysis in different regions of the world.

The methods, such as input-output model, computable general equilibrium model, social accounting matrix model, Keynesian multiplier model, TSAs etc., were employed in analyzing economic impacts of tourism, in some way each of the methods needed to utilize input-output table as a foundation in estimating the economic impacts of tourism. It is noticeable from the available tourism literature that input-output model is one of the most widely used methods. The summary of literature in table 1 also reveals that past studies were only able to represent the economic impacts of tourism from a static view point where the derivation of dynamic multipliers of several sectors of tourism industry was particularly excluded. Even the most recent method, TSA model which was considered to be the extension of input-output framework, was unable to estimate the indirect effects and intermediate consumption without making adjustments (Smeral, 2005). Therefore, it only provided the effects generated by the direct economic relationship between guest and producer (Smeral, 2006). Underlying the limitation of TSA, World Tourism Organisation (1999) commented that TSA model essentially provided a kind of static analysis that described the interdependence of tourism sector with the rest of the economy. Input-output model was defined as complementary model that could represent complete information about contribution made by tourism to macroeconomic performance (Smeral, 2005 & 2006). In this context, Ahlert (2008) argued that input-output was the only incomparable method which allowed synchronized documentation of all direct and indirect effects of value-added.

By addressing the limitations of the past studies (static analysis) that derive multipliers of the tourism industry using input-output model, Dwyer et al. (2004) developed and approached an alternative technique known as the CGE technique to achieve the best practice for evaluating economic effects of tourism. Nevertheless, the CGE model can also be considered as static model due to its incapability to illustrate the dynamic impact of tourism. In addition, there is an existence of a gap of economic impact of tourism literatures that employ both static and dynamic economic impact analysis of tourism together in order to study the comparative aspects of these two analyses. Forecasting based on static input-

output analysis has been considered a kind of significantly misleading method in impact studies that should be avoided. Therefore, past studies were unable to provide information in directing policies precisely.

In this context, to overcome the considerable limitation of forecasting reflected in previous studies, it is essential to employ dynamic input-output analysis to estimate dynamic multipliers of tourism industry along with the utilization of static input-output analysis. There is existence of studies that estimated dynamic multipliers using Leontief dynamic input-output analysis. Such as, Liew (1977) estimated the dynamic multipliers for Oklahoma regional economy, USA to demonstrate a comparative study of different sectors dynamic multipliers. The support for using the dynamic input-output analysis to estimate dynamic multipliers is well documented in literature except tourism economics. In this respect, Liew (2000) asserted that dynamic multipliers can be treated as an efficient method to illustrate the consequences of a change in final demand (for example, the expenditure effects by state or federal government). Therefore, policymakers of governments, businesses, and consumers can be benefited from the estimated dynamic multipliers.

Richardson (1972) pointed out that economic policy makers are more attracted to the utilization of dynamic input-output model as it is useful when dimension of forecasting period increase in length. The use of Leontief dynamic input-output model bears significance on the view point of both theoretical and empirical aspects (Liew, 2000). Specifically, the existing literature suggested that there is a lack of studies that has been taken into consideration the economic impact of tourism on a wide range of macroeconomic variables into three distinct directions (direct, indirect, and induced effects) while there is prevailing a clear deficiency of dynamic input-output analysis.

#### **4. Conclusion**

By acknowledging the above literature, it can be admitted that economists and planners have applied different models and techniques for measuring the economic impacts of tourism on regional, local and national economies. The model or technique that is to be used in a particular situation depends upon the objectives of the analysis, the types of problems found in the subject region, data availability, and conditions assumed in the study. It is evident from the literature cited above that input-output model is predominant among the models that are being used to estimate multipliers. Input-output model has become more popular and widely adopted because it is cost effective and simple in comparison with CGE models (Kasimati, 2003). Input-output method has been considered as a useful technique for estimating the complete performance of tourism in terms of direct, indirect, and induced impacts of tourism on generating output, income, employment, value-added, import, and tax revenue. However, this method is considered to be limited to inter-sectoral transactions (Pyatt & Round 1985). Acknowledging the limitations of the method, whether it is exploratory or hypothetical, Babcock (1993) asserted that it will sustain and gain persistent popularity because of its narrative ability and usage adaptability. Although the method has limitations, like other methods, it also has some advantages in measuring the direct, indirect and induced impacts of tourism in terms of its usage flexibility. The method will continue to be a practical tool for conducting economic impact analysis if employed cautiously (Daniels, 2004). Daniels also asserted that the benefits of input-output analysis could be utilized to make strategic policy formulation and useful for community planners, coordinators,

respective authorities dealing with diversifying tourist attractions. Therefore, using such a method to conduct economic impact analysis can provide valuable information to policy-makers about the economic benefit as a result of an increasing economic activity (e. g. tourism) or changes in economic policy.

Therefore, the analysis in viewing the contributions of tourism should be concerned with estimating the economic impacts of tourism. For this reason, there is a need to conduct economic impact analysis of tourism in order to identify tourism's performance in the growth and development process of the economy and its contribution in generating output, income, employment, value-added, import, and tax revenue at three different levels (direct, indirect and induced). There are several advantages of input-output analysis as pointed out by Fletcher (1989b) and Daniels (2004). They include: 1) it operates under a general equilibrium framework; 2) it provides a comprehensive view of a given economy; 3) it pays attention on sectoral interdependencies; 4) the structure of this analysis is flexible that allows researchers in making decisions such as aggregation choices; 5) it consider uniform treatment of each sector to reduce subjectivity; 6) it enhances data availability; and 7) it allows impacts of tourism to be viewed at direct, indirect, and induced levels. Therefore, economic impacts studies of tourism should utilize static and dynamic input-output model to derive macroeconomic multipliers for tourism industry.

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# Carrying Capacity of Tourism System: Assessment of Environmental and Management Constraints Towards Sustainability

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## 1. Introduction

The tourism sector accounts nowadays for about 10% of world GDP (source: World Travel & Tourism Council - WTTC) and it is widely acknowledged that tourism activities depend highly on the quality of natural resources (see, among others, Inskeep, 1991). Thus, the aim of sustainable tourism development plans, in order to reach sustainable development goals, should be the decoupling of economic growth from natural environment depletion, through the definition of more sustainable patterns of production and consumption in tourism activities, as also stated by international and European resolutions about sustainable development (see, for instance, the Reviewed Strategy for Sustainable Development, the Integrated Product Policy, the Action Plan on the Sustainable Consumption and Production and Sustainable Industrial Policy, the Renewed EU Tourism Policy).

Considering that to reach this goal and to set targets for improvement the basic requirement is to investigate the physical and managing limits of the system, carrying capacity evaluation seems to be a useful concept to support the definition of local management strategies and plans for sustainable tourism.

Moreover, sustainable development, and particularly the development and application of indicators able to measure sustainability of specific activities, require a multidisciplinary approach, that allows us to obtain results for specific aspects (Farrell & Twining-Ward, 2004). As underlined by some authors when referring to the triple bottom line approach (Buckley, 2003; Elkington, 1997), it is necessary to develop new methodologies, which are able to widen and to integrate analysis in a systemic vision, through instruments that allow the evaluation of different aspects in a comprehensive manner. An accurate evaluation of the tourism sector, for instance, necessarily involves aspects related to productive activities (production of goods and services for tourists), the construction and management of tourist facilities (hospitality and leisure structures, management of mobility), consumption of resources (energy consumption, water consumption and wastewater treatment, waste management) and the effects of tourism activities on the quality of life of the local community (availability of services, crowding, pollution). All these aspects are covered by a recent study by the authors (Castellani & Sala, 2012), in which the relevance of integration of

methodologies (e.g. Life Cycle Assessment and Ecological Footprint) in order to answer different planning enquiries is highlighted.

Starting from these considerations, the present research focuses on the evaluation of sustainability in the tourism sector with the aim to develop a method for assessing the physical and environmental carrying capacity of tourism destinations, as a tool to analyze the sustainability of the current situation and to determine to which extent a rise in visitors number could affect the quality of the environment, the availability of resources and the quality of public services. The final aim of the study is to provide results supported by quantitative data, overcoming the qualitative approach, which is more common in tourism carrying capacity evaluation (Prato, 2001).

## 2. Tourism and sustainability

Tourism can generate both positive and negative effects on the areas where visiting and leisure activities take place. It can be a positive element for the local economy of the tourist destination, but it can also generate some externalities (positive or, more frequently, negative) that are not included in the local economic balance and that can affect the quality of the visitors' experience (Casagrandi & Rinaldi, 2002; Gössling & Hall, 2005; Mathieson & Wall, 1982; Saarinen, 2006). Therefore, it is important that tourism planning, carried out by local decision makers, assures a good level of conservation of natural resources and mitigates the impacts that tourism necessarily entails.

If managed in a responsible and sustainable way, tourism can be a motivating force for the conservation of local heritage; on the other hand, if the strategy adopted for tourism development has the sole aim of getting large and immediate economic results through the uncontrolled growth of the tourist flow, it will lead to a rapid exploitation of the destination, which, after a short period, will become spoilt and no longer attractive (Khan, 1998; Manning, 2002).

Impacts related to tourism activities can be divided into two main categories (May, 1991).

1. Impacts due to the building of hospitality structures (hotels, restaurants, camping sites) and the production of goods and services for tourists; which can be summarized as the:
  - a. loss of soil previously used for agriculture, pasture or other activities;
  - b. necessity to build new roads to connect new tourist structures or to improve and enlarge existing roads to enable them to cope with an increased level of traffic. It is important to consider that these kinds of impact are persistent, because tourist structures, often built on a scale to cope with a wider tourist flow, remain in the territory, even though it is almost empty, during the rest of the year;
  - c. resource consumption and pollution (emissions, waste water and solid waste production).
2. Impacts due to the presence of tourists and, generally, to their activities in the area. The presence of tourists can generate two main kinds of problem: the production of solid waste and wastewaters (which imply a cost for the collection and disposal systems, which is paid for by the local community and the need for the organisation of a service of collection scaled to the maximum volume generated during the year, i.e. at the peak of the tourist season); and the possibility of conflict between residents and tourists in



the use of local resources and services (use of drinkable water and wastewater treatment plants, air pollution, noise pollution, traffic, crowding, etc.). Furthermore, when natural and protected areas are involved, the presence of a high number of visitors can cause disturbance to fauna and flora, especially when visitors are not well informed about the proper way to behave in such a context.

In addition, it is necessary to consider that the impact generated by tourism activities is strictly dependent on the type of tourism which is predominant in the destination and on tourist behaviour. Each tourist visiting the destination generates a different amount of impact (waste production, energy and water consumption, land use, etc) which is dependent on numerous factors, such as the type of activities undertaken during the holiday, the length of stay, etc. Nevertheless, it has to be considered that the type of tourist services available for tourists influence the possibility for them to adopt sustainable behaviours: tourists make consumption choices which are limited by the effective availability of sustainable products and services and are determined by their environmental consciousness and responsibility. This implies that it is not possible to assess the sustainability of a destination in an absolute manner, but it is more useful to define scenarios for the evaluation, considering possible patterns regarding the production (tourism offer) and the consumption (tourism demand) sides.

Moreover, considering that even eco-tourism activities generate, undoubtedly, some impact on the area where they take place, to assure a sustainable development of the tourism sector it is necessary that the planning of tourism development of a destination takes into consideration the relationship between tourism activities and the local environment (from natural, economic and social points of view). Therefore, it should be based on a robust analysis of environmental, social and economic conditions of the area and on an evaluation of existing physical, economic and social limits to current and potential development of tourist activities, i.e. an assessment of the actual carrying capacity of the destination.

### **3. Carrying capacity of tourist systems**

As illustrated in section 2, tourism, like every kind of human activity, causes changes in environmental conditions. In order to evaluate the consequences of the impact of tourism activities it is necessary to know the characteristics of the environment where they take place and especially its resilience, which is the magnitude of disturbance that a system can experience before it shifts into a different state of equilibrium (Holling, 1973). Indeed, carrying capacity concept is linked with resilience and rises from the necessity to establish what is the maximum acceptable level of impact for the environment or for one of its components and the capability of recovery back to the previous condition.

From an ecological perspective, carrying capacity is "the maximum number of individuals of a given species that a given habitat can support without being permanently damaged" (Odum, 1989). If we consider the application of this concept to the relationship between natural and social (or human) systems, we can also define carrying capacity as the ability of natural and man-made systems to support the demands of various uses without degrading the natural, cultural and social environment (Abernethy, 2001; Godschalk & Parker, 1975; Oh et al., 2002).

In order to provide useful support to operational approaches oriented to decision-making, carrying capacity should be the scientific concept that helps to identify the maximum

acceptable level of human activities, population growth, land use and physical development that can be sustained by the area under investigation without causing irreversible damage to the environment. In the field of sustainable development strategies and in spatial planning processes, as it is for sustainable tourism planning, this implies that the evaluation is made considering not only the availability and quality of natural resources, but also the characteristics of the existing infrastructures, land use and tourist facilities (Oh et al., 2005).

Indeed, the purpose of the evaluation of the carrying capacity of a destination is the measurement of the threshold over which alteration due to tourism activities becomes unacceptable for the entire system (composed by natural and man-made resources). The World Tourism Organization has defined Tourism Carrying Capacity as “the maximum number of persons which could visit a location within a given period, such that local environmental, physical, economic, and socio-cultural characteristics are not compromised, and without reducing tourist satisfaction” (WTO, 1999).

This definition of the carrying capacity of a destination led to some attempts to develop quantitative carrying capacity assessment by defining a number of tourists which represents the limit beyond which the degradation of the destination occurs (see, among others, Brown & Turner 1997; Saveriades, 2000).

Nevertheless, this kind of approach highlighted some flaws linked to the concept of tourist carrying capacity intended as a mere application of an ecological carrying capacity concept to tourism destinations, some of which were pointed out by McCool & Lime in 2001:

1. Tourism destinations are complex systems, which include objective (e.g. availability of resources) and subjective variables (e.g. tourist and local community perceptions) (Bimonte & Punzo, 2005).
2. The definition of the maximum number of tourists that can visit the destination without causing permanent damage should entail the possibility to limit access to the destination (but this can be true only for a few kinds of places – e.g. nature reserves and historical sites), otherwise it remains only a theoretical exercise, with no operational meaning (Hof & Lime, 1997).
3. The extent of the impacts caused by tourism activities is not uniquely dependent on the number of tourists that visit the area, but also, and maybe in more considerable ways, on their behaviour (Ioannides & Billing, 2005; Wagar, 1974) and by the characteristics of the local offer.
4. Tourist destinations don't have a unique carrying capacity, but multiple carrying capacities, determined not only by the availability of natural and physical resources, but also by the characteristics of the management system, by the type of tourism that characterises the area, by stakeholders' perceptions (e.g. perception of crowding) and other local conditions (Ioannides & Billing, 2005). Therefore, some authors (see, for instance, Lindberg et al., 1997; McCool & Lime, 2001) suggested a shift from the question “How many is too many” to “How much change from natural conditions are acceptable given the goals and objectives of an area”, starting from the Limit of Acceptable Change (LAC) model (Stankey & Cole, 1985). This approach suggests setting the tourism carrying capacity assessment method not just as a scheme aimed at obtaining a unique value, but rather as a framework composed by a set of standards able to quantitatively define acceptable changes (Ahn et al., 2002).

In the research literature there are only a few attempts to make the carrying capacity concept operational, defining a framework in order to obtain numerical standards for the destination, as a management tool that enables decision makers to implement the results of the assessment in the planning process (Clivaz et al., 2004; Huges, 2002; Trumbic, 2005). Moreover, there are several models such as Visitor Impact Management (VIM) (Graefe & Kuss, 1990), Visitor Experience and Resource Protection (VERP) (US Department of the Interior, 1997) and Tourism Optimization Management Model (TOMM) (Manidis Roberts Consultants, 1997), that, even though they represent an attempt to combine scientific expertise and public-held knowledge, to give a quantitative evaluation of the limits existing to tourism development in the destinations, they are more decision-making frameworks rather than scientific theory.

Thus the challenge in tourism carrying capacity research is the definition of a conceptual model that could be applicable to all kinds of tourism areas and that allows to select indicators and to define standards that are relevant for each specific destination. As highlighted by the guidelines developed by UNEP - PAP/RAC (1997), a good method for carrying capacity assessment should be able to: 1) consider the priorities of the area under investigation (e.g. involving decision makers and local experts in the definition of indicators and standards at a local scale); 2) identify local constraints to tourism development, balancing the demand of new tourist infrastructures and the necessity to protect local environment, also because it could represent an important attraction factor; 3) select a set of indicators that can be useful to all tourism sector managers and that can be easily applicable, with well defined sources (i.e. the availability and quality of data should be checked, to assure the possibility of monitoring through time); 4) define scenarios for the development of the destination.

According to these recommendations, the present study suggests a methodology for tourism carrying capacity assessment focussed on environmental and management issues, applied to two tourist areas in northern Italy, which are characterized by the presence of protected areas.

#### **4. Methodology**

The methodology developed for this study is based on an evaluative procedure inspired by the DPSIR model (Drivers, Pressures, State, Impacts, Responses), as it is useful to underline which are the drivers of impacts and to define which is the most useful dataset to describe current and future scenarios for the area under investigation. The conceptual DPSIR model, developed by the European Environmental Agency (EEA, 1999), highlights causal links and relationships between human activities, pressures on the environment and impacts on ecosystems and human health. In order to address local policies, the model also includes the responses, i.e. promising measures to reduce the extent of drivers and pressures and improving the state of ecosystems and mitigating impacts. It is possible to identify several kinds of responses involving different actors: planning strategies defined by decision makers, technical solutions (e.g. BAT); education and communication strategies among stakeholders and, finally, the involvement of all local actors in a participatory process, with the aim of defining a commonly shared planning strategy and of building a network of subjects working on sustainable solutions.

The analysis of tourism sector based on the DPSIR model allows the identification of the main issues related to tourism activities and enables us to address the definition of a framework for tourism carrying capacity assessment (Table 1 shows an analysis of tourism sector based on the DPSIR model).

DRIVERS	Construction and management of hospitality structures and facilities, presence of tourists, road traffic.
PRESSURES	Emissions of air pollutants, use of groundwater resources, emission of pollutants in surface waters, production of solid urban waste, land use and soil erosion, energy consumption, presence of tourists in protected areas.
STATE	Concentration of pollutant in air and water, groundwater availability, quantity of solid urban waste, level of urbanization, level of crowding in natural sites.
IMPACTS	Loss of biodiversity, disturb of wild species, adverse effects on human health.
RESPONSES	Promotion of sustainable tourism: reduction of water and energy consumption, reduction of waste production and increasing of separated waste collection, promotion of public transports, use of renewable energy, promotion of ecotourism activities.

Table 1. DPSIR model for tourism sector

In the conceptual framework presented in this article, the main environmental and socio-economic aspects of the area are separately taken into account to evaluate the tourism carrying capacity of the destination. The environmental and managing issues related to the daily life of residents and to tourism activities (air quality, water quality and disposability, waste management, land use) are considered and included in the evaluation.

One of the main aims in developing this methodology is to attempt to define thresholds for each indicator which compose the framework: indeed, even if the definition of thresholds is necessarily a choice that implies a certain level of subjectivity, the evaluation of indicators becomes meaningless in absence of reference targets and standards. Some authors highlighted the necessity to link indicators to policy standards and targets to strengthen their role in supporting decision makers (see, for instance, Hammond et al., 1995; Pinter et al., 2005); nevertheless, standards derived from professional norms or regulations are frequently non-existent for some topics, so there is the need to find alternative solutions (PAP/RAC 1997). The methodology presented in this study considers some alternatives for defining reference values when law constraints' standards are not available:

- policy targets (e.g. a target for the recycling of solid urban waste production in European countries);
- objective physical limits (adopting the precautionary principle, the current structure of the tourism system is taken as a baseline to ensure that no additional impact is generated through the construction of new tourism infrastructures (there are some physical limits that cannot be overcome, e.g. the number of beds available in the system, the capacity of wastewater treatment plants, etc.);

- benchmark values coming from data at national or regional level and values derived from literature (e.g. hospitality density).

In addition, when it is not possible to find reference values following the previous methods (e.g. for the biodiversity issue, which is quite controversial), the evaluation is made by expert judgement, involving local experts (e.g. park managers), to ensure that indicators (i.e. issues) are not excluded from the evaluation due to methodological problems.

The methodology consists of a preliminary analysis of the area to identify existing data sets and to define the typology of the tourist destination; the final aim of this phase is the identification of issues that are more relevant for the development of the tourist destination. Then, for each issue identified, the following steps are implemented:

1. the analysis of the issue and characterization of the drivers related to it and the identification of activities which are more relevant in the local situation;
2. the selection of drivers relevant for the issue referring to the tourism system, from the set of drivers identified in step 1;
3. the identification of the main pressures generated by the selected driver/s.
4. the definition of quantitative indicators for identified pressures, to measure the (state of the area under investigation with reference to that issue. In the selection of indicators, priority is given to indicators already existing and commonly implemented for tourism activities' analysis and to the availability of data on a local scale to assure the possibility of monitoring results through space (comparison between different destinations) and time (evaluation of trends in the same area); furthermore, for each indicator included in the evaluation scheme, the source of data has to be indicated, to help the collection of updated data in the future;
5. the definition of standards for the indicators, considering benchmark values, minimum and maximum, and for the definition of classes of carrying capacity (high, medium and low) for the result. As explained before, the selection of reference values is based on:
  - a. standards determined by international, European and national laws or policy targets
  - b. physical limits
  - c. benchmarking with the regional or rational situation
  - d. literature
  - e. expert judgement (for which the use of standardised method is required, such as the Delphi method);
6. the collection and processing of local data;
7. the evaluation of the carrying capacity of the issue, based on benchmarking among considered variables. For the evaluation, a precautionary principle is adopted, the worst case is taken into account and if one of the variables is near the limit, low carrying capacity is attributed to the entire issue;
8. the responses development: processing the results to provide descriptive information about the local situation to decision makers, with the aim of enabling them to select appropriate short or long term solutions for the main problems identified, which can be performed by public and private administrators and by tourists themselves, in a shared responsibility perspective. The development of responses is part of the process but it stands as a separate stage. In fact the development of responses is composed by two steps: the first is the identification of possible actions (from technological solutions to

communication actions) based on the results of scientific assessment; the second is the policy development, based on a participatory process that should involve all stakeholders, aimed to choose adequate actions, providing objectives and targets for each of them. This process encompasses both descriptive, scientific, assessment and policy making, using scientific results as guidelines for action, bridging the gap between science and policy (for a deeper discussion about how to integrate scientific assessment results in the development and monitoring for sustainable tourism development strategies see Castellani & Sala, 2009).

Table 2 shows an example of a detailed scheme, developed for “air” issue in Oltrepo Mantovano area.

DPSIR	METHODOLOGY	LOCAL RESULT
1) DRIVERS	Analysis of datasets of emissions sources aimed to identify which sources / activities are most relevant in the area object of the investigation.	Analysis of data from Inemar Lombardy Region inventory of emission sources: main drivers for Oltrepo Mantovano are: electric power generation (electric power plants), non industrial combustion (heating) and urban traffic, which cause emissions of PM <sub>10</sub> , CO <sub>2</sub> , COV, NO <sub>x</sub> , SO <sub>2</sub> and CO.
2) DRIVERS AND VARIABLES RELEVANT FOR TOURISM SECTOR	From the drivers set identified in step 1, selection of drivers which are most relevant for tourism sector.	The emission source most relevant for tourism sector evaluation in Oltrepo Mantovano is emissions due to road traffic, because electric power generation is an industrial activity, not strictly linked with local consumption and heating becomes not relevant during high tourist seasons (spring-summer).
3) PRESSURES	Selection of main pressures generated by identified driver/s.	Urban traffic generates emissions of PM <sub>10</sub> , CO, COV and NO <sub>x</sub> . Regional Environmental Agency (ARPA) monitoring network registers periodically the values of concentration of PM <sub>10</sub> , CO and NO <sub>2</sub> ; data of COV concentrations are not available.
4) INDICATORS	Selection of appropriate indicators to measure state. Indicator used by European and Italian legislation to evaluate air pollution level is the number of daily overcoming of limit concentration during a year.	a. number of overcoming for PM <sub>10</sub> concentration in Oltrepo Mantovano; limit value: 35 days of overcoming/year. b. number of overcoming for NO <sub>2</sub> concentration in Oltrepo Mantovano; limit value: 35 days of overcoming/year. A limit for CO is not fixed because this pollutant is no longer a problem in Italy.

DPSIR	METHODOLOGY	LOCAL RESULT
5) STATE CLASSES	On the basis of indicators and limit identified in the previous step, classes of carrying capacity are fixed.	<p>a. nr of overcoming for <math>PM_{10} &lt; 10</math>: HIGH carrying capacity nr of overcoming for <math>PM_{10} = 35</math>: LIMIT of carrying capacity nr of overcoming for <math>PM_{10} &gt; 35</math> and <math>&lt; 50</math>: LOW carrying capacity nr of overcoming for <math>PM_{10} &gt; 50</math>: VERY LOW carrying capacity</p> <p>b. nr of overcoming for <math>NO_x &lt; 10</math>: HIGH carrying capacity nr of overcoming for <math>NO_x = 18</math>: LIMIT of carrying capacity nr of overcoming for <math>NO_x &gt; 18</math> and <math>&lt; 30</math>: LOW carrying capacity nr of overcoming for <math>NO_x &gt; 30</math>: VERY LOW carrying capacity</p>
6) LOCAL RESULT	Analysis of local data about indicators identified.	<p>nr of overcoming for <math>PM_{10}</math>: 108 nr of overcoming for <math>NO_x</math>: 1</p>
7) CARRYING CAPACITY	Carrying capacity assessment, based on classes identified and data collected; carrying capacity level of the entire compartment is assigned according to precautionary principle.	<p>a. <math>PM_{10}</math>: <b>VERY LOW</b> b. <math>NO_x</math>: <b>HIGH</b> Carrying capacity of the issue: <b><u>VERY LOW</u></b></p>
8) RESPONSES	Processing of the results and discussion among stakeholders to plan responses, based on scientific assessment, that can be included in the local strategy for sustainable tourism development.	To promote public transport and tourist offers for discouraging use of private car by tourists: improvement of existing bike-routes (included in Eurovelo 7 and 8) and establishment of facilities for bikers along the trails (hotel with special services for bikers, renting stations, etc.) to promote bike tourism and to encourage the use of bicycles for local connections).

Table 2. Example of assessment for the issue “air” in Oltrepo Mantovano area

## 5. Areas of study

The methodology developed was implemented in two areas of the Lombardy region: Oltrepo Mantovano and Alpi Lepontine Mountain Community (Italian Mountain Communities are administrative clusters of municipalities in mountain areas); the study was performed in order to support these two destinations in the implementation of the European Charter for Sustainable Tourism in Protected Areas (Europarc, 1995).

The European Charter is a process promoted by Europarc (the European Federation of Parks), with the aim of ensuring environmental conservation and promoting economic and

social development through the definition of a strategy for sustainable tourism development of the area. Assessing carrying capacity in these areas aims, therefore, to provide a useful tool for decision makers who have to define tourism development policy for the future, while aiming to promote sustainable development and preventing adverse effects on the environmental, economic and social systems of the destinations.

The protected areas of Alpi Lepontine and Oltrepo Mantovano applied to the European Charter in 2006 and were awarded with the Charter certificate in 2008. They are now at the second stage of the process, which is the implementation of the strategy and action plan, and that will be followed by an evaluation by Europarc in 2012, which is necessary to renew the certificate for the following 5 years.

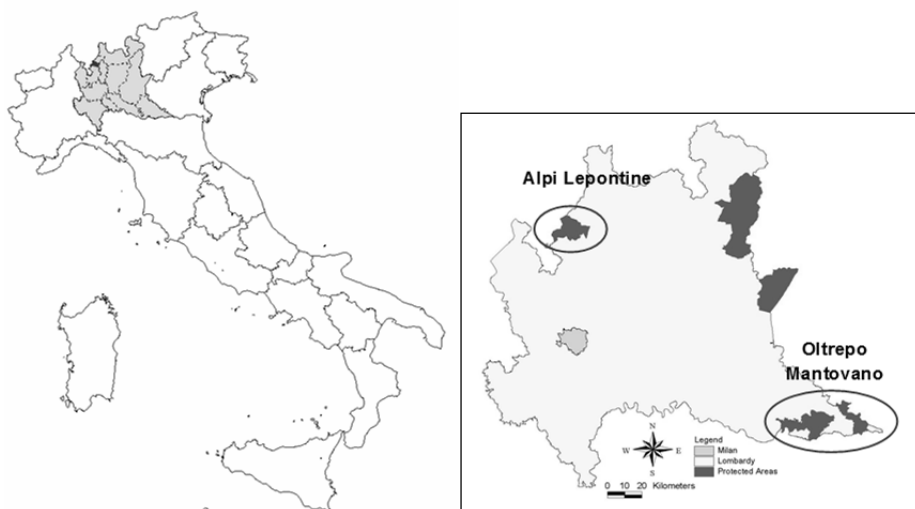


Fig. 1. The two areas of study in Lombardy Region, northern Italy

It is interesting to compare the tourism carrying capacity assessment in the two areas because even if they are now involved in the same planning process, they represent two different stages of the life-cycle of the destination model (Agarwal, 1994; Butler, 1980; Miossec, 1977). Oltrepo Mantovano is a newly emerging destination, not yet well structured, with few tourists arriving in the area, whereas Alpi Lepontine is a more mature destination, even if it shows contrasting aspects (e.g. in the summer season the number of tourists is high in some municipalities near the lakes, but very low or zero in mountainous ones).

The case studies show that the evaluation of the tourism carrying capacity can support the planning process and provide useful information to decision makers both in the case of a newly emerging destination and of a more mature destination. In the first case, it can draw the guidelines for more conscious planning, helping to prevent over-exploitation of resources and a rapid decline of the destination; in the second case, carrying capacity assessment can help to evaluate the possibilities of rejuvenation policies (e.g. investments for promoting a new type of tourist for the destination), to avoid the stagnation and decline phases that can occur when the depletion of natural and physical capital of the area make



the destination less attractive for new tourists (Farrell & Twinning-Ward, 2004; Hernandez & Leon, 2007; Prideaux, 2000).

## 6. Results and discussion

Following our methodology, we first carried out a comprehensive analysis of the area, to identify existing data sets and to define the typology of the tourist destination, the general characteristics of the area and its development (Castellani et al., 2007; Trentini et al., 2008).

Then, from the results of the analysis, the main environmental and physical aspects of the area were separately taken into account in order to evaluate tourism carrying capacity of the destination, following the steps illustrated in section 4.

Table 3 illustrates the indicators which were considered for the evaluation of the two destinations and the carrying capacity classes defined for each indicator.

As explained in section 4, classes of carrying capacity were defined for each indicator in order to allow the comparison of local results with reference standards and to assess the tourism carrying capacity of the destination based on quantitative evaluation. The following paragraphs illustrate in more detail the references considered for the definition of the classes. For the following issues, classes were defined referring to legal limits and policy targets:

- Quality of fresh water – People served by wastewater treatment plants, the ecological state of fresh water and the ecological condition of lakes: 2000/60/EC, “Water framework Directive”;
- Waste management – Separate waste collection: Regional Law 26/2003 (which defines the target of 40% by 2010 for separate waste collection);
- Waste management – Per capita daily production: classes defined considering the average urban solid waste production per capita in Europe (about 600 kg/d per capita in 2008) and the target of the European Campaign for Waste Reduction, which is 100 kg/d per capita.
- Air quality: 96/62/EC, “Air quality framework Directive”.

Indicator	State - classes		Indicator	State - classes	
Drinking water supply and consumption			Biodiversity		
1. water balance (WEI: consumption / availability) (L*residents <sup>-1</sup> d <sup>-1</sup> ) / (L*residents <sup>-1</sup> d <sup>-1</sup> )	H	WEI < 20%	13. loss of species, disturb (total nr of visitors in protected areas*year <sup>-1</sup> )	no classes, expert judgement	
	M	20%<WEI <40%			
	L	WEI > 40%			
2. daily consumption (L*residents <sup>-1</sup> d <sup>-1</sup> )	H	< 150 L*res <sup>-1</sup>	Land use		
	M	150-250 L*res <sup>-1</sup>	14. hospitality density (beds*1000 residents <sup>-1</sup> )	H	0-100
	L	> 250 L*res <sup>-1</sup>		M	10-300
3. withdrawal / recharge of ground water (m <sup>3</sup> *d <sup>-1</sup> ) / (m <sup>3</sup> *d <sup>-1</sup> )	H	< 1	15a. tourist buildings (non-hotel structures/total hospitality structures)	L	> 300
	M	= 1		H	> 20%
	L	> 1		M	10%-20%
Quality of fresh water				L	< 10%

Indicator	State - classes		Indicator	State - classes	
4. people served by water purifier (people served*people resident <sup>-1</sup> ) *100	H	100%-75%	15b. tourist buildings (houses not used by residents/ total nr of houses)	H	< 20%
	M	74%-50%		M	20%-50%
	L	< 50%		L	> 50%
5. potential H.E./actual H.E. (H.E. = habitant equivalents)	H	> 1	16. crowding of natural sites and paths	no classes, expert judgement	
	M	= 1	17. daily visitors (V = nr daily visitors / nr resident tourists)	H	V < 1
	L	< 1		M	1 < V < 2
6. ecological state of fresh water (LIM index)	H	optimal, good	Economic efficiency of tourism sector	L	V > 2
	M	sufficient			
	L	bad, poor			
7. ecological state of lakes (correspondence to natural condition)	H	current state = natural state	18. use of tourist structures [(overnights*beds <sup>-1</sup> ) *365]*100	H	< 20%
	L	current state ≠ natural state		M	20% - 40%
				L	> 40%
Energy consumption			Mobility		
8. local energy consumption/national mean energy consumption (MWh*residents <sup>-1</sup> ) / (MWh*residents <sup>-1</sup> )	H	< 1	19. % of tourists reaching the destination by private car	H	< 40%
	M	= 1		M	40%-70%
	L	> 1		L	> 70%
Waste management			20. nr of cars in the area/residents	H	0-0.3
9. per capita daily production (kg* residents <sup>-1</sup> *d <sup>-1</sup> )	H	0.27 Kg*res <sup>-1</sup> *d <sup>-1</sup>		M	0.3-0.5
	M	0.28 – 1 Kg*res <sup>-1</sup> *d <sup>-1</sup>		L	0.5-0.8
	L	> 1Kg*res <sup>-1</sup> *d <sup>-1</sup>			
10. residual capacity of waste collection system (C = volume of waste collected daily/ volume of waste collectable daily)	H	C < 0.7	21. railway service (nr of municipalities with railway station/total nr of municipalities)	H	0.8-1
	L	0.7<C<1		M	0.4-0.7
				L	0-0.3
11. % Separate waste collection	H	> 45%	22. nr of vehicles in tourist season (nr vehicles in peak hour)	H	< 100
	M	35-45%		M	100-300
	L	< 35%		L	> 300
Air quality			Tourism intensity		
12. nr of days exceeding law limits per year	Law limits: 35 days of exceeding/ year PM <sub>10</sub> , 18 exceeding/ year NO <sub>2</sub>		23. tourist intensity in high season I = (overnights high season*d <sup>-1</sup> )*residents <sup>-1</sup>	H	I < 0.5
				M	0.5 < I < 1
				L	I > 2

Table 3. Indicators selected for Tourism Carrying Capacity assessment (Classes: H = high c. capacity; M = medium c. capacity; L = low c. capacity; LL = very low c. capacity)

Classes defined with reference to the physical limits of the system include:

- Drinking water supply and consumption – the ratio between abstraction and recharge
- Quality of fresh water – designed capacity/actual capacity used;
- Quality of fresh water – capacity of wastewater treatment plants;
- Waste management – residual capacity of waste collection system.

Benchmark values coming from data at national or regional level and values derived from literature were used to define classes for the following indicators:

- Drinking water supply and consumption – Water balance: the classes are defined considering the Water Exploitation Index (WEI) and its warning threshold of 20%, which distinguishes a non-stressed, from a stressed region, while a threshold of 40% identifies a region where severe stress occurs (source: EEA, Europe's environment, fourth assessment, 2007);
- Drinking water supply and consumption – daily consumption: classes defined considering that the average domestic water consumption in Europe is around 150-200 L/d per capita, while a tourist can consume on average 300 L/day (source: Freshwater in Europe - Facts, Figures and Maps, UNEP/DEWA, 2004);
- Energy consumption: comparison with the national average of energy consumption;
- Land use - Hospitality density: EEA classification in "Indicator Fact Sheet Signals 2001 – Chapter Tourism", 2001;
- Land use - Tourist buildings, a and b: classes defined on the basis of the situation existing in some of the major tourism destinations in Italy; (under 20% of second houses in low density destinations, over 80% in high density destinations such as Alpine ski areas; source: Dossier about second houses in the Alps by Legambiente (2009) and the 3rd report about the state of the Alps by CIPRA (2008);
- Land use - Daily visitors: estimation based on previous studies about the impacts generated by residential tourists and visitors;
- Use of tourist structures: classes defined considering the average occupancy rate in Italy (which is around 30%; source: Eurostat, year 2008);
- Mobility - ratio of tourists reaching the destination by private car: classes defined starting from European figures about car use for tourism purposes (61% of tourist travel by road, source: EEA, Europe's environment, third assessment, 2003);
- Mobility – number of cars in the area/residents: classes defined considering the average car ownership in Europe-15 (0,50 passenger cars/inhabitant; source: Eurostat, year 2006);
- Mobility – number of vehicles in the tourist peak season: the classes have been defined considering a monitoring study carried out by the Province of Parma on the traffic on roads which are similar to the ones in the two destinations considered ("Analisi sui flussi di traffico in provincia di Parma", Province of Parma, 2001);
- Tourism intensity: the classes are defined considering that the two destinations under evaluation are nature-based destinations, that cannot afford to sustain high-intensity levels of tourists (high density destinations in the Alps have a current level of tourist intensity of around 8, while international, mass-tourism, seaside resorts, such as the Balearic islands, can reach a peak level of tourist intensity of 50).

Finally, expert judgement from local experts helped to evaluate the carrying capacity of issues for which it was not possible to identify suitable carrying capacity classes:

- Biodiversity – loss of species, disturb caused by tourism activities
- Land use – crowding of natural sites and paths.

The application of the methodology to the two areas under investigation provided an overall evaluation of the tourism carrying capacity of the two destinations. Table 4 compares the results for Alpi Lepontine and Oltrepo Mantovano (data refer to year 2005). The table of results also contains some issues for which local value and carrying capacity scores are not mentioned: they were included in the model because they emerged as relevant according to the DPSIR evaluation, but it was not possible to evaluate the carrying capacity for them, because of the lack of available data at local level. The choice of including these issues in the results arises from the consciousness that there is the risk of measuring “what is measurable rather than what is important” (as highlighted by White et al in their review about sustainable indicators for tourism, 2006), thereby providing misleading information for decision makers. On the contrary, our aim was to make decision makers aware of the importance of these topics and the necessity to deepen the current investigation and to provide a collection of data about them.

Indicator	Unit	Oltrepo Mantovano		Alpi Lepontine		Source of data
		Value	Carrying capacity	Value	Carrying capacity	
1. water balance (consumption / availability))	$(L \cdot \text{residents}^{-1} \cdot d^{-1}) / (L \cdot \text{residents}^{-1} \cdot d^{-1})$	n.a.	--	n.a.	--	
2. daily consumption	$L \cdot \text{residents}^{-1} \cdot d^{-1}$	280.2	L	229.3	M.	ISTAT, National Statistic Institute (1999)
3. withdrawal / recharge of ground water	$(m^3 \cdot d^{-1}) / (m^3 \cdot d^{-1})$	1.3	L	n.a.	--	Lombardy Region
4. people served by water purifier	$(\text{people served} \cdot \text{people resident}^{-1}) \cdot 100$	75%	H	95%	H	Local water resources plan
5. potential H.E./actual H.E. (H.E. = habitant equivalents)	potential H.E./actual H.E.	>1	H	1	M	Local water resources plan
6. ecological state of fresh water (LIM index)	Score of LIM index	sufficient	M	Good	H	Province authority
7. ecological state of lakes	Correspondence to natural condition	Not applicable (there are no lakes)	--	current state $\neq$ natural state	L	Province authority
8. mean energy consumption in municipalities / national mean energy consumption	$(MWh \cdot \text{residents}^{-1}) / (MWh \cdot \text{residents}^{-1})$	0.8	H	1.4	L	Terna - owner of the National high-voltage Electricity Transmission Grid (2003)

Indicator	Unit	Oltrepo Mantovano		Alpi Lepontine		Source of data
		Value	Carrying capacity	Value	Carrying capacity	
9. per capita daily production of waste	kg* residents <sup>-1</sup> *d <sup>-1</sup>	1.6	H	1.1	H	Provincial waste monitoring office
10. residual capacity of waste collection system	C = volume of waste collected daily/ volume of waste collectable daily	n.a.	--	n.a.	--	
11. % Separate waste collection	%	39.8%	M	12.4%	LL	Provincial waste monitoring office
12. nr of days exceeding law limits per year	Nr of days	PM <sub>10</sub> : 108 NO <sub>x</sub> : 1	LL	PM <sub>10</sub> : 0 NO <sub>x</sub> : 0	H	ARPA (Regional Agency for env. protection)
13. loss of species, disturb	Total nr of visitors in protected areas*year <sup>-1</sup>	4 000-5 000	H	"Area rilev. Amb": 4 000-5 000	H	Local experts
				"Riserva Lago di Piano": > 50 000	LL	Local experts
14. hospitality density	beds*1000 residents <sup>-1</sup>	13.7	H	419.0	L	Provincial tourism office, ISTAT
15a. tourist buildings	non-hotel structures/ total hospitality structures	54%	H	60%	H	ISTAT
15b. tourist buildings	houses not used by residents/ total nr of houses	8%	H	29%	M	ISTAT
16. crowding of natural sites and paths	Level of crowding	low	H	low	H	Local experts
17. daily visitors	V = nr daily visitors /nr resident tourists	>2	L	n.a.	--	Local experts
18. use of tourist structures	[(overnights* beds <sup>-1</sup> )*365]*100	30.7%	M	7.5%	L	Provincial tourism office
19. % of tourists reaching the destination by private car	%	>70%	L	>70%	L	Survey
20. nr of cars in the area / residents	Nr of cars/inhabitants	0.6	L	0.6	L	ISTAT

Indicator	Unit	Oltrepo Mantovano		Alpi Lepontine		Source of data
		Value	Carrying capacity	Value	Carrying capacity	
21. railway service	nr of municipalities with railway station/total nr of municipalities	0.6	M	0	L	Ministry of Transports
22. nr of vehicles in tourist season	nr vehicles in peak hour	n.a.	--	360	L	Estimation
23. tourist intensity in high season	I = (overnights high season*d <sup>-1</sup> )* residents <sup>-1</sup>	0.2*10 <sup>-3</sup>	H	0.1	H	Provincial tourism office

Table 4. Results of Tourism Carrying Capacity evaluation in Alpi Lepontine and Oltrepo Mantovano

The analysis of results enables researchers and decision makers to comprehensively evaluate the tourist carrying capacity of each area and then to compare the carrying capacity of a newly emerging destination (Oltrepo Mantovano) with the carrying capacity of a more mature one (Alpi Lepontine). This difference is also underlined by the ratio of employees involved in tourism activities. The comparison between the value for Alpi Lepontine (13% in 2005, according to the Regional Statistic Office data), with the value for Oltrepo Mantovano (3% in 2005, according to the Regional Statistic Office data), shows that in the first area tourism is already an important activity for the local economy, while in the second one it is still a marginal activity. The differences about land use are also representative of the different level of development of the two areas: the hospitality density in Alpi Lepontine is considerably higher than in Oltrepo Mantovano, while the difference in the ratio of houses not used by residents (considered as a proxy for the number of second houses, which are not officially recorded) is negligible. Nevertheless, the value of “tourist intensity” puts Alpi Lepontine in the high class of tourism carrying capacity; though it also has to be underlined that the indicator considers the whole area, creating a compensation between the municipalities near the lakes, which have higher tourist intensity, and the mountainous ones, where the intensity is very low. Therefore, to obtain more precise and useful information, it would be necessary to deepen the investigation at the municipality level.

The analysis of tourism carrying capacity regarding natural resources and infrastructures allows for an evaluation of the possibility of development for the destinations in the future; the evaluation is made considering the capacity of the current system of facilities and infrastructures, in the perspective of avoiding new buildings (i.e. excessive urbanization and land use). Data about water availability and consumption, even if not complete, show a problem about abstraction from groundwater sources in Oltrepo Mantovano. The situation is already unsustainable, and could be worsened by an increase in the number of tourists visiting the area. In Alpi Lepontine, however, there is a problem about the capacity of wastewater treatment plants, which are already near their capacity limit and would not be able to assure continuity and quality of service if the volume of water to be treated increased (e.g. in case of an increase in the number of tourists).

Another critical issue in Alpi Lepontine is the separate waste collection system, which includes only 12.4% of the total amount of waste generated in the area. This value is lower than 35%, which is the minimum ratio that was fixed by European and national regulations as a target for 2003 (chosen as a reference because the data refers to the year 2005) and this could be a serious problem, especially in the summer season, when the presence of a lot of visitors causes an increase in the volume of waste to be collected and processed.

Mobility is a problem for both the destinations; firstly because the number of cars owned by residents is high and, secondly, because, due to the scarcity and the inefficiency of public transport services, most of the tourists reach the areas by private car. This situation affects the quality of the tourist experience and the quality of life for the residents, causing street congestion, noise (that could especially disturb protected areas) and, in Oltrepo Mantovano, a high level of air pollution.

From the methodological point of view, the most critical issues to be evaluated for the tourism carrying capacity assessment seem to be water availability and energy consumption (for which there is a lack of data in the Italian statistic dataset at local level), and the impacts on biodiversity. Available Italian data for local energy consumption refer to 1997, because this was the last year of national management of the energy market. From 1998 there have been various energy suppliers, so the collection of data is now very difficult and a detailed national dataset on consumption is no longer available.

Besides, measuring the impact of tourism activities on biodiversity requires specific study of the areas under investigation, because every situation has specific characteristics. The assessment of biodiversity loss due to tourism activities requires the definition of a representative species for each kind of impact, considering a multiple stress condition. This information is not yet available, so a periodical, detailed monitoring campaign on the flora and fauna of protected areas should be promoted in order to have reliable data sets at national and local level and investigations on the number and characteristics of tourists should be carried out to obtain more data, which would be useful to measure the disturbance caused by tourism activities and to assess the carrying capacity of the areas. Moreover, it would be interesting to perform a detailed investigation into the seasonality of tourism impacts, measuring indicators with monthly scaled data: the amount of waste generated, for instance, is largely variable between the high and the low season and this can be a problem for decision makers who have to scale the waste management system in a way that ensures the most efficient service (and environmental protection) in both conditions.

Although not completely exhaustive, the results of tourist carrying capacity assessment allow for a comprehensive evaluation of the situation in the destinations and are useful for underlying critical issues to be considered for the definition of policies for sustainable tourism in the areas.

The results of the carrying capacity assessment were opened to feedback from the stakeholders: they were presented in a forum for consultation involving decision makers, tourism operators and residents and were taken as the basis upon which some responses to the main problems identified were planned. The responses, commonly shared by local administrators, local stakeholders and experts, compose the Action Plan, included in the "Strategy for sustainable tourism" presented at the end of the first phase of the

implementation of European Charter for Sustainable Tourism in Protected Areas process (Tarelli et al., 2008, Trentini et al., 2008).

The identification of responses to issues, including those which currently have a good carrying capacity score, was carried out in order to prevent possible damages coming from an excessive and uncontrolled tourist development and to address the planning of the entire sector towards sustainability. Clearly, actions developed to be included in a tourist management plan cannot address all the drivers that influence the state of the environment in the destination (e.g. energy generation in Oltrepo Mantovano area). The tourism carrying capacity assessment is intended to support the development of sustainable tourism activities, in order to decouple the economic growth of the tourism sector from its impact on the natural environment in the destination.

## 7. Conclusion

The most critical aspect associated with carrying capacity assessment of tourism destination is the complexity of making the carrying capacity concept operational and of providing quantitative results, compared to established thresholds. The present study represents an attempt to quantify the current state of every compartment involved in tourism management and to give a quantity perspective on present and future scenarios of destination development, with the aim of addressing future policies for sustainable tourism.

The application of the methodology to the two destinations in northern Italy highlighted some critical aspects which should be further considered for research; the following paragraph lists some reflections about them:

- there is the need to define thresholds of sustainability, to be able to evaluate the results of the indicators selected for the assessment, even though in some cases (e.g. when commonly recognized values are not available), it could entail a certain degree of subjectivity;
- in the definition of thresholds, a good solution seems to be the use of legal limits, but these are not available for all issues, so further research is required, especially in the field of ecological issues (e.g. biodiversity);
- the use of multiple sources for data collection and of different methodologies for thresholds' definition, implies a certain degree of uncertainty in the final results that should be validated in order to ensure the repeatability of the assessment through space and time and the comparability of the outcomes;
- the integration between physical carrying capacity and managing carrying capacity supports decision makers in the planning process, providing useful information about the interaction between physical limits determined by the characteristics of the natural environment and limits of the existing structures of the local tourism system (e.g. the number of beds or the capacity of local wastewater treatment plants), all of which can influence the feasibility of some responses.

The choice of not aggregating the indicators to compose a final index of the tourism carrying capacity of the area comes from the consciousness that it is not feasible (or useful) to set a limit to the number of tourists (due also to the fact that not every tourist determines the



same impact, see sections 2 and 3) and that having a set of information about single issues, to be considered in a comprehensive manner, helps to avoid compensation between different aspects. For instance, considering the indicator “Economic efficiency of tourist structures”, it could be argued that increasing the number of beds in the destination (i.e. increasing the number of tourists that can be accommodated) could be a good solution to improve the performance of the system, because it would lead to an increase in the carrying capacity in that issue, but, if we also consider the other aspects, such as “Land use” or “Waste management”, it becomes evident that increasing the number of beds would increase the pressure with respect to other issues, thereby reducing the carrying capacity of the system.

Moreover, to evaluate the effectiveness of the policies for development that are defined resulting from the outcome of sustainability evaluation, it could be interesting to extend the assessment of tourism carrying capacity through time, to have a multi-year period of evaluation. Finally, further development of the research could refer to the development of scenarios considering what the situation would be according to existing plans for development in the areas under investigation (e.g. the local structure plan).

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# Reputational Damage to Tourism Industry from Earthquakes – Impact and Analysis of Mass Media Information

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## 1. Introduction

In the history of Japan, earthquakes have been a frequent occurrence, and some have caused considerable damage. The most recent major earthquake in Japan was the 2011 Tohoku Earthquake, which resulted in unprecedented damage in the country, including damage to a nuclear power plant. When large-scale earthquake disasters occur, direct physical damage to buildings and human casualties are the most visible result. In addition, neighboring tourist areas near the disaster zone receive reputational damage.

Reputational damage is a type of secondary economic damage that is caused following an earthquake when tourists avoid visiting neighboring tourist areas near the disaster zone, even though the tourist areas did not receive serious physical damage. Reputational damage can result in massive economic harm to the tourism industry in neighboring areas. The tourism industry is a key industry that has a major impact on the overall economy and on employment creation. Tourism involves various services such as hotel, restaurant, and transportation services, all of which are deeply related to the primary and secondary industries in the area. Therefore, reputational damage in neighboring tourist areas, not only results in significant economic damage, but also hinders the rapid reconstruction of physical damage in the earthquake-affected area, as the ability of the neighboring area to provide financial assistance and human cooperation to the disaster area is reduced. Currently, reputational damage from earthquakes is important social problem in Japan that must be solved.

However, effective measures to counter reputational damage in neighboring tourist areas have not been established. In academic research, the search for measures to counter reputational damage following earthquakes has been few, although some research on the mechanisms of reputational damage and case studies of past incidences have been conducted (Sekiya, 2003; Sano et al., 2007; Todoroki et al., 2009; Takano & Meguro, 2010). Consequently, people working in the tourism industry must carry out measures following an earthquake such as campaigns to attract customers and sales promotions using trial and error to find the most effective strategies. The establishment of effective measures to counter reputational damage is required immediately.

To establish effective measures to counteract reputational damage, the conditions and trends in information sent by mass media such as newspaper and television must be considered. Media information is an important contributor to the occurrence of reputational damage following an earthquake. Often, a large amount of media information about human casualties and building damage in a disaster area is repeatedly broadcast immediately after an earthquake. Even if measures to counteract reputational damage are performed under such circumstances, they do not work effectively. People do not respond to the measures because the negative media information they have received creates feelings of avoidance toward the neighboring tourist area. However, over time, the amount of media information about earthquake damage lessens and more positive media information such as progress toward recovery in the disaster area begins to be reported by the media. This shift can reduce feelings that the neighboring tourist areas are to be avoided. In this stage, if measures to counter reputational damage are performed, they can be effective because less negative media information exists to influence potential tourists. Thus, careful consideration must be given to the conditions and trends in media information when designing strategies to counter reputational damage following earthquakes.

In this chapter, we discuss the mechanisms by which reputational damage occurs to neighboring tourist areas near earthquake disaster zones (Nagao et al., 2006). In this discussion, we look from the viewpoint of the impact of mass media. Subsequently, we manually analyze the conditions and trends in past media information when reputational damage to neighboring tourist areas have occurred following an earthquake in order to confirm the impact of media information in causing reputational damage (Nagao et al., 2010). Here, we use media information on two earthquakes for the analysis. The first is the 2007 Noto Earthquake and the other is the 2007 Niigata Chuetsu Earthquake. These earthquakes caused serious physical damage to the affected areas, and also resulted in significant economic damage from reputational damage to neighboring tourist areas near the disaster area. We use newspaper and Internet news articles as the target of our investigation. In this analysis, we determine the amount and content of information sent by mass media. Using the results of the analysis, we discuss measures to counteract reputational damage on the basis of the conditions and trends in media information.

Media information changes on a daily basis and must be analyzed immediately to examine its content and identify trends in order to implement measures to counteract reputational damage following earthquakes. It is difficult to perform such information analysis manually because the amount of media information is extremely large when an earthquake occurs. Thus, a method is required that can automatically and accurately analyze media information and then immediately provide the results. We propose an analysis method using information technology (Suto et al., 2009; Nagao et al., 2011). Our method consists of Japanese language morphological analysis, pointwise mutual information/information retrieval (PMI-IR), and so on. The proposed method can analyze the similarity and overall impression in media information to examine content and trends in the data. We apply the proposed method to the media information on the two earthquakes described above in order to confirm its adequacy. Moreover, we discuss an effectiveness of our proposed method by comparing the results of a manual inspection of media information with the result obtained by the proposed method. Finally, from the comparison result, we conclude the potential for measures to counter reputational damage following earthquakes based on the conditions and trends of media information.

## **2. Reputational damage to the tourism industry**

In this section, the details of reputational damage are described, specifically with regards to public concerns and fears about tourist areas near earthquake disaster zones. In addition, the occurrence of reputational damage is explained and the potential countermeasures are discussed.

### **2.1 Reputational damage**

Reputational damage has been originally used as a word related to indemnity problem of economic damage that actually safe food or product is recognized as an object receiving radioactive contamination by nuclear accident and then people do not buy them (Sekiya, 2003). However, in addition to nuclear accident, reputational damage currently expresses the idea that an unrelated or undamaged industry is harmed economically because of fear and suspicion on the part of the public that product or service quality or safety is diminished following an accident or event. Recently, food and industrial products received significant reputational damage following the nuclear accident at Fukushima Daiichi Nuclear Power Plant.

Further, reputational damage to neighboring tourist areas near an earthquake disaster zone recently has been recognized as an important social problem. When earthquake disasters occur, the disaster area incurs physical damage such as human casualties and building collapse, but the neighboring tourist areas that do not receive serious physical damage also receive economic damage from reputational damage. The 2004 Niigata Chuetsu Earthquake is an example of a situation where reputational damage happened in the neighboring tourist areas following an earthquake. In this earthquake, reputational damage occurred to the whole of Niigata prefecture, and then the tourism industry in the prefecture incurred economic damage of about 20 billion Japanese yen. The 2005 Fukuoka Earthquake is another example. In this case, the earthquake reduced the number of tourists in Fukuoka prefecture by 20% compared to normal years.

Japan is situated in an area where many earthquakes occur. Therefore, in comparison with reputational damage generated by nuclear accident or other events, reputational damage from earthquakes has a high possibility of occurring. Moreover, the tourism industry has a very high possibility of receiving reputational damage compared to other industries. Reputational damage results from the characteristic of tourism, namely, that tourism is recreational and not indispensable for living, and even slight worries or fears can result in trip cancelations and avoidance of an area.

Furthermore, the scale of reputational damage in tourism industry is quite large. The tourism industry is an industry that has a strong economic ripple effect on other industries because it consists of various tourism services such as transportation, accommodation, restaurant, and amusement services. In addition, each tourism service is deeply connected to the primary and secondary industries in the region. Reputational damage to the tourism industry near an earthquake disaster zone also influences employment in the area, which can hinder the rapid recovery of the disaster area because the economic damage to the surrounding area limits the ability to provide human and financial cooperation to the disaster area. For these reasons, Japan must find solutions to the problem of reputational damage to tourist areas following an earthquake disaster.

Thus far, however, academic research on reputational damage to tourist area has been not actively performed. The few examples of academic studies have looked at the mechanism of reputational damage, conducted survey investigation in the area where reputational damage has occurred, and analyzed past examples of reputational damage. Moreover, there have been few academic studies on measures to counteract reputational damage. Therefore, when reputational damage occurs to neighboring tourist area, people engaged in the tourism industry must rely on trial and error when performing countermeasures such as public relations and campaigns for tourism.

## **2.2 Precipitating factors and measures to counter reputational damage**

One of major precipitating factors of reputational damage is the information sent by mass media. Reputational damage occurs when mass media sends false or exaggerated information. In addition, reputational damage also can occur even when accurate media information is sent to people. This results from the fact that how receivers of media information respond to information, both true and exaggerated, is itself a cause of reputational damage.

When earthquake disasters occur, information about damage in the disaster area is first sent by the mass media. Serious and disturbing damage in disaster area are repeatedly reported day and night by newspaper, television, radio, and other media. Moreover, in this coverage, the areas with the most serious damage are highlighted. Because of this media focus on the worst hit areas, people incorrectly overestimate the scale of the damage. In addition, although people can approximately ascertain the disaster area, doing so precisely is difficult with only media information. People incorrectly perceive that a wider area than the actual damaged area has received serious damage and is dangerous. Tourist resorts in the area falsely believed to have incurred damage receive reputational damage. Preventing reputational damage is difficult because its causes lie not only in the information sent by mass media but also in the receivers of information. Therefore, countermeasures should be implemented that can effectively limit reputational damage and promote recovery.

To implement effective measures to counter reputational damage, the conditions and trends in media information must be considered, as it is a major factor in causing reputational damage. People feel the need to avoid visiting neighboring tourist areas for sightseeing immediately after an earthquake because media information on damage causes them to overestimate the extent of damage in the wider area around the disaster zone. In such situations, even if strategies such as public relations for tourism promotion are performed, they are not effective. Moreover, people doubt the reliability of information conveyed in these public relations efforts and the measure may have a negative impact. For example, premature measures to counter reputational damage following the 2007 Niigata Chuetsu Earthquake had a negative effect. In this earthquake, a nuclear power plant near the epicenter suffered damage and water containing radiological material flowed from the nuclear power plant into the sea. The mayor undertook a public relations campaign to emphasize that ocean products were harmless. The public relations campaign was performed immediately after the occurrence of earthquake and the damage investigation at the nuclear power plant has not completed yet. For this reason, the public relations efforts had no effect. Moreover, after the campaign, mass media reported many damaged parts and problems at the nuclear power plant. People became suspicious of the discrepancies



between the information reported by the mass media and the public relations campaign, and a long-term shift away from the consumption ocean products occurred.

However, over time, the amount of media information about the earthquake decreased and the content of media information shifted from reports of damage to the progress made toward recovery, which eased feelings of avoidance toward visiting the neighboring tourist areas for sightseeing. If the measures to counter reputational damage were performed in this stage, better results could have been expected because there efforts would not have been obstructed by the negative information in the media about earthquake damage. Thus, clarifying the information sent by mass media should be performed and implementation of public relations strategies should be based on the conditions and trends in media information for measure countering reputational damage to be effective.

Against this background, in our research, we analyze media information when earthquake disasters occur. Subsequently, we propose an analysis method of media information using information technologies to automatically analyze media information.

### 3. Earthquake for media information analysis

In our research, we employ the media information for two earthquakes to perform media information analysis. The details of two earthquakes are described below.

#### 3.1 2007 Noto earthquake

The 2007 Noto Earthquake was a massive earthquake that occurred in Japan on March 25, 2007. The Noto Peninsula is located on the west coast of Japan and projects into the Sea of Japan (See Fig. 1). Almost the entire peninsula is located in Ishikawa prefecture.



Fig. 1. Location of earthquakes

The epicenter of the earthquake was in the Sea of Japan near the Noto peninsula. The magnitude of the earthquake was estimated at 6.9 on the Richter scale. Shaking in the city of Nanao and the town of Anamizu in Ishikawa prefecture was measured as 6 upper on the Japan Meteorological Agency (JMA) seismic intensity scale. The earthquake caused extensive damage to many cities and towns in Ishikawa prefecture and neighboring Toyama prefecture. In terms of human casualties, one person died and at least 279 people were injured in Ishikawa and Toyama prefectures. In terms of property damage, 649 houses were completely destroyed and 26,614 houses were partly destroyed. Lifeline utilities (electricity, water, gas, etc.) were cut off. In addition, all rail service in this area stopped. Following this earthquake, reputational damage was incurred by many tourist areas in Ishikawa prefecture. For example, at the Wakura Hot Spring Resort in Ishikawa prefecture, 66,413 hotel bookings were cancelled during the month following the earthquake. Wajima city in Ishikawa prefecture had 15,526 hotel booking cancellations. Moreover, the tourism-related sales decreased by 20% in the resorts at Kaga Hot Spring in Ishikawa prefecture, which received almost no physical damage and is far from the epicenter.

### **3.2 2007 Niigata Chuetsu earthquake**

The 2007 Niigata Chuetsu Earthquake occurred on July 16, 2007. Niigata prefecture is located on the western side of Japan along the Sea of Japan (See Fig. 1). Chuetsu is the central area of the three mainland areas of Niigata prefecture. The epicenter of the earthquake was in the Sea of Japan off the coast of Chuetsu. The magnitude of the earthquake was estimated at 6.8 on the Richter scale. Kashiwazaki city, Nagaoka city, and Kariwa village registered the highest seismic intensity, registering 6 upper on the JMA scale. Fifteen deaths and at least 2,315 injuries were reported. In addition, 1,319 buildings were completely destroyed and 40,280 buildings were partly destroyed. Lifeline utilities and various transport facilities were disrupted. Considerable damage resulted from this earthquake and several incidents occurred at the Kashiwazaki-Kariya Nuclear Power Plant. A fire broke out in an electrical transformer and radioactive gases leaked from the nuclear power plant. Many tourist areas in Niigata prefecture experienced significant reputational damage as a result of the public's fears concerning the plant accident. For example, the number of hotel guests in all hot spring resorts in Niigata prefecture was reported to decrease by 40%.

## **4. Analysis of media information**

We analyze the information sent by mass media following the two earthquakes described above in order to investigate the actual condition of the media information. The analysis method and result are described below.

### **4.1 Analysis method**

We collected the information on the earthquakes from two types of media — print newspapers and Internet news websites managed by newspaper publishing companies (henceforth, described as web news). For each earthquake, we collected earthquake-related articles from five newspapers, including four national newspapers and one local newspaper. In the analysis of web news, we used two websites for the 2007 Noto Earthquake and three websites for the 2007 Niigata Chuetsu Earthquake, respectively. For the 2007 Noto Earthquake, articles were taken from Chunichi Web ([www.chunichi.co.jp](http://www.chunichi.co.jp)) and Yomiuri Online ([www.yomiuri.co.jp](http://www.yomiuri.co.jp)).

For the 2007 Niigata Chuetsu Earthquake, we collected earthquake-related articles from MSN Sankei News ([sankei.jp.msn.com](http://sankei.jp.msn.com)), Niigata-Nippo Online ([www.niigata-nippo.co.jp](http://www.niigata-nippo.co.jp)) and YOMIURI Online. Yomiuri Online and MSN Sankei News are managed by national newspaper publishing companies in Japan, and Chunichi Web and Niigata-Nippo Online are managed by local newspaper publishing companies. In this collection, we treated articles including the name of the earthquake as the disaster-related information. The collection period was two months from the day of the occurrence of each earthquake.

We investigated the amount of information in newspapers and web news. To determine the amount of information, we used the amount of page space of earthquake-related articles for printed newspaper and the number of articles for web news. Moreover, we analyzed the contents of articles collected from both media. In this content analysis, we classified the articles into three categories on the basis of whether or not the article gave readers the feelings of avoidance toward visiting neighboring tourist resorts for sightseeing. The articles that prompted feelings of avoidance were classified into the NEGATIVE category. For example, articles that gave damage reports, the number of deaths, and the like were classified in this category. Articles that ease feelings of avoidance were classified into the POSITIVE category. This category included the articles about the progress of recovery, visits of celebrities, and similar topics. Finally, the articles that neither caused nor eased feelings of avoidance were classified into the NEUTRAL category. The articles reported on topics such as the economic and political changes related to the earthquake were included in this category.

## 4.2 Analysis results

The analysis results are shown in Fig. 2 through Fig. 5. Figure 2 and Fig. 4 indicate the change in the amount of earthquake-related information in newspapers and web news, respectively, for the two earthquakes. Fig. 3 and Fig. 5 represent the change in the content ratio in each category for newspaper and web news, respectively.

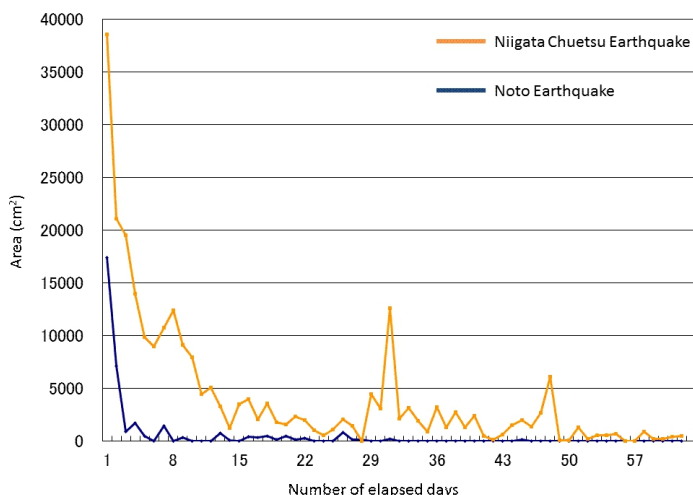


Fig. 2. Amount of earthquake-related information in newspapers

In Fig. 2 and Fig. 4, the x-axis represents the number of days elapsed after the earthquake and y-axis represents the amount of information. For newspapers (Fig. 2), the amount of information represents total amount of page space of articles published by the five newspapers. For web news, the amount of information reflects the average number of articles published on websites (Fig. 4). In Fig. 3 and Fig. 5, the top graph indicates the results of the content analysis of articles covering the 2007 Noto Earthquake and the bottom graph indicates the results for the 2007 Niigata Chuetsu Earthquake. In these figures, the x-axis represents the number of days elapsed after the earthquake and the y-axis represents the content ratio in each category. In these charts, the value at the top of the dark bar represents the ratio of NEGATIVE articles and the value of bottom of dark bar represents the ratio of POSITIVE articles, respectively. When the bar is light-colored, the type of content is reversed, with the ratio of POSITIVE articles at the top and NEGATIVE news at the bottom.

First, we discuss the analysis result for newspaper. As shown in Fig. 2, the amount of information on the Noto Earthquake rapidly decreased following the third day after the earthquake, and the amount of information did not increase after this. In the case of the Noto Earthquake, property damage happened over a wide area, but few people died. It is likely that the amount of information decreased because of a lack of fresh news. In the case of Niigata Chuetsu Earthquake, the amount of information dropped steadily over the first week and then increased during the second week. After the first month, the amount of information increased again. After this, the amount of information did not increase, except for an upward tick on the 48th day after the earthquake. This increase after the 48th day resulted because of the tourism public relations advertisements published by government and is an exception to the general trend in newspaper coverage. For this earthquake, prolonged coverage was performed, likely because this earthquake caused unique damage (e.g., the accident in nuclear power plant and stoppage of automobile manufacturing) that had negative impacts on other areas. To compare the two results, when news coverage extended over a long period of time, the summary of the events of the earthquake disaster was reported. In addition, the results show that the continuity of coverage depends on the scale and features of the damage from the earthquake.

In Fig. 3, the content of newspaper articles on the Noto Earthquake can be divided into three periods on the basis of the ratio between the three categories. The first period is from the day of the earthquake through one week after. The second period is between one and about four weeks after the earthquake. The final period is the period more than four weeks from the occurrence. In the first period, the ratio of NEGATIVE articles was continuously high. In the second period, the ratio of POSITIVE articles increased on some days and the ratios of NEGATIVE articles varied. In the final period, the content fell solely into the NEUTRAL category. The result of the content analysis can also be divided into three periods for the Niigata Chuetsu Earthquake. The first period is from the date of the earthquake until 30 days after. The second period is from 30 days to 40 days after the earthquake. The final period is more than 40 days after the earthquake. In the first period, the ratio of NEGATIVE articles was consistently high. In the second period, the ratio of NEGATIVE category decreased. In the third period, the content ratio for each category showed large variation.

We use the results above to discuss the conditions and trends of media information from the viewpoint of countering reputational damage in surrounding areas. It is obvious that the appropriate period to start measures to counter for reputational damage is during calm

periods in terms of both the amount and content of media information. In regard to the content of media information, we regarded calm periods as when the ratio of NEGATIVE articles is low and the ratio of POSITIVE articles begins to rise. This calm period was identified with consideration of the continuity of the ratios for each category. In the analysis results for newspapers, it was found that the appropriate period for measures to counter reputational damage depended on the calm period in terms of content. Therefore, the calm period was four weeks after the Noto Earthquake, and was about six weeks after the Niigata Chuetsu Earthquake, respectively.

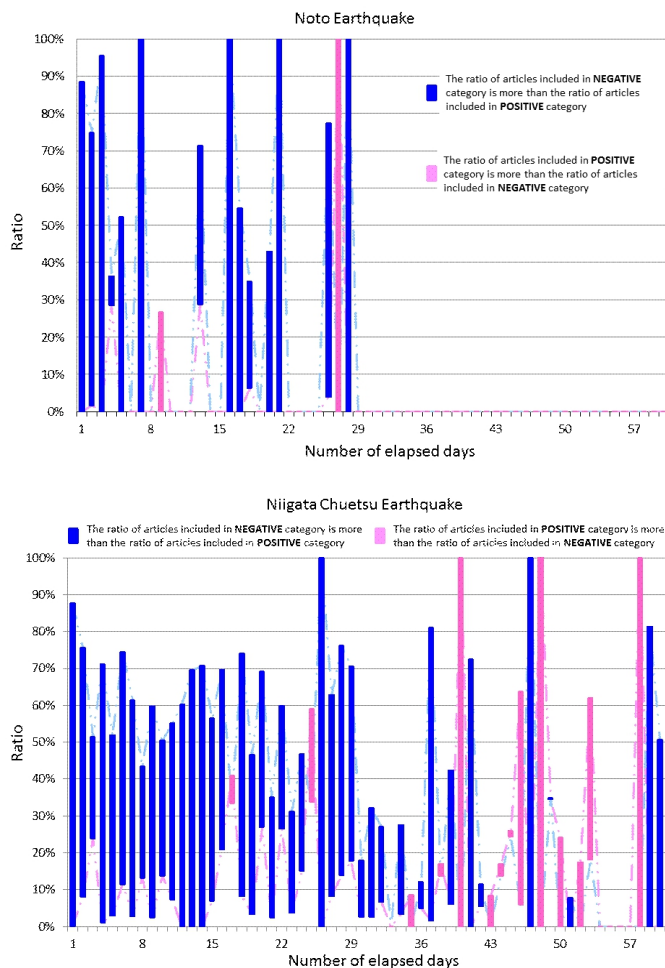


Fig. 3. Results of content analysis of newspapers

Next, we discuss the results of the analysis of web news. Figure 4 shows the change in the amount of information for web news over time. The maximum amount of information emerged on day following the both earthquakes, which reflects the time that is required to

confirm the total damage done by earthquake. Although web news can be quickly posted on the Internet, the maximum value emerged on the next day following the earthquake because it took time to investigate the totality of the damage situation, given that these earthquakes caused damage over large areas. The subsequent slow decrease in web news could be found for both earthquakes although the trend in the amount information in two earthquakes differs over the first two weeks after the earthquake. This overall trend and the amount of information means that web news reach a calm period after two weeks following the earthquake

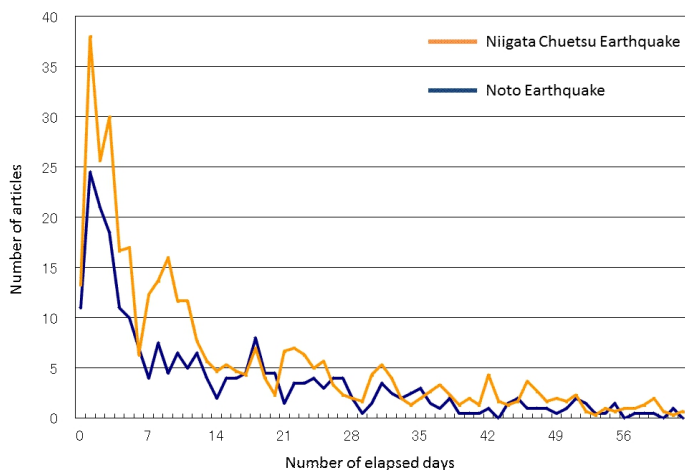


Fig. 4. Amount of information in web news

In Fig. 5, the calm period in terms of web news content is regarded as when the ratio of NEGATIVE articles is low and the ratio of POSITIVE articles begins to rise. This period corresponds to the period two weeks after the Noto Earthquake. For the Niigata Chuetsu Earthquake, it was about four weeks later. The appropriate period for measures to counteract reputational damage from web news corresponds with the calm period of content of media information in common with the results for newspaper.

Figure 6 summarizes the results for the appropriate period to conduct measures to counteract reputational damage after the two earthquakes. We discuss methods to counter reputational damage from each media on the basis of the analysis results. For newspaper, a large amount of page space dedicated to a story attracts readers' attention, and typically it is difficult for an article to be published if it is not topical. Therefore, to be effective, countermeasures using newspapers should include the placement of public relations advertisements that have a wide enough area to attract a great deal of attention during the calm period of media information. Advertising activity during the calm period influences people without being obstructed by media information that gives negative impressions about visiting neighboring tourist areas for sightseeing. Then the countermeasure can begin to remove negative impressions and build positive impressions about tourism in the areas near the earthquake zone. Moreover, such a strategy is expected to effect people of all ages because newspapers are read by many types of people.

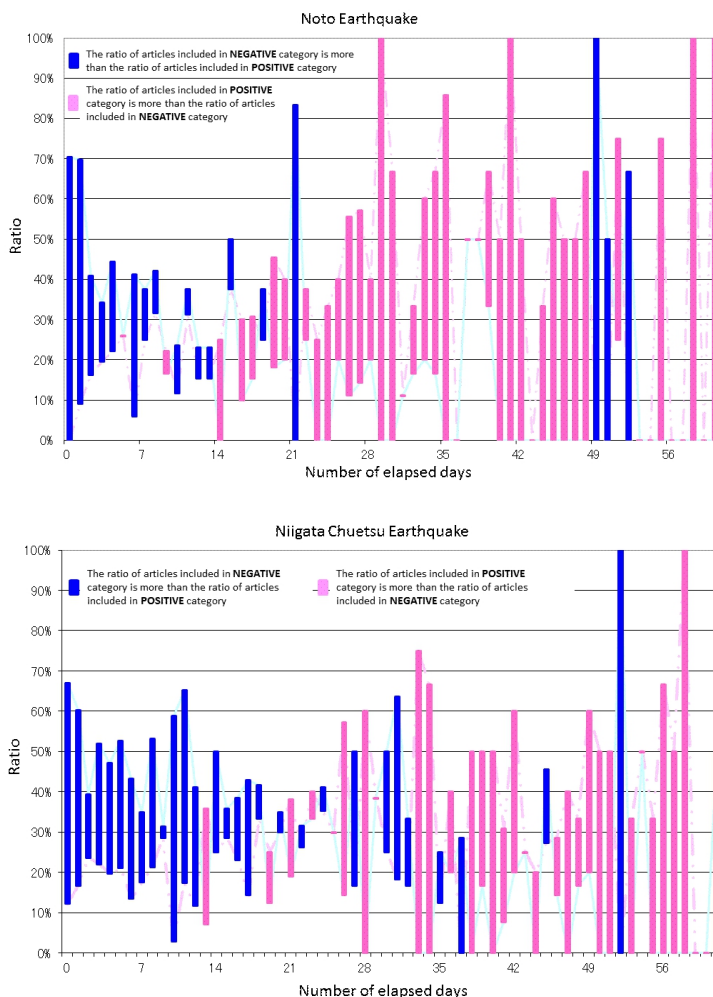


Fig. 5. Results of content analysis of web news

For web news, articles about events and affairs are published even if they are not highly topical. In addition, articles are published promptly on the website. Therefore, a strategy of active public relations measures during the calm period of media information is an effective method to counter reputational damage from web news. By performing such measures, the effect of the public relations efforts can be obtained first, and then the ripple effects from the publication of the web news articles can be expected.

Moreover, reputational damage from earthquake is specifically connected with the effects of potential visitors hesitating to go sightseeing near the disaster area even if it is safe. Therefore, the public relations campaign must clarify that visiting neighboring tourist areas for sightseeing contributes to the smooth rehabilitation of the disaster area.

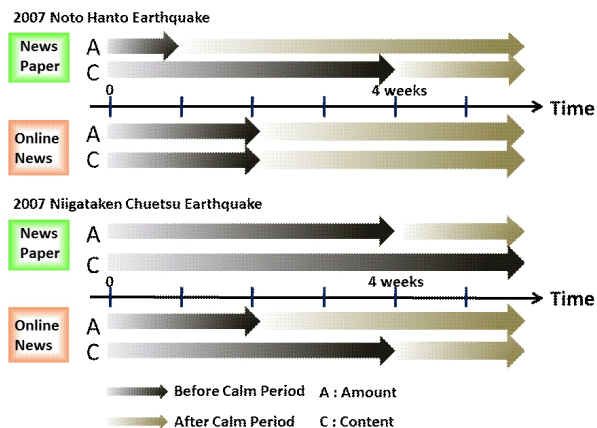


Fig. 6. Summary of media information analysis

## 5. Method of analysis for media information using information technology

The contents of media information have been found to be important when determining the calm period for performing the measures to counteract reputational damage. A manual analysis of media information content is not suitable for providing analysis results in real time when an earthquake occurs because the amount of information is extremely large. Therefore, an automatic method of content analysis is required. In this research, we propose an analysis method using information technologies. The details of the proposed method are described below.

### 5.1 Overview of proposed method

We propose a method for analyzing trends in the content of media information that compares the similarity of information over time following an earthquake. It is clear that the information about damage and human casualties is repeatedly published immediately after the earthquake and the content gradually shifts to a focus on recovery progress over time. Therefore, our method compares the content of media information immediately after the earthquake with the subsequent content of media information further from the date of the earthquake. The trends in media information are quantified by comparing the results.

An overview of proposed method is shown in Fig. 7. In the proposed method, the media information is analyzed on a daily basis. First, media information is broken down into morphemes, which are the minimum unit in language that has meaning. Association rule mining is then applied to the extracted morphemes and can extract frequently appearing words in the media information. Next, the value of  $\chi^2$  is calculated on the basis of the co-occurrence frequency of frequently appearing extracted words. By this method, important words in the media information are identified. The similarity of the content is calculated using the rank correlation coefficients of frequently appearing and important words. The trends in media information are quantified by this process.

The proposed method can schematically grasp the overall content of media information by extracting frequently appearing words based on association rule mining. In addition, the



emphasis of the overall content can be obtained by extracting important words based on  $\chi^2$  value. The trend of media information can be appropriately grasped by calculating the similarity from the viewpoints of two criteria. The detail of each step is shown below.

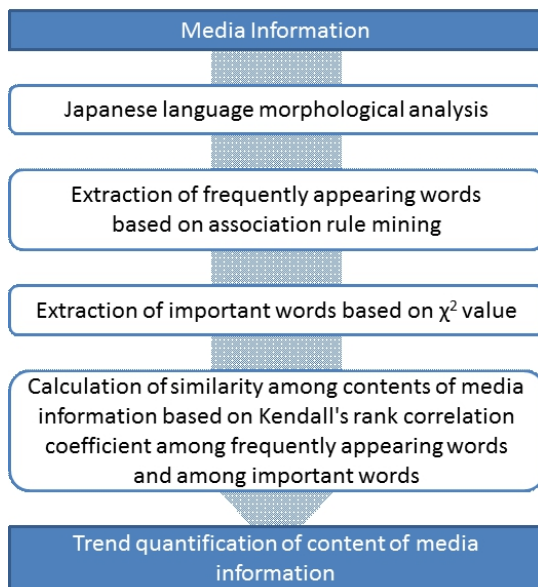


Fig. 7. Overview of proposed method of content analysis

## 5.2 Japanese language morphological analysis

In our method, we use Mecab, an open source Japanese language morphological analysis engine, in order to resolve text information into morphemes (Kudo, 2011). Only nouns are extracted from text information in this operation, and morphemes for words other than nouns (verb, adjectives, numbers, symbols, etc.) are removed.

In addition, we connect nouns extracted in the Japanese language morphological analysis that are part of multiword phrases or names. Thus, some continuous nouns are treated as one noun by connecting them. For example, the name "Sapporo city" is normally divided into two nouns—"Sapporo" and "city"—in Japanese language morphological analysis. We link both parts so that "Sapporo city" is treated as one noun. This operation can prevent an excessive resolution of one word and maintain the original meaning of the expression.

After this, a word appearance list is created, consisting of the combinations of nouns and the number of lines on which each noun is included. This operation is based on the extracted nouns and the line feed and punctuation information in the text.

## 5.3 Association rule mining

Basically, in our research, the content of media information is analyzed using the frequency of words, including nouns and multiword noun phrases. Namely, frequently appearing

words are extracted by association rule mining in this step. We employ an Apriori algorithm, which is the association rule extraction algorithm proposed by Agawal (Honiden, 2005). In this algorithm, the user decides thresholds for support and confidence, and words having values over the thresholds are extracted.

As the first step in extracting frequently appearing words, the support value is calculated for each word in the word appearance list. The support value represents the probability of occurrence for a word. We calculate the support value by using formula (1). In formula (1), the support value considers the number of words and the number of the word types in the text is calculated, as the probability of occurrence for word is sensitive to these numbers. In the first calculation step in formula (1),  $X$  equals  $Y$  because each word consists of one noun.

$$s = P(X \cap Y) \times \frac{I \times N_{std}}{N \times I_{std}} \quad (1)$$

$N$  : Number of words appearing in text

$I$  : Kinds of words appearing in text

$N_{std}$  : Criterial number of words appearing in text

$I_{std}$  : Criterial kinds of words appearing in text

The values extracted from the media information text on the first day following the earthquake are used as the criterion of word numbers appearing and the criterion of word type appearing in the text. Next, the confidence value for each word is calculated by using formula (2). If the support and confidence values are over fixed thresholds, the word is added to the frequently appearing word list.

$$c = P(Y | X) \quad (2)$$

As the next step, two words in the frequently appearing word list are combined. The support and confidence values for the combined words are calculated, and the words having the values over the thresholds are also added to the frequently appearing word list. The combination of words in the frequently appearing word list is repeated until the combined words satisfying the thresholds are exhausted.

If a combined word consisting of multiple words appears only one time in the text, the combined word is not added to the frequently appearing word list. Moreover, if the support value for a word that is a subset of a combined word equals the support value for the combined word, the subset word is removed from the frequently appearing word list. These operations are performed eliminate the redundancy of words appearing in the list as single and combined words.

## 5.4 Calculation of the value of $\chi^2$

The important words in text are often used in conjunction with some particular words. Namely, co-occurrence of words likely becomes an index representing the importance of words in the text. Thus, we analyze the co-occurrence of words in the text in order to grasp the emphasized content in the whole of the media information (Matsuo & Ishizuka, 2002).

A co-occurrence matrix is created from the words in the frequently appearing word list created by association rule mining. The expectation for the frequency of each word in the

frequently appearing word list is calculated. The value of  $\chi^2$  is calculated using formula (3), based on the expectation and co-occurrence frequency of the words. If a word co-occurs with a particular word, a relationship between ancillary words likely exists among these words. Thus, a value of  $\chi^{2'}$  is employed that ignores the ancillary relationship. The value of  $\chi^{2'}$  is calculated by a formula (4). The important word list is created using  $\chi^{2'}$  value.

$$\chi^2(i) = \sum_{w \in W} \frac{(freq(i, w) - n_i p_w)^2}{n_i p_w} \quad (3)$$

$$\chi^2(i)' = \chi^2(i) - \max_{w \in W} \left\{ \frac{(freq(i, w) - n_i p_w)^2}{n_i p_w} \right\} \quad (4)$$

$freq(i, w)$ : Co-occurrence frequency of word  $i$  and  $w \in W$

$n_i$ : Total number of co-occurrence between word  $i$  and set of frequently appearing word  $w$

$p_w$ : Occurrence probability of frequently appearing word

### 5.5 Kendall's rank correlation coefficient

Media information is collected daily. Thus, a frequently appearing word list and an important word list are created for each day. Kendall's rank correlation coefficients between the frequently appearing word lists and the important word lists are calculated using formula (5). Kendall's rank correlation coefficient for the frequently appearing word lists indicates the recapitulative similarity of media information and for the important word lists indicates the similarity of content emphasized in the media, respectively.

$$R = \frac{\sum P_{ij} - \sum Q_{ij}}{\sqrt{\frac{n(n-1)}{2} - T_x} \sqrt{\frac{n(n-1)}{2} - T_y}} \quad (5)$$

$$T_x = \sum_{i=1}^{n_x} \frac{t_i(t_i-1)}{2} \quad (6)$$

$$T_y = \sum_{j=1}^{n_y} \frac{t_j(t_j-1)}{2} \quad (7)$$

$P_{ij}$ : Combination of words that have an order relation of word  $i >$  word  $j$  in list  $x$  and same order relation in list  $y$

$Q_{ij}$ : Combination of words that have an order relation of word  $i >$  word  $j$  in list  $x$  and an order relation of word  $j <$  word  $i$  in list  $y$

$n$ : Length of list

$t_i$ : Number of words with same rank as word  $i$  in word list  $x$

$t_j$ : Number of words with same rank as word  $j$  in word list  $y$

In the calculation of similarity in the media information, both of the similarities of the recapitulative content and the emphasized content can be considered by using two rank correlation coefficients between the frequently appearing word lists and the important word lists. The similarity between media information is calculated using formula (8).

$$Sim(i, j) = \sqrt{R_{freq}(i, j)^2} \times (1 + \sqrt{R_{imp}(i, j)^2}) \quad (8)$$

$Sim(i, j)$ : Similarity between media information of day  $i$  and media information of day  $j$

$R_{freq}(i, j)$ : Rank correlation coefficient between the frequently appearing word lists of day  $i$  and day  $j$

$R_{imp}(i, j)$ : Rank correlation coefficient between the important word lists of day  $i$  and day  $j$

We use the absolute value of the rank correlation coefficient to calculate the similarity between media information. A negative correlation coefficient between lists means that the recapitulative contents of media information are the same and just the quantity of each topic in the media information is different. Therefore, the absolute value is used because it is clear that there is similarity between media information in this case.

The similarity between media information for a given day  $i$  and the previous day  $i-1$  is calculated by using the formula (8). In addition, the similarity between media information on a given day  $i$  and all previous days, (i.e., all days from day 0 to day  $i-1$ ) is calculated and then the average value of these is calculated. The trends in media information are obtained on the basis of the time series analysis of these similarities.

## 5.6 Experimental method and results

In this experiment, we used the media information from web news about the Noto and Niigata Chuetsu earthquakes that were used in the previous analysis in order to confirm the validity of our proposed method. The reason why the media information from web news was employed is that it is easy to obtain the media information as digital data. The thresholds of support and confidence in the association rule mining were 0.7 and 0.015. These thresholds were determined by a heuristic method. Moreover, the top 20 words in the frequently appearing word list and the important word list were used to calculate Kendall's rank correlation coefficient.

The result of the media information analysis for each earthquake is shown in Fig. 8. In Fig. 8, if the similarity of media information between each given day and all past days and the similarity of media information between each given day and the previous day are continuously low, the mass media sent information of varying content each day that was different from past trends. Namely, a situation where the two similarity scores are continuously low indicates the turning period when the trend of media information changes.

In the results for the Noto Earthquake, the similarities to media information on all previous days and to of the immediately previous day both decreased on the 14th day after the earthquake. A decrease in similarity was also observed on 43th day after the earthquake. However, the decline on the 43th day was caused by a decrease in the amount of information. We investigated the words in the frequently appearing word lists and the important word lists in order to clarify the cause of decrease in similarity. From this investigation, we found that the words relating to earthquake damage and aftershocks were

extracted until the 14th day following the earthquake and then words related to the withdrawal of self-defense forces and other events were extracted from the 14th day and beyond. Moreover, the results obtained by the proposed method corresponded with the results of content classification represented in Fig. 5.

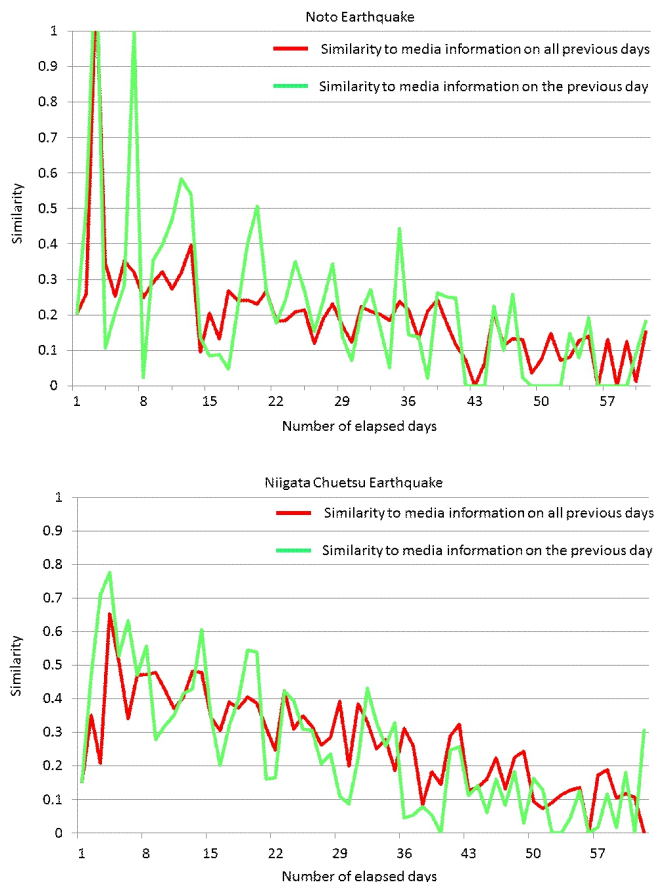


Fig. 8. Trends in media information from web news

For the Niigata Earthquake, a large decrease in similarity to the media information of the previous day was observed on the 36th day after the earthquake. The similarity to the media information of all previous days decreased on 38th day after the earthquake. We also investigated the frequently appearing word lists and the important word lists in order to strictly check the cause of the decrease. Words relating to the closure of an evacuation center were extracted on 35th day and words relating to criminal activity connected to the earthquake were mainly extracted on 36th day. It is likely that the decrease of similarity to the media information of the previous day resulted because of this difference. Moreover, the trend in words in each list changed from 37th day. However, the words extracted from media information on 37th day after earthquake

partly agreed with the words extracted from media information immediately after the earthquake. For this reason, the large decrease in the similarity to the media information of all previous days was not observed on the 37th day and then emerged on the 38th day. In the results of the media content classification described in Fig. 5, the ratio of POSITIVE articles in the media started increasing from the 33rd day after the earthquake. The result obtained by the proposed method roughly agreed with the classification results of the human analysis of media information.

From these results, it was found that the change in media information could be properly obtained by the proposed method. Therefore, it is likely that effective measures to counter reputational damage could be performed based on the conditions and trends in media information by using our proposed method.

## 5.7 Discussion

From the experimental results described above, it was revealed that our proposed method could quantify the transition in media content and then could grasp changes in the trends in media information. In this method, media information such as damage reports was assumed to be widely disseminated immediately after the occurrence of earthquake and then that media information gradually shifts over time to other content such as recovery progress. Namely, a situation where the similarity in media information is low compared to immediately after the earthquake means that the content has shifted, which can lessen the feelings of avoidance toward neighboring tourist area near the disaster zone. However, there is the possibility that media information changes to even worse content, which would further promote the feelings of avoidance toward the neighboring tourist areas. However, it is difficult to judge using our proposed method how changes in media content affect feelings of avoidance toward neighboring tourist areas. A function must be implemented that can analyze whether the contents promote a positive or negative impression of neighboring tourist areas.

In our research, we attempted to add a function to the proposed method that can analyze the impression of media information on the public. In order to judge the impression of media information, we analyzed which frequently appearing words and important words are used in the text to get the connotation of the media information. Namely, the connotation of words was analyzed. Here, we applied dependency parsing software to sentences containing frequently appearing words and important words and then extracted the grammatical relationships. Specifically, nouns, verbs, adjectives, adverbs and conjunctions in the segments including the frequently appearing words or important words were extracted to specify how the words were used in the text. We employed CABOCHA, which is Japanese dependency structure analysis software based on support vector machines, to perform dependency parsing (Kudo & Matsumoto, 2002).

After Japanese dependency parsing, the direction of the meanings for each word was quantified by PMI-IR, which calculates the strength of emotional polar value (Tunney, 2001; Kaji & Kitsuregawa, 2007). Words representing positive things are often used together with other words that have positive meanings. In contrast, words representing negative things are often used together with other words that have negative meanings. The connotation of word was analyzed on the basis of information retrieval using a search

engine in PMI-IR. Thus, we investigated whether words having positive meanings or words having negative meaning were used together frequently with the words on the frequently appearing word list and the important word list on the basis of the number of hit counts in search engine.

First, a key phrase for the search engine is created. The key phrase consists of a word from the frequently appearing word list or the important word list along with words from the list of words having a modifying relationship extracted by Japanese dependency parsing and the index of words having positive connotations. Information retrieval was conducted using a search engine. The key phrase was entered into the search engine and the number of hit counts was determined. Similarly, the number of hit counts for the key phrase was also determined with an index of words having negative connotations substituted in place of the positive word index. Moreover, the hit counts for the positive and negative index words were investigated, respectively. SO value for the key phrase was calculated by using four values as shown in formula (9).

$$SO(ph) = \log_2 \left( \frac{hits("Ph" Near "GW") \times hits("BW")}{hits("Ph" Near "BW") \times hits("GW")} \right) \quad (9)$$

In the formula (9), *ph* represents a key phrase consisting of a word in the frequently appearing word list or the important word list and the words having a modifying relationship. Further, *hits("Ph" Near "GW" or "BW")* indicates the hit count from information retrieval using the key phrase, the index word and the NEAR operator. Multiple SO values were calculated for each word in the frequently appearing word list and the important word list because they were present in multiple sentences along with different modifying words. The average SO value is used each word. In addition, the impression level of media information was calculated using formula (10). The impression level of media information is calculated using multiple SO values because the frequently appearing word list and the important word list contain multiple words.

$$IMG = \sum_{j=1}^n \left( SO\_F_j \times \frac{freq_j}{\sum_{p=1}^n freq_p} \right) \times \sum_{k=1}^m \left( SO\_I_k \times \frac{imp_k}{\sum_{q=1}^m imp_q} \right) \quad (10)$$

$SO\_F_j$  : SO value for the *j*th word in the frequently appearing word list

$SO\_I_k$  : SO value for the *k*th word in the important word list

$freq_j$  : Support value for the *j*th word in the frequently appearing word list

$imp_k$  : Importance value for the *k*th word in the important word list

$\sum_{p=1}^n freq_p$  : Sum of support values for all frequently appearing words in word list

$\sum_{q=1}^m imp_q$  : Sum of important values for all important words in word list

$m, n$  : Length of list

We applied the impression analysis to the media information from web news for the Niigata Chuetsu Earthquake. We used Google as the search engine for the impression analysis. Combinations of words having positive or negative connotations were used as index words, such as words that could be considered "good" and "bad" and having to do with "relief" and "fear". The impression values (IMG) were calculated for these combinations, and then the average value was used as the impression level for media information.

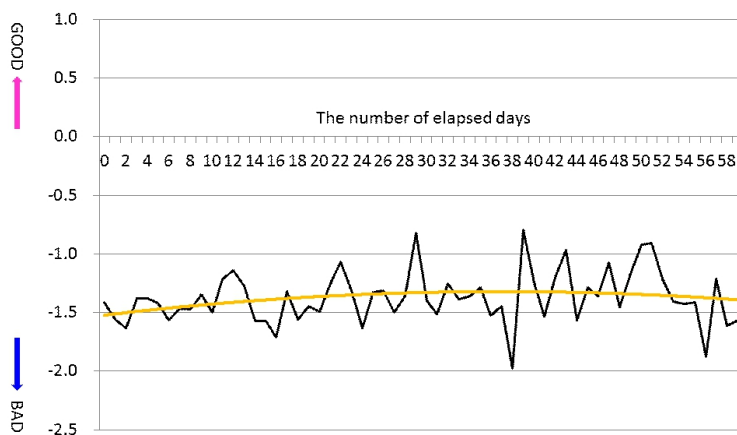


Fig. 9. Results of impression analysis of media information

Figure 9 shows the results of the impression analysis. From the experimental result, it was revealed that the impression level of media information had negative values on each day following the earthquake. Immediately after an earthquake, the media information gives a negative impression to people. Therefore, the values for all days are likely to be negative. However, a pattern approximating a curve can be seen in Fig. 9, as a slightly positive increase in the impression level was observed. Namely, the impression level from media information is assumed to indicate a gradual recovery trend. However, these results using the search engine did not completely correspond to the analysis results from media information categorized by humans. In this experiment, as described above we employed two combinations of words, positive and negative, as index words (i.e., "good" and "bad", "relief" and "fear"). It is likely that the appropriate index word for each frequently appearing word and important word are different because the media can use words in various contexts in media information. Therefore, improvement is needed in the impression analysis function to be able to dynamically change index words depending on the word used when investigating the impression. Improving the impression analysis function will be one of our goals in future work.

## 6. Conclusion

In this chapter, we discussed the causes of reputational damage in neighboring tourist areas near earthquake disaster zones. In addition, we analyzed the conditions and trends in media information in actual situations where tourism areas incurred reputational damage during earthquake disasters.



The analysis found that the amount of media information was highest immediately after the occurrence of earthquake and that the amount of media information gradually decreased over time, depending on the nature of the damage and the scale of earthquake. Moreover, in terms of the content of media information, negative information promotes feelings of avoidance in the public towards visiting neighboring tourist areas for sightseeing was sent immediately after the earthquake. Over time, the media content gradually shifted towards positive information, which eases the feelings of avoidance. The analysis of media information in newspapers showed that the turning point in media information from negative to positive was 4 weeks from the date of the earthquake in early cases, from which point the amount of media information and its content is suitable for starting measures to counteract reputational damage in surrounding areas. In late cases, the turning point was 6 weeks after the earthquake. On the other hand, the analysis results of web news revealed that turning point in media information was as soon as 2 weeks in early cases and 4 weeks in late cases.

The analysis indicated that content analysis of media information was more important when considering when to begin measures to counter reputational damage. However, content analysis has higher cost in comparison with the analysis of amount of media information. Content analysis is difficult to perform manually because the amount of media information is large and analysis must be performed rapidly in order to be effective when planning measures to reduce reputational damage. We proposed an analysis method to realize an automated content analysis of media information. In the proposed method, media information was analyzed on the basis of its characteristics following an earthquake. Media information that has a negative impact on neighboring tourist areas is immediately sent to the public after an earthquake and the content of media information gradually becomes more positive over time. In the analysis, media information was analyzed by comparing the similarity to media information immediately after earthquake.

Moreover, we used the proposed method to analyze media information on the 2007 Niigata Chuetsu Earthquake and the 2007 Noto Earthquake in order to confirm the adequacy of the proposed method. From the experimental results, it was revealed that the similarity between media information immediately after an earthquake was high and that the similarity was then reduced gradually over time. This change indicates that the proposed method could grasp how media information changed over time and how media content promoted or eased feelings of avoidance toward neighboring tourist resorts. Therefore, measures to counter reputational damage could be developed based on the conditions and trends in media information using the proposed method.

However, it was difficult to judge the effect of media content on causing and easing feelings of avoidance in the public. Therefore, we discussed a function that analyzes the impression of media information using Japanese dependency parsing and PMI-IR. From the experimental results, the impression of media information was found to become gradually more positive, although the function's results were different from the results of media information classified by a human. The reason for this difference was likely the lack of flexibility in the selection of index words used to investigate the polar direction of the meaning of a word. Our future work will be to implement dynamic index word selection that is capable of rating each analyzed word appropriately.

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# The Tourist Potential of the Minho-Lima Region (Portugal)

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## 1. Introduction

It is generally recognised that tourism plays an important role in the economic development of some territories, providing long-term benefits to local economies, primarily when implemented on a sustainable base. The capacity of tourism to establish synergies with other services, such as lodging, food, transport and entertainment for tourists, makes it a structuring industry in many economies.

In many developed countries and in many developing ones too, tourism is now a strategic activity. This is the case in Portugal, where tourism has been managed as a strategic cluster by the government since the implementation of the *Economic and Social Development Plan for 2000/2006*. In this document, tourism was officially claimed to be one of the activities pivotal to achieving economic and social development of the country and its regions.

Tourism, as a socioeconomic activity, does not occur randomly and its success differs from region to region, destination to destination or site to site, depending on the real potential for attracting tourists (Formica & Uysal, 2006).

To evaluate tourism potential or destination attractiveness, researchers have devised assessment tools from a supply side and/or a demand side perspective (Cha & Uysal, 1995; Ferrario 1979; Formica & Uysal, 2006; Gunn, 1988; Kusen & Tadej, 2003; Leno Cerro, 1992; Smith, 1987; Var et al., 1977). The object of analysis in the supply side perspective is the number and quality of available tourism attractions at a given destination. In the demand side perspective, it is tourists' perceptions and interests in a territory that constitute the centre of the analysis. In some cases, researchers have focused on a single aspect of region destination attractiveness (Ritchie & Zins 1978; Sheng & Lo, 2010).

In the case of the Minho-Lima region, an important tourism potential exists in the variety and singularity of the region's resources - the beauty of its landscapes, the architectonic wealth of its secular buildings, and the exuberance of its gastronomy and many cultural events.

Assuming an analysis of the available tourism resources is crucial to defining the tourism vocation of a territory, and, above all, to select the best tourism alternative within the range of available possibilities (Formica & Uysal, 2006; Leno-Cerro, 1993; López-Ochoa & Lufin-

Varas, 2010), this investigation aims to present a preliminary evaluation of the tourism resources of the Minho-Lima region, as well as an analysis of the complementary elements at this destination. In this particular analysis of tourism potential, we have adopted both the demand and the supply side perspective. In our evaluation of the resources in the region, we have incorporated the opinions of tourists (demand side) and those of the tourism agents (public and private) charged with the design of the territory's promotional materials (supply side), in order to establish a balanced vision of the tourism destination.

In this way, the evaluation of the tourism potential of all municipalities in Minho-Lima aims to establish indicators that can be useful for both private and public use in terms of planning decisions.

The article is organized as follows: in Section 1, we review the concept of tourism potential of a territory and put forward a possible general formula to pursue its evaluation; in Sections 2, 3 and 4, the partial components to use in the general formula, that is, the value of resources, accessibilities and equipment, respectively, are discussed and calculated; the tourism potential index is estimated in the last section, followed by a summary of our final conclusions.

## **2. Tourism potential evaluation**

The tourism potential or the elements that configure a tourist destination depend, basically, on the amount and quality of the tourism resources, although other aspects such as accessibility or the equipments/infrastructures available also determine this potential (López-Ochoa & Lufin-Varas, 2010; Murphy, 1983; Ritchie & Crouch, 2005). In other words, to characterize a destination it is necessary to evaluate resources (Formica & Uysal, 2006; Gunn, 1988; Kusen & Tadej, 2003; Smith, 1987) as well as to analyze the geographical space that configures this territory, not just as a resource but also as a location factor for those activities (López-Ochoa & Lufin-Varas, 2010; Pardellas & Padín, 2001).

We are all well aware that the resources that attract tourists are limited in number, and vary in their features, distribution and degree of development. Consequently, increasing the tourism attractiveness of a territory implies careful planning of their use, taking into account their nature, diversity and location, and the profile of potential visitors. Empirical data show that tourism activities follow singular space location behaviour. As such, a general location theory can apply to these kinds of studies, but the specificity of particular tourism activities and related service sectors must be considered. In particular, one should account for the circumstance of the consumption of tourism products taking place in the locale where they are produced. This specificity implies, on the one hand, a direct and physical relation between tourism resources and the goods produced from them and, on the other hand, the displacement of tourists from their usual residence to satisfy that demand.

Establishing methods of classification and an inventory of the available resources constitutes a first step in the analysis of tourist potential, but the real value of the potential of a territory is not only measured by the number of attractions it possesses but also by their variety and quality. The use of evaluation techniques will establish a measure of the value of the resources available, and thus, provide support for the decisions taken in planning processes. As underlined by López-Ochoa & Lufin-Varas (2010), any attempt to improve the performance of a tourism industry in any regional context requires the strict identification of

the set of resources available, and of their nature and level of conservation, as well as the existence of supporting infrastructures.

Even so, the attractiveness of a territory does not depend solely on this supply of resources and infrastructures but, mainly, on the relationship that can be established between the available resources or tourism attractions and the importance given to such attractions by tourists (Iatu & Bulai, 2011).

The evaluation of the tourism potential of all municipalities in the Minho-Lima region aims to establish indicators that can be useful for the private and public actors in planning decisions. Following the findings of the above mentioned authors, namely, that in order to analyze the real value of the tourism potential of a territory one cannot only measure the number of resources and attractions but, most importantly must also, measure their quality, as well as other features like accessibility and equipment endowment, researchers have investigated the use of different indexes to evaluate the potential of tourism destinations. Iatu & Bulai (2011), for example, put forward a general index comprised of the two components "network quality" and "service quality". One major problem of such a formula is the inherent difficulty of finding the values of those variables, in addition to the problem of defining the attraction rating index, itself.

For the purposes of this paper, we adopt the formula suggested by Leno-Cerro (1992 and 1993) to calculate the Tourist Value Index or Tourism Potential of a certain territory, which is as follows:

$$IPT_i = \alpha Fr_i + \beta Fa_i + \delta Fe_i$$

where,

$IPT_i$  = Tourism Potential Index of the municipality "i".

$Fr$ ,  $Fa$ ,  $Fe$  = values of the "resources", "accessibilities" and "equipments" of the municipality "i".

$\alpha$ ,  $\beta$ ,  $\delta$  = weighting factors.

The weighting factors attributed to each one of the elements in the elaboration of the model are justified by the fact that not all of them have equal importance in the calculation of the tourist value of a destination.

### 3. Resources value

From the tourist point of view, not all the inventoried resources have the same value. This value depends on the nature of the resource (natural, historical, ethnographic) and on its characteristics relating to singularity, availability, etc. Therefore, as discussed above, in order to establish the attractiveness of a place, it is not enough to count the number of resources available. The individual importance of each one and the way it meets the needs of the visitors must also be considered; they must therefore be evaluated.

With this aim, we selected the methodology for evaluation of resources suggested by Leno-Cerro (1992 and 1993). This author believes that the tourist value of a particular resource should attend to its nature and singularity, in agreement with the following equation:

$$V_{ri} = J_{pi} \cdot \mu_i$$

where,

$V_{ri}$  = tourist value of resource “i”

$J_{pi}$  = primary hierarchy of the resource “i”

$\mu_i$  = weighting factor, attending to the nature of the resource “i”

Following this methodology, the tourist value of a resource will depend on the hierarchy that it occupies, derived from its importance and/or singularity, as well as on the weighting factor attributed to the category to which it belongs, according to its nature.

However, before progressing with an evaluation of the diverse resources, it is necessary to classify them in large groups. As a preliminary task, they must be classified within homogeneous groups.

Taking into consideration the proposals of Defert (1996), Padín (2004) and Vera (1997), we decided to classify the resources into 3 main categories: RN - natural resources; RH - historical resources; and RE - ethnographical resources. Other classifications could be adopted, such as one that differentiates between natural and cultural resources (besides the infrastructural ones), as found in Iatu and Bulai (2011); or Murphy (1983), who advocate a basic distinction between their natural or cultural nature, complemented by the infrastructures and services supplied.

The methodology we follow in this paper allows a greater differentiation of cultural resources, separating those endowed with a more material component from those with a more immaterial component.

### 3.1 Resources rankings

An evaluation of resources implies establishing rankings. Those rankings are a function of the importance and singularity of each resource, which can be classified as being of international, national, regional or local interest. This involves, of course, the resources attractiveness to tourists, who are coming from diverse origins and distances (López-Ochoa & Lufin-Varas; 2010).

To approach these hierarchies of resources, we considered the various references we were able to find to them in electronic supports and in published paper materials (that is, brochures, tourist guides, itineraries, etc.). In this procedure (Table1), following other authors, namely Leno-Cerro (1992 and 1993) and López-Ochoa and Lufin-Varas (2010), we attributed a scale of 1 to 4 points to the importance and/or singularity of each of the resources identified, being:

Hierarchy 1: local interest.

Hierarchy 2: regional interest.

Hierarchy 3: national interest.

Hierarchy 4: international interest.

To be of international interest means a tourism resource is capable of attracting international visitors. A similar approach is used to classify resources as being of national, regional or local interest.

Hierarchy/Category	Natural Resources	Historical Resources	Ethnographical Resources	Total	Total %
Hierarchy 1	56	103	86	245	24,43
Hierarchy 2	79	314	166	559	55,73
Hierarchy 3	21	74	25	120	11,96
Hierarchy 4	15	49	15	79	7,88
Total	171	540	292	1003	100
Total %	17,05	53,84	29,11	100	

Table 1. Resources by category and hierarchy, in Minho-Lima

On the other hand, the evaluation of resources implies consideration of a factor that weights the nature of the resource<sup>1</sup>, given that the ranking does not indicate the tourist value of the resource, but its importance inside its own category. The weighting factor will allow the transformation of that hierarchy into an economic graduation. With this purpose, we made use of two different methodologies, which are presented in the next sections.

This approach to the valuation of resources is similar to that followed by the body for the Spatial Planning of the National Territory Romania, in 2008, which adopted a method of applying points (scores) to both quantitative and qualitative data referring to the tourism and infrastructures resources (Iatu & Bulai, 2011). There is of course criticism of these evaluation methods but, as underlined by the before mentioned authors, every system or method will always raise debate.

### 3.2 Demand-based coefficients

Leno-Cerro's proposal (1993) is based on the empirical work done by authors such as Cinelli (1985), Ferrario (1980) and Var et al. (1977). In order to solve the problems arising from the space scope being different to those used in previous studies, Leno-Cerro conducted a questionnaire on the Spanish tourists' motivations (Leno-Cerro, 1992).

Following this initiative, we tried to obtain these weighting coefficients by questioning the tourists who visit Minho-Lima about their preferences regarding the type of tourism resources. From our analysis of their preferences<sup>2</sup> it was possible to estimate the relative importance of tourism resources, by large categories/groups of resources (Table 2) which were then adjusted to a 5 points scale of values, to approximate the scale on which the results are expressed in the supply side analysis (Table 3):

<sup>1</sup> The establishment of weighting factors is made not for each resource but for major groups of resources, according to their nature, which, in our case, will correspond to the three categories inventoried.

<sup>2</sup> This analysis can be found in Vareiro, L., Ribeiro, J. & Pardellas, X. (2009). Preferências dos turistas que visitam o Minho-Lima: Uma análise com base nas preferências declaradas. *Estudos Regionais*, Vol. 22 (3º Quadrimestre): 35-46.

	Relative importance	Weighting factors
- Natural resources:	49%	5
- Historical resources:	32,4%	3,308
- Ethnographical resources:	18,6%	1,897

Table 2. Demand based resources coefficients

Although the numerical values obtained do not coincide, our results concur with those of the authors mentioned above in identifying the natural resources as those that generate the greater interest among tourist demand, far above the rest.

One possible explanation for this lies in the evolution of the demand in close relation to the change in the hierarchy of motivations of tourists. Recently, there has in fact been a remarkable change in social values, showing a growing concern about the environment, that is, about its preservation and conservation. As a result of this evolution, we have seen an increasing demand and recovery of lesser known destinations, with tourists seeking enjoyment of natural beauty and a more intense contact with nature.

### 3.3 Supply-based coefficients

Besides the tourists' opinion, we also decided to consider that of the agents (public and private) charged with the elaboration of the territory's promotional material. From this, we envisaged obtaining a vision of the tourist destination through the eyes of its promoters, that is, from a supply side approach.

Starting from their mention in the various promotional materials, we made an estimation of linear regression (annex1), in order to determine the implicit importance of each category of resources.

We took the number of references made to the resource in the various promotional supports (websites, brochures, tourist guides, itineraries, etc.) as the dependent variable. And, as independent variables, we used: i) the number of natural resources; ii) the number of historical resources; and iii) the number of ethnographical resources existing in each one of the parishes of the municipalities considered in our study.

The results we obtained were:

	Weighting factors
- Natural resources:	2,682
- Historical resources:	5,342
- Ethnographical resources:	4,493

Table 3. Supply based resources coefficients

As previously mentioned, these coefficients expose the importance that the agents (public and private) responsible for the promotional material consistently give to the built heritage, as well as to the festivals, pilgrimages and gastronomy. This approach to the marketing of the territory is, of course, related to the image the agents think the potential visitors have of the tourism destination and/or the profile of the tourists they envisage attracting to the destination.



### 3.4 Results of the resources evaluation

After the estimation of the parameters that define the tourism value of each type of resource, it is possible to evaluate the potential of each municipality in Minho-Lima. The resources factor<sup>3</sup> for each municipality is given by the sum of the scores obtained by the *n* resources with which it is endowed (Table 4).

$$Fr_i = \sum V_{ri}$$

where,

$V_{ri}$  = tourist value of each resource of the municipality "i".

$Fr_i$  = value of the "resources" attributes of the municipality "i".

Municipality	Vr (Demand)	Weighed value (Demand)	Vr (Supply)	Weighed value (Supply)
Arcos de Valdevez	678,74	58,56	1031,07	62,88
Caminha	651,98	56,25	872,66	53,22
Melgaço	451,57	38,96	681,10	41,54
Monção	510,57	44,05	796,71	48,59
Paredes de Coura	480,81	41,48	697,06	42,51
Ponte da Barca	529,51	45,68	774,03	47,21
Ponte de Lima	1034,01	89,21	1564,96	95,44
Valença	592,65	51,13	890,41	54,30
Viana do Castelo	1159,09	100	1639,74	100
V.N. Cerveira	446,01	38,48	578,69	35,29
<b>Minho-Lima</b>	<b>6534,94</b>		<b>9526,43</b>	

Table 4. Resources value, by municipality

In order to compare the different factors inside the tourist potential index, we must standardise the values, since they present themselves in different scales. For the purposes of this paper we decided to express the results in a scale from 0 to 100 points, the maximum value corresponding to the one of the municipality that attains the biggest value after the addition of resources.

Even though the coefficients (weighting factors) we obtained by using the two methodologies are quite different, it is interesting to note that the final results obtained in terms of tourist ranking of the municipalities are similar.

We should consider these results from two perspectives: the one of the territory's present reality; and the one envisaging the future evolution of the territory. The former depends on the present situation and current characteristic of each municipality included in the analysis,

<sup>3</sup> The results shown in Table 4 are the final results; the intermediate calculations and the weighting scales were not incorporated in this paper due to limitations of space.

establishing the potential at the present moment. Accordingly, we could observe large disparities between the better endowed municipalities and others occupying less central geographical positions and being less endowed with natural and historical resources.

The second perspective concerns changes in the initial parameters. This means, in strict terms, the election of planning alternatives with defined objectives for the improvement of the economic and social situation of the municipalities worst placed. It also means that a desirable future scenario should be properly defined.

Resource category	Vr (Demand)	Weighed value (Demand)	Vr (Supply)	Weighed value (Supply)
Natural Resources	1685,00	25,78	903,83	9,49
Historical Resources	3800,88	58,16	6138,00	64,43
Ethnographic Resources	1049,06	16,05	2484,60	26,08
<b>Total</b>	<b>6534,94</b>	<b>100</b>	<b>9526,43</b>	<b>100</b>

Table 5. Resources value, by resource category

#### 4. Accessibilities value

The accessibilities factor refers to the conditions that facilitate or make difficult the tourists' displacement from the emitting markets to the destination.

To calculate this factor properly consider internal and external accessibility should be considered separately. Internal accessibility relates to the real and ideal distance between the municipalities. In this case, there will be a qualitative approach only, through the consideration of the main communication infrastructures and accesses to each of the municipalities.

Given that within the concept of external accessibility, we should capture the space-distance and the space-time vectors, we will assume that the whole area of the study benefits from the same network of high-speed motorways (see Figure 1 and 2), approaching the issue from the point of view of the area's overall accessibility for visitors coming from the remaining domestic and European territory. This is a simplifying hypothesis which we believe is acceptable as a preliminary approach.

In order to obtain an indicator of accessibility for a certain destination, other approaches could be followed. For example, in their empirical research regarding *Autofagasta*, in Chile, López-Ochoa and Lufin-Varas (2010) adopted the Euclidian concept of distance to locate tourism resources vis-à-vis the main town of the region.

The maps shown in the next page (Figures 1 and 2) allow us to conclude that our area under study presents conditions of physical access by motorway similar to those of other better known tourism destinations. This is a favourable factor that should be considered in the planning of the set of tourism offers, as well as in the marketing strategies.



Fig. 1. National Road Plan (PNR): Portugal



Fig. 2. National Road Plan: Minho-Lima

Regarding internal accessibility, the type of road infrastructures available to reach each municipality will be the basic element for its estimation, establishing a schematic and simplified structure based on the following scores:

- Municipalities accessed exclusively by city roads: 1 point.
- Municipalities accessed exclusively by regional roads: 2 points.
- Municipalities accessed by national roads: 3 points.
- Municipalities accessed by complementary high-speed roads: 4 points.
- Municipalities accessed by main itineraries/ motorways: 5 points.

Municipality	Total Value	Fai
Arcos de Valdevez	4	80
Caminha	4	80
Melgaço	3	60
Monção	3	60
Paredes de Coura	3	60
Ponte da Barca	4	80
Ponte de Lima	5	100
Valença	5	100
Viana do Castelo	5	100
Vila Nova de Cerveira	3	60

Table 6. Accessibility Value, by municipality

Although we recognise that “great access does not mean great tourism” (Iatu & Bulai, 2011: 173), an analysis of Table 6 shows two differentiated situations: on the one hand, the municipal axis which includes Viana do Castelo, Ponte de Lima and Valença, served by motorways; and, on the another hand, the situation of the municipalities of Melgaço, Monção, Paredes de Coura and V.N. Cerveira, whose internal communication is served mainly by national roads. This second case signifies greater difficulties in terms of accessibility, which is further reinforced if the levels of identification (markers and informative signs) for the destinations and resources on the routes of access are taken into consideration.

## 5. Equipment value

The equipment factor is the most complex and also that with smaller specific weight in the final value of the IPT (Pardellas et al., 2005). This factor is defined as a synthetic indicator of three basic elements: the tourism infrastructure; the commercial infrastructure; and the recreational-sport infrastructure, applying the formula:

$$FEi = f (Iti, Ici, Irdi)$$

where,

FEi = equipment factor in the municipality “i”.

Iti = tourist infrastructure in the municipality “i”.

Ici = commercial infrastructure in the municipality “i”.

Irdi = recreational-sport infrastructure in the municipality “i”.

Regarding the tourism infrastructure, we considered two variables: lodging services and restaurants<sup>4</sup>, being defined as:

<sup>4</sup> Leno-Cerro (1993) suggests a third variable in this factor, the number of secondary residences, calculated by approaching the quotient between the number of telephones and its inhabitants. With the proliferation of mobiles, we considered that this variable could adulterate the results.

$$Iti = (aci + ri)/2$$

where,

aci = accommodation capacity in the municipality "i".

ri = restaurants capacity in the municipality "i".

Each one of these variables was expressed in a scale of five points, although in this case they can also take the value zero. In Table 7 we can see that the results obtained reflect a widespread lack of tourist infrastructure, particularly in the areas already referred to as "poor" in terms of accessibilities.

Municipality	Iti = (aci+ri)/2			
	aci	ri	(aci+ri)	Iti
Arcos de Valdevez	3,09	1,4	4,49	2,245
Caminha	4,45	2,4	6,85	3,425
Melgaço	2,14	1,22	3,36	1,68
Monção	0,74	1,84	2,58	1,29
Paredes de Coura	0,41	0,21	0,62	0,31
Ponte da Barca	1,91	1,75	3,66	1,83
Ponte de Lima	2,15	3,66	5,81	2,905
Valença	0,64	2,05	2,69	1,345
Viana do Castelo	5	5	10	5
V. N. Cerveira	1,22	0,93	2,15	1,075

Table 7. Tourist Infrastructures, by municipality

The retail and wholesale infrastructure was calculated from data of the Commercial Cadastre Database of *DG Trade and Competition*, concerning the number of retail and wholesale establishments in the area of study. For this variable, as in the previous ones, a location coefficient was used in a scale of 0 to 5 points, applying the equation:

$$Ici = (Estci*5)/Estcm$$

where,

Ici = commercial infrastructure in the municipality "i".

Estci = number of commercial establishments in the municipality "i".

Estcm = number of retail and wholesale establishments in the municipality with the maximum number of commercial establishments.

<b>Municipality</b>	<b>Estci</b>	<b>Eci</b>
Arcos de Valdevez	315	1,23
Caminha	283	1,10
Melgaço	111	0,43
Monção	373	1,46
Paredes de Coura	116	0,45
Ponte da Barca	152	0,59
Ponte de Lima	478	1,87
Valença	128	0,50
Viana do Castelo	1281	5
Vila Nova de Cerveira	108	0,42

Table 8. Commercial Infrastructures, by municipality

It is worth mentioning the strong disparity among the number of retail shops in Viana do Castelo (the more urban municipality) and the other municipalities, with this city obtaining the maximum value (5), against values of just over 0,4 in V.N. Cerveira, Melgaço and Paredes de Coura.

The estimation of the recreational-sport infrastructure is based on the facilities of this type that each municipality possesses, transforming the existent establishments into a scale of 0 to 5 points. The inclusion of this variable in the IPT is justified by the more or less active nature of the tourists who visit the area encompassed in our research.

Analyzing the results obtained using the data from the city councils and RTAM, one can conclude that the scarcity of this type of infrastructure was strongly verified, not only from the tourism point of view, but also if the support to the local population is considered.

<b>Municipality</b>	<b>Eqrđi</b>	<b>Erdi</b>
Arcos de Valdevez	9	2,14
Caminha	21	5
Melgaço	11	2,62
Monção	5	1,19
Paredes de Coura	6	1,43
Ponte da Barca	11	2,62
Ponte de Lima	18	4,29
Valença	16	3,81
Viana do Castelo	20	4,76
Vila Nova de Cerveira	11	2,62

Table 9. Recreational-Sport Infrastructure, by municipality

As in the previous variable, a relative location coefficient was used, expressed in a scale of 0 to 5 points, applying the formula:

$$\text{Irdi} = (\text{Eqrdi} * 5) / \text{Eqrdm}$$

where,

Irdi = recreational-sport infrastructure in the municipality "i".

Eqrdi = number of recreational-sport establishments in the municipality "i".

Eqrdm = number of recreational-sport establishments in the municipality with the maximum number of recreational-sport establishments.

The three analyzed indicators, tourist infrastructure (It), commercial infrastructure (Ic) and recreational-sport infrastructure (Ird) are synthesized in only one factor (FE), which is the third component of the Tourism Potential Index (IPT).

In this way, the equipment factor is the result of the weighed sum of the values obtained from the individual components. The sum is weighed by the different specific weights of the values, the tourism infrastructure being the one that better reflects the tourism importance of the municipality, marked with a coefficient 2. Thus, the equipment factor is expressed as:

$$\text{FEi} = 2\text{Iti} + \text{Ici} + \text{Irdi}$$

where,

FEi = equipment factor of municipality "i".

Iti = tourism infrastructure of municipality "i".

Ici = commercial infrastructure of municipality "i".

Irdi = recreational-sport infrastructure of municipality "i".

As these variables are expressed in a scale from 0 to 5 points, the theoretical limit of this factor would be between 0 points, for the municipality that does not have any equipment or infrastructure, and 20 points, for the one best endowed. To allow for the comparability of this factor with the others analyzed, these initial results should be transformed into a scale of 0 to 100 points (FEiPond).

Municipality	2Iti	Ici	Irdi	FEi	FEiPond
Arcos de Valdevez	4,5	1,23	2,14	7,87	39,83
Caminha	6,86	1,10	5	12,96	65,59
Melgaço	3,36	0,43	2,62	6,41	32,44
Monção	2,58	1,46	1,19	5,23	26,47
Paredes de Coura	0,62	0,45	1,43	2,5	12,65
Ponte da Barca	3,66	0,59	2,62	6,87	34,77
Ponte de Lima	5,82	1,87	4,29	11,98	60,63
Valença	2,7	0,50	3,81	7,01	35,48
Viana do Castelo	10	5	4,76	19,76	100
Vila Nova de Cerveira	2,16	0,42	2,62	5,2	26,32

Table 10. Equipment Factor, by municipality

## 6. The tourism potential index

As previously stated, resources, accessibility and equipments and infrastructures are the factors that strongly determine the tourism value of a particular territory. Although it is difficult to measure the value of a perception, in this paper we intend to attempt this by applying the theoretical concepts suggested by a few authors (Iatu & Bulai, 2011; Leno-Cerro, 1992 and 1993; Pardellas et al., 2005).

At the same time, it is important to keep in mind that not all elements in the index have the same importance in the estimation of this value. In the theoretical formulation, we must, therefore, include weighting factors for the different elements. For the quantification of these weighting coefficients, the basic hypothesis relates to the human intervention level of each one of the factors. As a consequence, the resources will have the highest coefficient because if they did not exist, it would be very difficult to create them. The accessibility factor is the second in importance, since we can improve the quality of the accesses, but it is impossible to reduce the physical distances. Finally, the equipments constitute the less critical factor, since their lack is relatively easy to solve. In this regard, the Tourism Potential Index (IPT) would be expressed by the following equation:

$$IPT_i = 1,5 \text{ FR}_i + 1,25 \text{ FA}_i + 1,00 \text{ FE}_i$$

Thus, the IPT of a given municipality will vary between a maximum of 375 and 0<sup>5</sup>. To maintain the homogeneity of the scales used in the estimation of each factor, we transformed the index into a scale of 0 to 100 points (IPTiPond), taking the 375 possible points as a basis. The results obtained are presented in Table 11:

Municipality	1,5 Fri		1,25FAi	1,00FEi	IPTi		IPTiPond	
	Demand	Supply			Demand	Supply	Demand	Supply
Arcos de Valdevez	95,06	94,32	100	39,83	234,89	234,15	62,64	62,44
Caminha	87,53	79,83	100	65,59	253,12	245,42	67,50	65,45
Melgaço	60,75	62,31	75	32,44	168,19	169,75	44,85	45,27
Monção	70,97	72,89	75	26,47	172,44	174,36	45,98	46,50
Paredes de Coura	63,69	63,77	75	12,65	151,34	151,42	40,36	40,38
Ponte da Barca	74,51	70,82	100	34,77	209,28	205,59	55,81	54,82
Ponte de Lima	136,2	143,16	125	60,63	321,83	328,79	85,82	87,68
Valença	81,29	81,45	125	35,48	241,77	241,93	64,47	64,51
Viana do Castelo	150	150	125	100	375	375	100	100
Vila Nova de Cerveira	59,06	52,94	75	26,32	160,38	154,26	42,77	41,14

Table 11. Tourism Potential Index, by municipality

<sup>5</sup> The result 375 is obtained from:  $1,5 \times 100 + 1,25 \times 100 + 1,00 \times 100$ , which are the maximum values of each one of the factors. The minimum value is close to zero, for each one of the factors.



The Tourism Potential Index allows analysing the possibilities for the industry's development and, by extension and integration, for the set of productive activities in a certain territory (Pardellas et al., 2005). In our research, we obtained significant information about the differences among municipalities, and this will allow adjusting the mechanisms and planning alternatives to each situation, modifying those factors considered less favourable.

Given the aim of this paper to compare the perspectives of the supply and demand sides on the importance of resources, it is worth underlining here that the results obtained from the two different perspectives are very similar, with no impact on the final ranking.

## 7. Conclusion

In this study we suggest a new Tourism Potential Index derived from the empirical approach we developed, and supported by established analytical tools and similar investigations previously conducted by other authors. Using this approach, we were able to derive a few main conclusions.

The first concerns the high value presented by the resources factor in Viana do Castelo and Ponte de Lima. In the case of Viana do Castelo, this is the result of the municipality's singular endowment of natural resources (sea, river and mountain) and its wealthy ethnographic heritage. In the Ponte de Lima case, the potential comes from the important built heritage, not only civilian but also religious, as well as from the relevant ethnographic resources. In the case of some municipalities in the region, it is worth noting the small importance given to natural resources, even though they are endowed with excellent examples, as is the case of Paredes de Coura, with its Protected Landscape of Corno do Bico.

A second conclusion concerns the accessibility factor which, due to the simplification adopted in the analyses, presents more elevated values in Ponte de Lima, Valença and Viana, and lower values in the other municipalities. If we add this result to the previous one, we can verify that the rectification of the deficiencies identified at the infrastructures level is a crucial factor for the improvement of the economic position and the tourism potential in the less favoured territories.

The third concerns the equipments and infrastructures, where the differences are greater between the municipalities under analysis. Partially, this situation is linked to the differences found between the population densities. As a consequence, the highest equipment values are attained by the more urban areas, allowing comparative distances of 2,5 and 19,76 points, if we take the minimum (Paredes de Coura) and maximum (Viana do Castelo) values.

Clearly, this factor, on the one hand, highlights the need for public policies, given that it is the factor more easily modifiable in the short-term and, on the other hand, makes clear the market tendency to an asymmetric growth path. This is the result of the circular effect between (less) offer/(more) production costs and (less) demand.

As a final conclusion, it is possible to say that the analysis mentioned above verified that an important tourism potential exists, but that the consolidation of the territory as a tourist

destination will imply all the agents, public and private, involved in the different components of the tourism supply, taking action in order to attain a more efficient use of the available endogenous resources. A first step in that direction will be the definition and consequent promotion of an image of the region as common tourism destination.

Although the goals envisaged by this kind of investigation seem to be meritorious, the authors of the article recognize the need to address some of its limitations. To this purpose, we intend to rely less on the Leno-Cerro index in future empirical work and, thus, we intend to explore alternative methodological approaches to appraise the tourism potential of a destination.

Regarding accessibility, we are aware of the need to incorporate the ways in which tourists can access the territory (air transportation, railways, and motorways – by car or bus). With regard to infrastructures, the authors will also seek to determine the weighting factors for each of its internal components (tourism, commercial and recreational-sport infrastructures).

A further limitation of the approach followed for the evaluation of the tourism potential of a territory arises from its supply side bias, that is, the index is derived from looking at the available territorial resources as tourism attractions. This can have the effect of establishing a dangerous relationship between territorial attributes and tourism products and services. To overcome this potential pitfall, we see no alternative apart from simultaneously looking at the demand market and checking what its tendencies are in terms of tourist behaviour and product demand.

## 8. Annex

Ind. Var.	Dep. Var.	NRef
RN		2,682 (7,243)***
RH		5,342 (40,400)***
RE		4,493 (17,272)***
Constant		- 1,394 (-2,822)**
R <sup>2</sup>		0,965
Adjusted R <sup>2</sup>		0,965
F		2093,805
N		228

Notes: \*p<0,05; \*\*p<0,01; \*\*\*p<0,001. The values in parenthesis are t-statistics.

\*\* statistically significant at the 0,01 level; \*\*\* statistically significant at the 0,001 level.

Annex 1. Linear regression used to estimate the weighting factors, attending to the nature of the resource

Municipality	Tourist Infrastructures					CETi	Aci = (CETi*5)/CETm
	EH	TER	TN	MCAT	PC		
Arcos de Valdevez	0,94	1,61	5	0	1,28	8,83	3,09
Caminha	2,2	1,14	0	5	4,36	12,7	4,45
Melgaço	1,14	0,19	3,33	0	1,44	6,1	2,14
Monção	0,92	1,18	0	0	0	2,1	0,74
Paredes de Coura	0,16	1	0	0	0	1,16	0,41
Ponte da Barca	0,16	0,59	3,33	0,09	1,28	5,45	1,91
Ponte de Lima	1,15	5	0	0	0	6,15	2,15
Valença	1,29	0,54	0	0	0	1,83	0,64
Viana do Castelo	5	3,42	0	0,86	5	14,28	5
V. N. Cerveira	1,51	0,18	0	0,83	0,96	3,48	1,22
Minho-Lima	14,47	14,85	11,66	6,78	14,32	62,08	

EH - Hotel accommodation capacity weighted by categories.

TER - Tourism establishments' capacity available in rural areas weighted by categories.

TN - Tourism establishments' capacity available in natural areas weighted by categories.

MCAT - Extra-Hotel accommodation capacity weighted by categories.

PC - Camping capacity weighted by categories

CETi - Tourist infrastructures capacity weighted by categories.

CETm - Municipality value with higher CETi.

Aci - Accommodation capacity in the municipality "i".

#### Annex 2. Tourist Infrastructures Value by Municipalities

Municipality	Capacity	CRi	Ri = (CRi*5)/CRm
Arcos de Valdevez	2416	6383	1,40
Caminha	4145	10931	2,40
Melgaço	2095	5533	1,22
Monção	3126	8367	1,84
Paredes de Coura	337	941	0,21
Ponte da Barca	2795	7960	1,75
Ponte de Lima	5794	16654	3,66
Valença	3361	9356	2,05
Viana do Castelo	7796	22767	5,00
Vila Nova de Cerveira	1444	4226	0,93
Minho-Lima	33309		

CRi - Restaurant capacity in the municipality "i" weighted by categories.

CRm - Municipality value with higher CRi.

Ri - Restaurants value in the municipality "i".

#### Annex 3. Restaurants Value by Municipality

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# Long-Term Impacts of Non-Sustainable Tourism and Urban Development in Small Tropical Islands Coastal Habitats in a Changing Climate: Lessons Learned from Puerto Rico

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## 1. Introduction

### 1.1 Importance of the coastal tourism and urban construction industries in Puerto Rico

Characterized by a very high biodiversity that include some of the richest, productive, and fragile ecosystems on earth, tropical coastal areas represent the transitional zone between the land and sea (Cenacchi, 2010). Easy access to these coastal and marine resources, in combination with their natural allure, has made coastal resources highly vulnerable to tourism, population growth, and urban expansion pressures. More than half of today's world population lives in coastal areas (within 200 km from the sea) and this number is on the rise (Hinrichsen, 1998; Creel, 2003). In the particular case of the Commonwealth of Puerto Rico (PR) (Figure 1), about 70% of the island's population of 3.7 million live within close proximity to the sea on municipalities that lie adjacent to the coast (U.S. Census Bureau, 2010). Coastal areas are also those which are most visited by tourists, often presenting the most important economic activity. In the Insular Caribbean for example, tourism is one of the premier economic activities. The construction sector and tourism are two of the most important economic drivers in PR (PRTC, 2008, 2009). Tourism is the largest

expanding industry that has substantially contributed to increase employment rates around the world, has represented a significant source of revenue (WTTC, 2005, 2011), and is projected to keep expanding over the next decade. The total number of visitors in PR increased from 4.6 million visitors in 1999 to nearly 4.9 million in 2010 (PRTC, 2011). The number of tourists staying on hotels increased by 28% between 1999 and 2010. Total tourism-related employment increased from 30,225 in 1985 to 54,656 in 2010, or by a factor of 81%. The total amount of employees directly working on hotels increased from 7,300 in 1985 to 12,800 in 2010, or a magnitude of 75%. Overall hotel room availability increased by a factor of 27%, from 11,061 in 1999 to 14,076 during 2010. Overall number of hotel facilities increased by a factor of 15%, from 137 in 1999 to 158 during 15 2010. This has evidently triggered a recent large boom in construction of tourism facilities, but also has launched a major increase in urban development along coastal zones, often intermingled with tourism facilities targeting almost exclusively the upper economic classes.



Fig. 1. Geographic location and subdivision of Puerto Rico's tourism regions.

The commonwealth of PR has become an interesting case study of tourism and urban development impacts on a tropical island scenario due to its socio-politic relationship with the United States (U.S.), and its advantageous socio-economic position relation to other Caribbean nations. Also, the local governing bodies on the island have largely claimed that current local tourism development trends are sustainable, but this claim is yet to be fairly tested. PR has embraced a globalized non-sustainable approach of coastal tourism and urban development that include unprecedented planning strategies and policy moves, with poorly addressed long-term environmental and socio-economic impacts.

PR is a subtropical island archipelago located in the northeastern boundary of the Caribbean Sea (18°N, 66°W). It is the smallest of the Greater Antilles following Cuba, La Hispaniola

(Dominican Republic and Haiti), and Jamaica (Figure 1). It roughly measures 176 x 62 km, and has about 432 km of coasts. Its population in 2010 was determined at 3.7 millions, a 2.2% reduction in comparison to 2000, which was largely the result of migration of residents to continental U.S. due to the recent economic crisis. The topography of PR can be categorized into three main provinces: the interior-central mountainous region peaking at 1,388 m, the karst province, and the coastal valleys (Monroe, 1977). The continuous influence of the easterly trade winds and the PR's geographic location, and topography, generate a somewhat varied maritime sub-tropical climatological canvas across the island. Monthly minimum and maximum temperatures fluctuate little ( $\sim 4^{\circ}\text{C}$ ) between the relatively cooler months and the warmer summer months, but variations of up to  $\sim 9^{\circ}\text{C}$  can be expected at any time between the warmer coastal valleys and the relatively cooler mountainous areas (Colón, 1977). The average annual rainfall is approximately 177 cm, but it may fluctuate from roughly 80 cm in the dry southwestern corner of the island up to about 260 cm in the northeast and western-interior regions (Colón, 1977). The diversity of climatological and topographical conditions have given rise to a six life zones ranging from dry sub-tropical forests in some coastal valleys to rain forests in the higher altitude mountainous areas (Ewel & Whitmore, 1973).

## 1.2 Information gaps and objectives

Many examples of inadequate approaches implemented by the local tourism and urban development sectors may be cited in PR. These include unprecedented planning strategies and policy changes recently implemented by the local government that may make these practices far from sustainable. Many of these must also be relevant to other tropical island nations and will be discussed in this chapter. We have identified the following: (1) *Old-style, non-participatory, top-down approaches* – tourism and urban housing projects being planned and executed without meaningful participation of local communities (Equations, 2003); (2) *Significant permanent negative environmental impacts* – projects built on top of or immediately adjacent to ecologically sensitive habitats, impacts to threatened or endangered species, destructive activities (i.e., dredging, blasting of coral reefs/seagrasses, wetland filling, deforestation, etc.); (3) *Socio-economic degradation* – globalized, top-down approaches of tourism and urban development has often resulted in social and economic marginalization of base communities, increasing unemployment, crime (Diedrich, 36 2006), drug abuse, prostitution (Cabezas, 2009; Padilla, 2007), child abuse (Equation, 2009), declining quality of life, and impoverished livelihoods; (4) *Lax regulations* – local governments derogate stringent zoning and planning regulations, implement flexible environmental standards and establish fast tracking procedures to facilitate permitting processes without proper evaluation that often favor private interests often over public interests; (5) *Non-sustainable operations* – the only model envisioned by local governments as an expected tool against economic crisis is largely based on a non-sustainable approach (i.e., focused on construction on sensitive sites, rapid revenue often at the expense of the environment, very limited revenue to local communities); (6) *Decision-making processes with significant conflicts of interests and corruption* – in many instances government contracted consultants or regulatory agency key personnel are/were also consultants of project developers, or instances where project developers are also significant economic supporters of political parties; (7) *Revenue leakage* – Large portions of the economic revenue of the massive tourism industry often end up on a large trans-national company far from the local community; (8) *Construction is often envisioned as the*

*solution to economic constriction* – Construction is often synonymized as progress leading to rapid project approvals without adequate planning and environmental impact evaluations, and to project construction on inadequate sites (i.e., sensitive habitats, soils prone to landslides, lands prone to flooding or vulnerable to coastal flooding or tsunamis); and (9) *Climate change impacts are still largely neglected by many local governments as a significant threat* – many nations, including the Commonwealth of PR, are still yet to adequately accept and much less address the threats faced by increasing climate-related impacts, particularly to coastal habitats where the vast majority of the tourism activities and large housing construction occur. Many of these factors, with very few exceptions, have been poorly addressed in the literature as many could be often considered “taboos” by the tourism and urban construction industries, as well as by local governments that do not want to upset the both industries and risk the possibility of maintaining wealthy revenues, even though the private sector of both industries often obtain the largest economic benefits in comparison to that obtained by local governments.

The main objective of this chapter was to identify most information gaps associated to the above topics in a context of a small over-populated Caribbean island, and in a context of the projected climate change impacts. It was also aimed at reviewing some of the existing literature regarding the impact of tourism and urban development on a tropical coastal scenario and discussing some of the most significant case studies and lesson-learning experiences of the historical non-sustainable approaches used by the tourism and housing construction industry in PR. We also examined some of the current controversies regarding the proposed coastal tourism and housing development expansion strategy in PR, as well as some of the most significant climate-related threats. Finally, we addressed the need to implement an alternative sustainable coastal tourism and housing development model, and made specific recommendations for reviewing and modifying existing strategies in a way that could also be helpful for other tropical countries that share similar situations.

## **2. Case studies from Puerto Rico: A brief history of coastal tourism and urban development**

### **2.1 The early stages: 1910s to 1960s**

Coastal tourism and urban development have represented an important and continuously growing economic activity in PR since the late 1910s. However, agriculture following the U.S. takeover of the island in 1898 was the most significant economic activity during the early 20th century. The expansion of coastal tourism offerings in PR was accompanied by a massive urban expansion as the main economic model of the island switched from an agriculture-based economy during the first half of the XX century to an industrial-based one. In year 1919 the Condado Vanderbilt Hotel was built in the capital city of San Juan right in front of the Condado Beach area, representing the first major turning point in the tourism and urban residential boom that occurred in the island. The second most important turning point was the opening of the San Juan Nautical Club (SJNC) in 1930 in the adjacent San Juan Bay. This was the first private marina in PR. The third major episode in coastal tourism development in PR was the opening of the Escambrón Beach Club during 1932. The Escambrón Beach Club was a private club located right at an important public beach in the metropolitan area of San Juan. It involved the construction of the first known breakwater to protect the shoreline from typical strong wave action of the northern coast of the island. It



also included the construction of a boardwalk on the water and an underwater steel fence to prevent sharks and barracudas to access the public bathing beach. Important social events were celebrated on the area for several decades. Development of the Escambrón Beach Club also triggered further tourism development on adjacent coastal lands. The luxury Normandie Hotel, the first major art-deco style hotel building on the island, was opened in 1939 adjacent to the Escambrón Beach and to the SJNC. Simultaneously, there was also the construction of significant urbanized areas on the metropolitan area of San Juan, as well as an increasing number of secondary beach homes built by wealthy families across different coastal municipalities of the island, such as Dorado, Vega Baja and Arecibo, along the northern coast. What is peculiar was that this occurred during the peak of the Great Depression. By that time agriculture had shut down significantly on the island and there was a lot of social and political turmoil. Hotel construction and tourism-related development slowed down during World War II and remained so while important political and socio-economic transitions that lead to the declaration of PR as a Commonwealth of the U.S. were taking place. Then, the emblematic Caribe Hilton Hotel, one of the most important hotels existing in PR, was opened in 1949. Historical aerial image analysis suggest that its construction involved also for the first time extensive filling of adjacent coral reef and seagrass bottoms to expand the coastal lands and build part of the hotel facilities. It also resulted in the creation of the first private artificial beach in the island.

There was a second boom in the tourism and urban construction industries during the early 1950s, after World War II, when important socio-economic changes occurred in PR from an agricultural to an industrial economy with the establishment by the U.S. Congress of the Commonwealth of PR in 1952 and the establishment of the Operation Bootstrap (*Operación Manos a la Obra*) during the administration of then governor Luis Muñoz-Marín (1948-1964). Operation Bootstrap promoted industrialization through several phases: (1) labor-intensive manufacturing; (2) petro-chemical industrialization; and (3) rapid establishment of pharmaceutical industries protected under now extinct federal tax exemptions (Berman-Santana, 1996). Berman-Santana (1996) also established that “one of PR’s most important industrial recruitment tools was the less stringent enforcement of environmental protection laws than on the U.S. mainland”. According to Dietz (1986), “Operation Bootstrap from its beginning was based, at least implicitly, on the assumption that self-interested behavior does lead to public benefit, and on the further assumption that economic growth benefits all classes and groups – i.e., the ‘trickle-down’ theory that the benefits of a growing output gradually spread throughout the social hierarchy”. Tourism and urban construction impacts on coastal areas in PR have been an expression of this. Benefits have been just measured in terms of economic parameters, while ecological degradation plays an insignificant role and is mostly seen as a deterrent to economic development.

Tourism was kind of mixed during 1950s and 1960s in between booming construction as it was needed to foment these industries by allowing investors to come to the island and be willing to put their money down. As a consequence, several foreign investors acquired extensive coastal lands and initiated the construction of new hotel complexes in Dorado (west of San Juan) and Fajardo (northeast PR). Also, one of the most dramatic coastal development socio-economic, cultural and political controversies initiated during the 1960s with tourism development projects that were proposed for Piñones Ward in the municipality of Loíza, east of San Juan, right in the midst of a traditionally underserved community, a case study discussed below. Then, following the 1970s, there was also a

significant increase in “internal tourism” activities, which refers to tourism activities carried out by island residents within the PR archipelago. One of the key drivers of increasing urban construction along coastal areas in PR mostly represents internal tourism in the form of secondary homes used for short-term vacationing during weekends and special holidays. Coastal towns such as Dorado, Lajas, and Rincón, are an example of this.

## **2.2 Changes in political and socio-economic models: The first significant turn of events in urban construction**

The designation of the Commonwealth status of PR represented significant political changes that impacted the socio-economic development of the island. The economic development plan that followed the Great Depression and World War II had some very important consequences in the spatial distribution of the island’s population and its land use patterns. An often mentioned repercussion of PR’s industrialization program was an abandonment of land for agricultural production and a migration of people from rural areas in the countryside to urban centers (Figure 2a) (Grau et al., 2003). According to the US Census Data, (<http://www.censo.gobierno.pr/>), while 60% of the island’s population lived in rural areas in 1950, these areas came to constitute only 6% of the population in 2000. The proportion of the island’s population that lives in municipalities along the island’s coastline has increased to roughly 70% from 1950 to 2000. Census data shows that most population growth in PR has occurred in urban centers on coastal municipalities (Figure 3). Whereas coastal urban centers contained roughly 34% of the total population in 1950, the proportion of the population in these areas almost doubled to 67% by 2000. The growth of the urban sector of the population in PR is a combined result of actual displacement of the population to pre-existing urban areas and a consequence of the new high density urban development patterns which have turned what were previously considered rural communities into urbanized areas.

The total number of dwellings (housing units or ‘*viviendas*’ in Spanish) in PR showed a net growth of almost 965,000 units between 1950 and 2000. Roughly 71% of this net increase in dwellings occurred in coastal towns (Figure 2b). Coastal towns had a total of 683,600 more units in 2000 than in 1950, while mountain towns showed a net increase of 281,300 units. The island-wide increase in the rate of growth of individual units was roughly 6,840 additional dwellings per year between 1950 and 1960. This rate significantly increased and peaked between 1970 and 1980 at 28,000 units per year. Rates between 1980 and 2000 remained high at values ranging between 19,500 and 23,000 units per year. The rate of growth in dwellings on coastal areas has been consistently higher than in mountainous areas since 1950, where growth rates have remained between 5,870 and 19,550 units per year. Remote sensing analyses conducted in various parts of PR corroborate the increased rate of growth suggested by the housing census data. Island-wide assessments suggest a slight but still significant increase in urban areas from 10.8% to 11.4% between 1991 and 2000 (Helmer et al., 2002; Matinuzzi et al., 2007). Meanwhile, smaller scale but longer-term studies conducted in the northeastern and southwestern portions of the island suggest a consistent increase in urbanized area over the last several decades. These smaller scale studies indicate that by the early to mid-1990’s urbanized zones covered between 3% and 32% of the study areas (Figure 3) (Lugo et al., 1996; Ramos-González, 2001; Ramos-Scharrón et al., in prep.). Studies consistently cite the preferential use of the lowland, low-relief coastal valley areas previously used for agricultural activities and pasture for new urban development (e.g., Helmer, 2004; Torres-Marrero, 2003). In the long run, such trends have also resulted in

increased environmental impacts to adjacent estuarine, coastal and marine habitats (Martinuzzi et al, 2009).

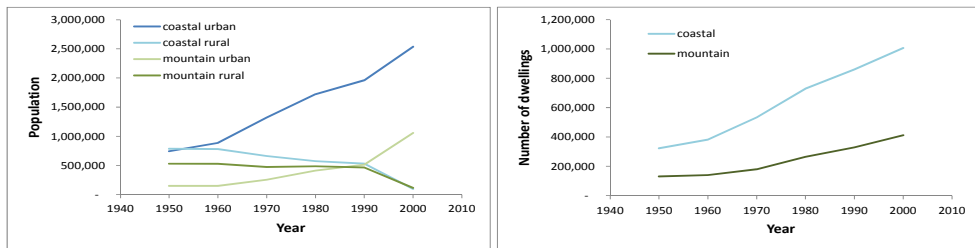


Fig. 2. (A) PR wide trends in population broken down by the number of people living in urban or rural areas and by location relative to the coastline. Population defined as 'coastal' refers to that living in a municipality located along the island's coastline, while those defined as 'mountain' are located away from the coast; (B) Time trends in the total number of dwellings in PR from 1950 to 2000. Dwellings defined as 'coastal' refer to those built on municipalities with a coastline, while those declared as 'mountain' do not.

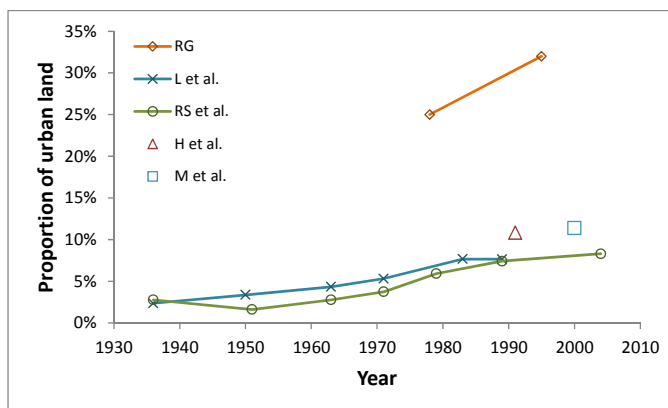


Fig. 3. Time trends in the proportion of urban land in PR. RG: Ramos-González (2001)-Northeastern PR; L et al.: Lugo et al. (1996)-Guánica; RS et al.: Ramos-Scharrón et al (in prep)-Río Fajardo Watershed; H et al.: Helmer et al. (2002)- Island-wide assessment; & M et al.: Martinuzzi et al. (2007)- Island-wide assessment.

While land development on coastal zones is evidently considered to be more prone to induce direct adverse effects on coastal and marine resources, the relatively small size of the watersheds in PR imply that all activities throughout the entire island may indirectly affect downslope marine resources through issues related to water quality. The quality of freshwater that gets eventually delivered to coastal waters is inevitably related to the intensity and extensiveness of land use. Water quality has been found to be inversely correlated with economic development, population density, land use patterns, and other socioeconomic indicators (Biagi, 1965). Therefore, the deterioration of coastal water quality in PR is presumed to have been initiated in the early to mid-1800's when an island-wide deforestation effort cleared the land for various uses including timber extraction, cattle

grazing, and agricultural production (Birdsey & Weaver, 1987). Change of sovereignty at the turn of the 20<sup>th</sup> century from Spain to the U.S. favored the extensive use of all available land for massive sugar cane production under a progressively mechanized and more centralized system that favored the use of coastal valleys and wetlands (Dietz, 1986; Labadie-Eurite, 1949; Martinuzzi et al., 2009) and this resulted in its own new set of water pollutants (Biagi, 1968). Assisted by a deliberately deficient enforcement of environmental safeguards, socioeconomic and political development in PR following World War II explicitly encouraged a move towards industrialization at the expense of agricultural production (Dietz, 1986) and environmental deterioration (Berman-Santana, 1996; Concepción, 1988). Even though implementation of this new economic model allowed for the recuperation of an island-wide forest cover (Grau et al., 2003; Rudel et al., 2000), it also introduced its own new set of water quality issues (Hunter & Arbona, 1995) that have established a legacy of documented stress and detrimental effects on marine ecosystems in various parts of the PR archipelago, largely as a result of eutrophication and sedimentation impacts (e.g., Goenaga & Cintrón, 1979; Goenaga, 1991; Hernández-Delgado, 2005; Hernández-Delgado et al., 2010; Hernández-Delgado & Sandoz-Vera, 2011; Larsen & Webb, 2009; Loya, 1976).

Excess sediment delivery to coastal waters is considered one of the most important sources of stress affecting marine resources worldwide (Rogers, 1990). Among the various affected marine ecosystems, coral reefs stand out as they are particularly susceptible to increased sediment delivery rates (Fabricius, 2005; Rogers, 1990). Terrestrial sediments are considered as a major threat to PR's coral reef systems (Hernández-Delgado, 2005; Larsen & Webb, 2009). Land disturbance in PR associated to the deforestation that began in the 1820's and the extensive use of land for agriculture that lasted until the middle of the 20<sup>th</sup> century was responsible for significantly increasing the rate of soil erosion on the island through the combination of increased landslide activity and surface erosion (Larsen, 1997). The current geomorphic model for PR suggests that while some watersheds had streamflow regimes competent enough to effectively deliver the sediment into the sea, other catchments the stream capacity was insufficient to transport the sediment and this lead to sediment aggradation (i.e., deposition) which delayed delivery to watershed outlets. This model suggests that aggraded sediment is still being slowly delivered by the stream through geomorphic processes that include upland channel extension on headwater streams and channel widening and deepening adjustments along the lower elevation valleys (Clark & Wilcock, 2000). Therefore, it is believed that some of the sediment that is currently being delivered to coastal waters from some areas in PR is a legacy of cumulative effects that have continuously affected the behavior of watersheds over the last two centuries.

In addition to the legacy of previous land use practices and geomorphic responses, current land use activities are still responsible for increasing erosion and sediment yields to PR coastal waters. Increased delivery of sediments associated to road construction is a very important component in the sediment budget of mountainous areas of the island as roads tend to increase the propensity for slope failure and landsliding (Larsen & Parks, 1997; Larsen & Torres-Sánchez, 1997). Land clearing trends in support of the little remaining agriculture on the island and construction associated to urban sprawl and tourism stand out as some of the most important active sources of terrestrial sediment on the island. It is important to note that empirical research shows that while agricultural activities may induce a tenfold increase in hillslope-scale erosion rates relative to undisturbed conditions

(Gellis et al., 2006; Smith & Abruña, 1955), erosion rates on barren surfaces typical of construction sites and unpaved roads may represent a one to a four-order magnitude increase relative to background rates (Gellis et al., 2006; Ramos-Scharrón, 2010). Therefore, the combination of a very high road density network that increases the incidence of landslides accompanied by a fast pace of land transformation to urban spaces suggests that current sediment yield rates may be among the highest ever experienced on the island. The manifestation of peak sediment yield rates during a period of fast urban expansion has been documented elsewhere (Wolman, 1967), and it appears to be supported locally by the relatively high suspended sediment yields documented for the island (570–1,900 mg/km<sup>2</sup>/yr) (Larsen & Webb, 2009) and the marine sedimentation record obtained at specific locations (Ryan et al., 2008). Therefore, the combined impacts of increased construction activities, not only along coastal areas, but also across the entire island, with the lack of implementation of the existing land use plans, and the poor implementation of mandatory erosion-sedimentation control regulations have resulted in long-term water quality degradation by sediments and on declining conditions of coastal ecosystems.

### **2.3 The Piñones case study: A 45-year struggle against massive tourism**

Just minutes away from the San Juan metropolitan area of PR, lies the traditionally underserved community of Piñones with its unique array of cultural, natural, archeological, gastronomic, and recreational resources. With a population of approximately 2,400 residents, Piñones is home to generations of families who have lived in this community for more than 400 years. It extends through 12 km of shoreline and 8,000 acres under the municipality of Loíza. Piñones reflect the richness of the island's Afro-Caribbean culture and traditions, especially in the form of music, food and crafts. It also has an extraordinary diversity of coastal and marine ecosystems, including the largest continuous mangrove forest in PR, estuarine lagoons, channels, swamps and marshes, seasonally bioluminescent waters, native coastal forests, sandy beaches, sand dune formations, coral reefs, and seagrass beds. All these ecosystems serve as habitat for numerous threatened and endangered species. Piñones is also the custodian of more than 120 archeological sites, some of them considered one of PR's oldest archeological remains. The community of Piñones has been historically marginalized by the state and municipal governments through the lack of provision of adequate government services (Guerrero, 2009).

Government land use policies toward Piñones gained a new dimension in the 1950s. The industrialization process fostered by Operation Bootstrap (i.e., 'Operación Manos a la Obra') was combined with an aggressive tourism development strategy, especially in the adjacent San Juan metropolitan area to attend the lodging needs of recently established industrial companies as well as the incipient increase in the number of recreational tourists visiting PR. One of the first impacts was the extraction of the large sand dunes in Piñones during the 1950s to use the material as fill for the wetlands just south of the Piñones' lagoons to build the Luis Muñoz Marín International Airport. The sand extracted from these 10 meter-high sand dunes was also used for the construction of various urbanizations in the metropolitan region adjacent to the coastal zone. This created a permanent problem of shoreline erosion and recurrent coastal flooding (Bush et al., 1995). At that time Piñones became the last frontier to conquer towards the east of the San Juan metropolitan area for residential and tourism purposes. The construction of various residential projects with water-access to the

Piñones lagoons and channels, such as Vistamar Marina in the municipality of Carolina, just east of San Juan, and the establishment of private marinas that required the dredging of La Torrecilla lagoon resulted in significant changes to the lagoon's water circulation, retention, salinity, and sedimentation levels.

During the early 1960s, the government of PR, through the PR Industrial Development Company (PRIDCO), the financial arm of the island's Economic Development Administration, acquired approximately 900 acres in the western part of Piñones to promote the development of massive tourism and recreation projects. Its plans, which included *A General Plan for the Boca de Cangrejos Area* of 1961 and *A Development Plan and Recommended Program for Finca Piñones* of 1968, proposed the construction of thousands of hotel rooms, a convention center, casinos, restaurants, golf courses, tennis courts, and Miami-style marinas throughout Piñones (Adams & Greeley, 1961; OPDAS, Inc., 1968). PRIDCO's investments in western Piñones raised expectations of potential large-scale development in the area fostering other private investors to acquire large tracts of land on the eastern part of Piñones to promote their own tourism and residential projects. As a result, private companies, such as PFZ Properties Inc., acquired more than 1,300 acres on the Monte Grande sector, within the eastern side of Piñones, in 1960. PRIDCO's plans identified Piñones residents as "squatters" and "invaders" that needed to be relocated to San Juan or other parts of the municipality of Loíza. Its plans even established measures to assure that residents were not allowed to construct new houses or conduct renovations within their homes; and were not permitted to inscribe the land title of their property by using the right to *usucapio* (Giusti, 1994).<sup>1</sup> In order to implement its plans, PRIDCO filed an injunction seeking to evict more than 200 families from the western part of Piñones in 1969. The residents responded with a countersuit, aided by the *pro-bono* entity *Servicios Legales de Puerto Rico* (Puerto Rico Legal Services), claiming *usucapio* rights and demanding recognition as formal owners of the land. This lawsuit extended until 1987 when a settlement was reached granting titles to the residents of Piñones through another legal statute that could grant titles to recent squatters, rather than by recognizing the residents' *usucapio* rights. As a result, PRIDCO's plans in western Piñones never materialized or were even implemented. As the community's land title battles with PRIDCO were being solved, PFZ Properties Inc. presented its first development proposal in 1969, *Talega Basin*, which consisted of 8,600 hotel rooms, plus 8,000 residential units in a "concrete city" of seven 30-floor towers with a variety of commercial structures, including a convention center and a large scale marina that required the dredging and filling of most of the property's mangroves and wetlands. The state government did not approve PFZ's first proposal because the proposed construction site did not have the necessary infrastructure (access road, wastewater treatment plant, and flood management controls). However, PFZ resubmitted its proposal for government review in 1973.

The conflicting and contradictory positions in which the government of PR found itself in the Piñones conservation versus development debate were clearly presented in the diverse number of policy determinations, planning exercises, administrative decisions, and research studies conducted by state agencies during the 1970s. While the PR Planning Board (PRPB)

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<sup>1</sup> "Under the PR Civil Code and civil law generally, possession for thirty years is enough for a squatter to become full owner even if the titled owner is recorded in the Property Registry. This is the right of *usucapio*, which corresponds to the more vaguely defined "adverse possession" of the common law" (Giusti 1994: 860).

and the Environmental Quality Board (EQB) had approved the sitting permit and the environmental impact statement for PFZ's *Talega Basin* in 1974, the local government also started shifting its perspective towards Piñones by recognizing its ecological singularity. For example, the recently founded Department of Natural Resources published a number of scientific documents that stressed out the uniqueness, extensiveness, and fragility of the Piñones mangrove forest and critiqued the private development proposals that would significantly alter the ecosystem.<sup>2</sup> In 1978, the PRPB designated Piñones as a Special Planning Area under the 1972 US Coastal Zone Management Act. It also approved other special designations that promoted natural resource conservation within Piñones, such as new areas designated as a Nature Reserve (1979), Critical Wildlife Area (1979), and proposed new areas to be acquired as a future Nature Reserve (1983), including part of the lands that belonged to PFZ Properties Inc.

During the early 1980s, a new series of residential and tourism development projects proposed in eastern Piñones started their permit acquisition processes, such as Proyecto Caribe from the development company Caribe Associates Ltd. In 1985, PFZ Properties Inc. presented a smaller scale version of its previous project with 3,556 residential and tourism units for government approval, as its 1974 project had been halted by a lawsuit that dragged for years with the U.S. Environmental Protection Agency regarding U.S. Clean Water Act violations.<sup>3</sup> The tensions that resulted from the 1980s environment versus development debate regarding future land uses in Piñones moved former governor Rafael Hernández-Colón's administration (1984-1992) on February 1988 to conduct a land use planning exercise that would clearly identify the lands that could be developed and those that would be conserved. As such, the PRPB was charged with the responsibility of leading the development of the Piñones Special Planning Area's Land Use Plan. After seven years of public hearings and revisions between two different government administrations, the Piñones Special Planning Area's Land Use Plan was approved in 1995 under the administration of former governor Pedro Rosselló (1992-2000). Without a doubt, the government was expecting too much from a document that merely listed some community, natural resource, and tourism strategies and included as an appendix a land use zoning map. Based on the reality of the Piñones 20-year debate, the government should have promoted a participatory planning process immersed in conflict resolution to try to find true solution to this extensive debate, if one was available. In the end, government ended up doing what it was used to do, "interventions not implementation", claiming it had achieved a solomonic solution towards all stakeholders (Mosse, 2004).

The 1995 Land Use Plan had the goal of "achieving the protection, conservation, and restoration of the different natural systems that compose the Planning Area, and at the same time, promote a limited and ordered ecological-tourism development" (PRPB, 1995: Preface). The state might have claimed this goal, but in essence what it ended up achieving was plotting in a map where hotels could be developed and establishing design and density criteria for constructions. Soon after the approval of the 1995 Land Use Plan and its new permit streamlining process, private companies presented new development proposals

<sup>2</sup> The Department of Natural Resources' research studies included: Wildlife Management Proposal for the Piñones State Forest (1974); Unit Plan for the Management of the Piñones Forest (1974); The Master Plan for the Commonwealth Forests of Puerto Rico (Division of Forest Planning) (1976); and Puerto Rico's Mangrove Systems (1978).

<sup>3</sup> *PFZ Properties Inc. v. Russell E. Train et. al.* [393 F. Supp. 1370 (D.D.C. 1975)]

before the PRPB and the EQB. As a result of this Plan, the following projects were being considered for Piñones by the late 1990s and early 2000s: (1) 1,320 condo-hotel units, 450 tourism villas, and 225,000 m<sup>3</sup> of sand extraction (Proyecto Turístico Caribe); (2) 880 condo-hotel units, 42 tourism villas, 1,394 parking spaces, various tennis courts and pools, and retail and commercial areas (Costa Serena); (3) 408 hotel units and 102 villas (PDCM Associates); (4) 290 apartments in 9 buildings (Comunidad Santiago); (5) 122 hotel units, 132 cabins, 27 villas, 5 pools and 40,000 m<sup>3</sup> of sand extraction (Vacía Talega Village); and (6) 375 tourism units with 2 golf courses (Casa Grande Resort, Caribbean Links). Together, these projects represented the development of more than 4,000 condo-hotel units, apartments, and villas; sand extractions; a population growth of more than 5,000 residents in a community of 2,400 residents; and an increase in infrastructure pressures for public services that were not optimal for the local community (i.e., water supply, wastewater management and treatment, road capacity, etc.) Public agencies quickly approved the environmental and sitting permits for the PFZ Properties Inc. and the Caribe Associates projects, some without even celebrating public hearings. As a response, community groups, such as the Piñones Residents Association and the *Frente Loiceños Unidos* (FLU), presented several environmental lawsuits against these projects, with the assistance of local universities' law clinics, because of their incompliance with environmental and land use laws and regulations. These community entities constantly prevailed in these lawsuits; cases that ended up establishing important environmental law jurisprudence in PR. After these long-awaited sentences, construction companies desisted in continuing with their development proposals as they were originally conceptualized.

The debate of the future land uses in Piñones continued during the decade of 2000, as the public campaigns and strategies to either promote large scale residential-tourism projects or smaller sustainable tourism development initiatives grew stronger. On March 2007, in a surprising turn of events during the traditional Governor's Message of the State, former governor Aníbal Acevedo-Vilá (2004-2008) announced that he had spoken with Joel Katz, PFZ's President, and that the Government of PR had entered into a collaborative agreement with PFZ Properties Inc. in which the state would acquire his lands at a market price value in order to designate them as a Nature Reserve. With the expropriation of the lands that belonged to PFZ Properties Inc., the 45-year old debate of the future land uses in eastern Piñones was put to a partial end. During the final years of this debate, a broad coalition of community residents, environmental and civic organizations, workers' unions, and academics successfully mobilized public support and influenced national political arenas and decisions in halting the construction of large-scale residential and tourism projects in eastern Piñones. Future sustainable tourism initiatives in Piñones should aim to find a common ground where a vision of the community's future can be delineated through participatory planning mechanisms, deliberative dialogues, and inter-sectorial consensus building.

### **The Fajardo and Palmas del Mar case studies in a nutshell**

#### **The Fajardo story: Displacement of local fishing communities by private marinas**

1960s – Construction of Hotel El Conquistador at Fajardo opened the gate of major tourism development across the northeastern PR zone; raw sewage discharged from hotel caused localized coral mortality at Las Croabas fringing coral reefs.



1970s – Construction of two apartment buildings and a private marina at Cayo Obispo, later known as Isleta Marina.

1970s-2000s – Construction of five more large private marinas in Fajardo; physical displacement of residents or displacement from part of their traditional fishing grounds (Miguel “Chan” Dávila, fisher folk and President, *Asociación de Pescadores de Maternillo y Mansión del Sapo*, Fajardo, pers. comm.).

Significant physical alteration of coastal morphology and of adjacent coastal coral reef and seagrass communities due to chronic coastal water quality decline.

Elimination of important essential fish habitats due to dredging, filling, piling, and breakwater construction; changes in littoral drift that caused net increased coastal erosion.

The vast majority of registered recreational vessels in PR (>65,000) are nowadays located within the Fajardo area, which has also created dramatic increases in recreational boating pressure, groundings, anchoring impacts on coral reef and seagrass habitats, oil pollution, illegal garbage dumping, recreational overfishing, and illegal coral collection as souvenirs in the past over the island archipelago across the eastern PR shelf (Hernández-Delgado, 2000, 2005), including Arrecifes La Cordillera Natural Reserve, Culebra Island, Vieques Island, and even up to the U.S. Virgin Islands, and the British Virgin Islands.

#### **The Palmas del Mar story: The first large-scale resort**

1970s – construction of Palmas del Mar, the first coastal mega-resort in PR, at the eastern town of Humacao.

1970s – 2000s – Continued expansion of the 1600+ hectare project that include several hotels, some of them right on Candelero Beach, the second largest private marina in PR, and one of the largest of the entire Caribbean region, several apartment walk up buildings, extensive residential areas, many of them as secondary homes, as well as four golf courses and other facilities.

Significant increase in the local demand for freshwater, as well as increases in sewage and solid waste production.

Public access to the coast became severely limited with a complete prohibition of access to some areas, and very limited access to some others due to very stringent rules.

## **2.4 The Río Grande case study: A dramatic turn of events for the coastal tourism industry**

Another major example of unsustainable tourism and residential development was the unprecedented deforestation and filling of continuous mangrove forest, wetlands and other estuarine habitats carried out during the late 1960s by local investment company, Empresas Díaz, at Punta Miquillo, Río Grande, in northeastern PR (Figure 1). More than 1,000 hectares of coastal wetlands were eliminated and filled for a proposed large-scale tourist resort and residential development named Coco Beach. This also included a major dredging of a deep

canal across shallow coral reefs and seagrass communities at adjacent Ensenada Comezón for the construction of a private marina. According to local fishermen, these actions caused an irreversible damage to coastal water quality that resulted in continuous sediment resuspension, degradation of seagrasses, and on a massive coral mortality across adjacent reefs, which induced the collapse of the local fisheries. Recent evaluations of Río Grande's coral reefs suggest that no recovery has occurred even four decades after the dredging (Hernández-Delgado, 2005, 2009). Due to major economic constraints, only the first stage of the residential component of the project was built during the 1970s and no resorts were built until 2003. In 1985, and during the administration of then governor Rafael Hernández-Colón (1984-1988) the PR Department of Natural and Environmental Resources (PRDNER) designated the entire zone, as well as its adjacent waters, as the Río Espíritu Santo Estuary Natural Reserve (RESENR), recognizing the critical ecological value of the zone and to counter-balance the proposed tourism development of the area. In spite of the public nature of all beaches in PR, coastal access was already extremely limited across the Punta Miquillo and Punta La Picúas zones at Río Grande due to continuous and increasing coastal construction and land segregation, and very stringent access regulations.

However, during the period of 1992 to 1994, under the administration of former governor Pedro Rosselló (1992-2000), an unprecedented fast tracking permitting system was established across several state government agencies aimed at: (1) establishing a smoother and fastest permitting process in government agencies for developers; (2) fostering a boom in residential and tourism construction activity; and (3) eliminating public participation from planning processes, public hearings, etc. In 1995 and after an unprecedented legal action in PR, the PRDNER eliminated the entire Punta Miquillo zone and the RESENR to facilitate tourism development. Further, during 1996, the Northeast Coastal Tourism Development Conceptual Plan was approved and implemented by the PR Planning Board (PRPB, 1996). This was aimed at establishing more flexible zoning schemes aimed at fostering massive 36 tourism construction across northeastern PR, though this strategy was later expanded to the rest of the island. Following these actions, a dramatic boom in tourism and residential projects occurred in many areas of PR, but mostly across the northeastern coastal zone during the late 1990s and early 2000s. During 2003 two large private resorts, the Meliá and Paradisus hotels, were constructed on Punta Miquillo, with four golf courses across the area, and further restricting public access to the coastal zone and establishing a *de facto* private beach. Current plans include the construction of a high-class resort/residential/golf club developed by multi-millionaire investor Donald Trump which also includes a proposed large private inland marina within the Río Espíritu Santo estuary, as well as two artificial beaches that will require the nearly total elimination of remnant fringing seagrass communities. The entire set of activities that have taken place in the Río Grande area represent one of the most dramatic examples where marginalization of local communities, in combination with unprecedented rapid legal changes in planning, zoning and environmental regulations, resulted in establishing a non-sustainable tourism development model which has had permanent negative irreversible impacts on adjacent coastal communities. According to many local fishers, it has also resulted in permanent impacts on the livelihoods of local communities that historically had depended on the coastal resources as means of recreation and income.

### **3. Swimming against the current: The still non-sustainable coastal tourism and urban development strategy of Puerto Rico**

#### **3.1 Non-sustainable political tactics: Unprecedented changes in land zoning rules, environmental regulations, permitting and decision-making processes to favor tourism and urban expansion plans**

The global economic crisis that has characterized the first part of the current century, in combination with the projected impacts associated to climate change, may represent the most critical threats to coastal tourism and urban growth at a global scale. The situation may become more complicated if there is no long-term vision, planning, and a successful implementation of sustainable socio-economic development strategy. In spite of its close political and economic relationship with the U.S., the Commonwealth of PR has been under a constantly changing political atmosphere every four years over the last two decades, but particularly since 1996, when four different administrations alternated between the two main political parties of the island with completely opposite political philosophies have switched power. Though all political administrations have fostered significant tourism and urban development, their plans and strategies have also followed a similarly changing pathway, leading to substantial changes in political tactics which have prevented embracing a sustainable tourism and socio-economic development model. But regardless of their philosophy, all four administrations have managed to maintain a nearly unchanged, non-sustainable approach aimed at rapidly-approving construction activities to sustain the construction sector as one of the principal economic drivers of the island. The most significant changes over the last two decades have included: (1) fast tracking of the government permitting processes, which basically represented the elimination of most steps of the standard bureaucratic burden for developers, particularly those that included public participation through public hearings on regulatory agencies; (2) more flexible state environmental regulations; (3) a massive change of zoning schemes across the coastal zone of the entire island and the island municipalities of Vieques and Culebra; (4) establishment of more flexible uses on each of the existing and new zoning classifications to allow significant construction of tourism and residential projects in areas where previous permitted uses prohibited it; (5) substantial suppression of public participation on planning and decision-making processes; (6) establishment of severe legal limitations through Law 161 of 2009 which created the Office of Permits Management and an Adjudicative Board whose decisions will be considered final to foster permitting fast tracking procedures and halting citizens and communities rights to appeal in court any questionable government decision regarding project approval; (7) adoption and implementation of the regional non-sustainable tourism development plan for the northeast coast as proposed by developers (PRPB, 2006); and (8) the partial elimination of the Río Espíritu Santo Estuary Natural Reserve, Río Grande, to favor tourism and urban construction.

Additional non-sustainable strategies have been also recently implemented in PR, including: (1) inadequate implementation of the highly controversial Ecotourism Law 340 of 1998 that was instead used to foster rapid tourism and urban development on sensitive coastal habitats; (2) inadequate implementation of Sustainable Development Law 267 of 2004 and Law 254 41 of 2006 for the Public Policy for the Sustainable Tourism Development of PR; (3) the most recent change in the political administration resulted in the immediate substitution of the *Master Plan for Tourism and Sustainable Development of PR* by the non-sustainable PR

*Tourism Strategic Plan 2009-2013*; (4) lack of compliance with Law 153 (August 10, 2002) for the Sustainable Development of Vieques and Culebra Islands; (5) elimination of the *Master Plan for the Sustainable Development of Vieques and Culebra Islands*; (6) the elimination of the draft revised and updated version of the *Puerto Rico's Land Use Plan* which proposed the conservation of extensive coastal areas where new large-scale tourism resorts, housing projects, golf courses and/or private marinas are now being either proposed or constructed; (7) the most recent change in the political administration resulted in the immediate elimination of the Climate Change Commission on the House of Representatives (it lasted only about a year and was nearly useless; no public policy was enacted regarding climate change impacts, neither it was replaced with something that might have had better guidelines on which to work on); (8) the failed attempt to enact a proposed new *Coastal Law* that would have allowed extensive tourism and urban construction right on the public domains of the maritime terrestrial zone and on coastal barriers; (9) alteration in the composition of the State Supreme Court to ensure a higher number of judges lined up with the Fortuño's administration philosophy; (10) unprecedented legal decisions at the state court system favoring private constructions on the maritime terrestrial zone, including at public beaches, mangroves and wetland areas; (11) rapid approval of projects mixing urban construction and tourism facilities to foster urbanization across ecologically sensitive coastal areas without full environmental impact evaluation; (12) declaration of tourism emergency in Culebra Island to foster additional construction of hotel rooms under an expedite exception of compliance with existing environmental regulations; (13) the unprecedented total elimination of the Northeastern Corridor Natural Reserve, Luquillo, to favor tourism and urban construction; and (14) According to PR newspaper *Primera Hora* (Justicia-Doll, October 26, 2011), there has been also a dual role of key personnel of several regulatory agencies as government employees and as consultants for private tourism and construction developers.

### **3.2 The Puerto Rico tourism strategy, 2009-2013: Perpetuation of the non-sustainable model?**

The administration of governor Luis Fortuño (2008-2012) implemented the very ambitious PR Tourism Strategic Plan 2009-2013 which fostered tourism expansion by focusing on the construction of large resorts and hotels across the coastal zone of the island. A total of 153 new projects were proposed to be completed between 2010 and 2013. In comparison to the existing number of hotels in 2009, this represents an astonishing 97% increase in the number of lodging facilities within only four years. According to Bauzá-Alvarez of the PRTC (pers. comm., 2011), a total of 27 projects were completed between 2009 and 2011 (17%), while 21 were still under construction (14%), and the remaining 105 (69%) were still in 2011 at some stage of the permitting process. A total of 26% of the lodging facilities were proposed on the metropolitan area of San Juan, followed by the eastern coast (25.5%) and the west coast (19%). Based on the PRTC information (Bauzá-Alvarez, pers. comm.), there would be only a 12% increase in hotel structures in the southern coast and 8% in the central zone. This expansion also included the proposed construction of 18,113 new rooms by 2013. This would elevate the total number of rooms available in the island to 32,189, and represents a 129% increase in relation to rooms available in 2009. Approximately 28% of the proposed rooms will be constructed on the metropolitan area, followed by 27% on the east coast and 22% on the west coast. Only 7% will be built in the southern coast and 2% in the central

zone. Total investment of these efforts were estimated in an unprecedented USD7.89bn, from which 32% will be invested in the eastern coast, 22% in the western coast, 21% in the northern coast, 19% in the metropolitan area, and less than 6% and 0.6% will be spent in the southern coast and central mountain range, respectively. Total investment in recently constructed structures reached USD789 millions. Another USD1.21bn are being invested in projects under construction, while an estimated USD5.89bn will be invested in projects still in the permitting process. According to PRTC (Bauzá-Alvarez, pers. comm.), nearly 70% of the proposed new hotels and other lodging facilities will be constructed adjacent to coastal habitats. As a mean, 57% of the structures already built between 2009 and 2011, as well as 85% of those under construction are located in coastal areas. Another 58% of those still under permitting processes will also be located at coastal habitats. From the geographic perspective, 92% of the proposed hotels for the eastern coast will be located on coastal habitats, as well as 86% of those from the northern coast, 68% of the western coast, 51% of the southern coast and 47% of the metropolitan area of San Juan. The proposed strategy has followed a non-sustainable pattern of further exporting massive tourism to coastal areas, with highly sensitive habitats, lack of adequate public participation in the decision-making and often fast-tracked process, without any guarantee to foster the protection of base-community livelihoods.

### **3.3 The Northeastern Ecological Corridor case study: Conservation efforts vs. yet another reversal by government in favor of tourism and urban construction**

Covering nearly 3,000 acres between the municipalities of Luquillo and Fajardo, in the northeast coast of PR (Figure 1), the Northeastern Ecological Corridor (NEC) has been recognized by Commonwealth and Federal government agencies, as well as local and international conservation organizations, as one of island's most valuable natural areas and one of the Caribbean's great biodiversity hotspots (PRDNER, 2008). According to the U.S. Fish and Wildlife Service (2002), the NEC's beaches are considered the most important nesting site for critically endangered Leatherback sea turtles 30 in all of PR and their second most important nesting site in all U.S. jurisdiction (just after 31 Sandy Point in Saint Croix, USVI). The NEC also supports an extraordinary array of tropical ecosystems, including coastal forests, wetlands, coral communities, and a bioluminescent lagoon. These are home to more than 50 rare, threatened, endangered, and endemic species. Since the late 1970s, local and federal government agencies had proposed that the NEC be designated as a Natural Reserve (PRPB, 1977; US Department of Commerce and PRDNER, 1978). In 1990, a large part of the NEC was designated as a Coastal Barrier under the US Coastal Barrier Act. In 1992, the PRDNER presented an official designation document to the PRPB proposing its designation as a Natural Reserve. Unfortunately, during the election 39 transition process of 1992, the then recently-elected administration of former 40 governor Pedro Rosselló (1992-2000) requested that the PRPB not approve the 41 designation of the NEC Natural Reserve as it wanted to promote tourism development in 42 the area. The Roselló administration's new land use vision for the NEC was approved in the 1996 Northeast Coastal Tourism Development Conceptual Plan, which re-zoned certain parts of the NEC to allow for residential and tourism construction (PRPB, 1996), therefore reverting the historical conservation objectives of previous administrations. After the 1996 Northeast Coast Tourism Development Conceptual Plan was approved, two mega resorts were proposed to be constructed in the NEC: (1) Dos Mares Resort - consisting of 3,450 residential and tourist

units, a 9-hole and an 18-hole golf course, among other related facilities in lands within and adjacent to the NEC; (2) San Miguel Resort - consisting of 1,450 residential and hotel units and two golf courses, of 18-holes and 9 holes each, among other related facilities. Over 80% of the units proposed by both projects were exclusively residential, which seriously undermined the developers' claim that these were tourism projects. If constructed, the Dos Mares Resort and the San Miguel Resort would result in massive deforestation, soil erosion, land movement, filling of wetlands, channelization of rivers, and the removal of coastal vegetation, significantly impacting many of the protected species and other living resources that depend on the NEC. The project's golf course maintenance practices would include the use of toxic substances such as herbicides, which could affect the water quality of surface, underground, and coastal waters, including adjacent coral reefs. In addition, both projects would severely limit public access to the NEC's beaches, public lands and other public natural resources, as would further increase the competition for water supplies needed by local communities, and thus potentially affecting the quality of life of thousands of citizens in the eastern region of PR.

As a response to these threats, a coalition of local community and environmental groups, organized under the NEC Coalition, initiated a public campaign to protect the NEC as a Natural Reserve with the vision to promote its economic development through the sustainable construction of eco-hotels and the operation of small-scale nature tourism amenities, as well as the revitalization of adjacent town centers that could serve as gateways to this natural protected area. After 10 years of public campaign, the Coalition celebrated the decision of former governor Aníbal Acevedo-Vilá (2004-2008) of signing an Executive Order on October 2007 that established as public policy the conservation of the NEC as a Nature Reserve while promoting its sustainable tourism development (Commonwealth of Puerto Rico [CPR], 2007). After the approval of this Executive Order, the NEC was officially designated by the PRPB as a Natural Reserve in April 2008, more than three decades after it was originally proposed by the PR Coastal Zone Management Program in 1978 (CPR, 2008). In addition, local agencies presented a Comprehensive Land Use and Management Plan for the NEC through a participatory planning process with the purpose of establishing clear guidelines for the development of outdoor recreational and ecotourism facilities in the area (PRDNER, 2008). This Comprehensive Plan was endorsed by a wide array of Commonwealth and Federal agencies, academic institutions, local community groups, as well as local and international conservation organizations. The USFWS and the National Oceanic and Atmospheric Administration (NOAA) also supported these efforts by assigning more than \$3 million in funding for the acquisition of private lands in the NEC, as a means of strengthening its conservation as a natural protected area.

In spite of this extraordinary conservation story, in another unprecedented action in the legal history of PR, governor Luis Fortuño (2008-2012) eliminated the NEC designation as a Nature Reserve on October 30, 2009. On June 28, 2011, the Fortuño administration approved the new Great Northeastern Reserve, as well as a new Special Land Use Plan that promoted the fragmentation and urban development of the Corridor by allowing the construction of residential-tourism projects within 450 acres of the former Natural Reserve (PRPB and PRDNER, 2011). Coincidentally, these 450 acres coincide perfectly with the urban development footprint of former residential and tourism projects proposed at the NEC, such as the San Miguel Resort, the Dos Mares Resort, Paradise Found Villas, and Seven Seas

Resort, among others. The direct, indirect, and cumulative threats of this new special zoning plan are significant: heavy human use, artificial light and noise, increased run-off, and downstream pollution of future developments will vastly change the character of the undeveloped forests and beaches of the Corridor, will permanently and unavoidably damage important ecosystems and its related species, and will eliminate the NEC's extraordinary recreational, tourism, and economic development potential as a regional, low-impact ecotourism attraction. The NEC Coalition is currently engaged in continuing its campaign in favor of the NEC, specifically urging the government of PR to reinstate the designation the NEC as a Natural Reserve in its totality and reverse its decision to open this extraordinary ecological area to residential and tourism construction.

### **3.4 The Dorado-Arecibo northern PR segment: Non-sustainable urban and tourism expansion threaten several natural reserves, coral reefs, and access to the coastal zone**

The coastal segment that lies between the municipalities of Dorado and Arecibo along the northern coast of PR (Figure 1) has sustained a dramatic increase in urban development over the last decade, particularly following the completion of highway PR-22, the main transportation artery connecting San Juan with the northern and western portions of the island. In particular, the municipalities of Dorado and Barceloneta experimented a 12.2% and 11.2% population increase during 2010 in relation to 2000 (U.S. Census Bureau, 2010). Also the adjacent town of Toa Alta showed a 15.9% population increase. These figures contrast with the mean 2.2% population loss of the entire island during the same period and suggest the rapid urban expansion trend of the zone. In the case of Dorado and Vega Alta, there has been a boom in urban sprawling (horizontal construction) across the coastal alluvial plain. But most of the recently proposed projects are focused in the construction of tourism resorts with mixed residential components along the shoreline. Examples of these include a failed 300 acre resort named Playa Hermosa at Cibuco Ward, Vega Baja, which would have directly impacted the Cibuco River Swamp and Mangrove Natural Reserve, as well as several traditionally underserved communities and the Maisabel archeological site. During 2002 a very large apartment complex named Chalets de la Playa was built right on the Vega Baja beach named Tractores, with buildings constructed between 70 and only 45 meters from the shoreline. Some of these structures are in open violation of the existing maritime terrestrial zone restrictions for constructing permanent structures within 50 meters off the shoreline. Tractores Beach still supports the largest and more dense thickets of threatened Elkhorn coral, *Acropora palmata* across the northeastern Caribbean (Hernández-Delgado et al., 2011). The apartment complex was built right behind a remnant sand dune, with its concrete fence right on the maritime terrestrial zone, less than 20 m off the shoreline, impeding beach access, and causing recurrent turbid runoff of storm waters from a retention pond located just 28 meters off the shoreline that reach the adjacent Acroporid reefs and cause recurrent coral and benthic invertebrate mortalities. The original project included a proposal to construct an artificial beach that would have included blasting of existing beach rock and rocky bottoms along the shore, the total elimination seagrasses, partial elimination of reef habitats, the construction of several breakwaters and massive sand filling of the area. Even without completing a full environmental impact analysis and completing its permitting process, this proposal even went to the stage of permit application at the U.S. Corps of Engineers, but local communities got organized, strongly opposed, and defeated it.

Local insults along Vega Baja beach continued during 2011 when an illegal gas station constructed at only 150 meters from the maritime terrestrial zone, and adjacent to Chalets de la Playa in 2008 was opened after three years of struggle with opposing local communities due to the direct intervention of the PRPB which modified an existing rule that prohibited the construction of gas stations within a given distance from another one. This project never had an environmental impact analysis and originally was constructing a 60 cm wide pipe to discharge oil-polluted storm waters directly atop an *Acropora palmata* reef known as El Eco, but was stopped again by the community organized under non-governmental organization *Vegabajenos Impulsando Desarrollo Ambiental Sustentable (VIDAS)* when the pipe was only about 30 meters from the shoreline. The pipeline was removed and substituted by an underground tank which is presumed to leak towards the water table. Due to the porous nature of the underlying rocks, water-borne pollutants are expected to have access to adjacent reefs. Due to the karstic nature of the soils, pollutants should be easily reaching the adjacent reefs. No actions from regulatory agencies have been taken to prevent pollution. In addition, another apartment complex called Vegamar Apartments was proposed right across the maritime terrestrial zone of Sarapa Beach, Vega Baja. In this particular case, *VIDAS*, in collaboration with other representatives from the local communities, took legal action to stop the project which would have impacted about 8 acres of coastal lands and beach access to the most significant surfing beach of the zone, which also harbors important remnant patches of Elkhorn corals. Although the community has prevailed in their legal action, the case was appealed by the developer and is still under review by the PR Supreme Court. For the record, former Vega Baja mayor Edgar Santana (2004-2011) was sentenced to 18 years in prison in 2011 for extortion and bribing several local developers, some of which were associated to several tourism and urban projects across the northern PR region. Also, the municipal government of Manatí was recently proposing the construction of a tourism resort right at the public beach of Los Tubos. These are not only public lands, but also part of the legally-defined buffer zone of Tortuguero Lagoon Natural Reserve. The project did not even made it out to the permitting processes due to the strong opposition of organized local communities and *VIDAS*. As an alternative, the municipal government is currently considering low-impact tourism development alternatives proposed by local residents.

There was also a recent dramatic case of a forced expropriation and destruction of many houses of residents of the traditionally underserved coastal communities of La Boca, Palmas Altas, and Isla del Roque, in Barceloneta, earlier in 2011. The dramatic part of the history is that there was no previous negotiation, administrative or legal actions in the process, and the forced action was ordered by the own mayor of Barceloneta, Sol Luis Fontáñez (1986-2012), who was promoting the privatization of these lands for the construction of tourism resorts and apartment buildings by several private investors. Base communities got eventually organized and took legal action against the municipality to stop further structure demolitions, a process that is still in court. Further, Mayor Fontáñez was put into jail in February 2012 with Federal charges of corruption and bribery in agreement with private developers. He is currently waiting full trial. Also, state road PR-681, which runs parallel to the shoreline from Barceloneta to Arecibo, has also become another hot spot for a variety of proposed projects. A very large urbanization was recently approved at flooding and tsunami-prone lands right adjacent to the protected wetlands of Caño Tiburones Natural Reserve, Arecibo. Also another apartment complex has been proposed right adjacent to the beach at Cueva del Indio Natural Reserve, which also harbors one of the most significant



archeological sites in PR. Another mega-resort named Island Cove has been proposed for construction along the beach adjacent to this Natural Reserve, while an apartment complex has been proposed right within the maritime terrestrial zone at Peñón de Mera, Arecibo, just off the Arecibo lighthouse, and eight apartment buildings have been also proposed right in front of the local beach called Caza y Pesca, at Arecibo. The northern coastal area of PR has become a very threatening and dangerous example of the consistent, negligent, corrupt, unscrupulous, and often illegal pattern of tourism and residential construction that is being forced in conjunction by private investors, as well as state and municipal governments, even in open violation of existing state and federal regulations, and under an absolute negation of the potential risks of constructing permanent structures along the shoreline in a time of unequivocal climate change and rapid sea level rise (see Titus et al. 2009). Though most, if not all of these approaches have faced strong grassroot and often legal opposition by traditionally underserved communities. However, these actions have not been enough to stop the massive assault to natural coastal resources and to base communities that have existed for generations on these areas.

### **Culebra Island in a nutshell**

#### **A history of bombs, land abuse, and environmental corruption in paradise**

Culebra is an archipelago composed of 23 islands or cays, located equidistant between the island of PR and the island of St. Thomas, USVI (Figure 1). The main island of Culebra measures about 11 x 7 km, and has roughly 2,000 residents. It was inhabited by pre-Columbian Taíno indians, colonized by Spain in 1880, and then moved under U.S. jurisdiction as spoils of the Spanish-American war in 1898 (Feliciano, 1976). By virtue of a presidential decree, vast extensions of Culebra became property of the U.S. Navy in 1901, becoming a military training facility for nearly eight decades (Delgado-Cintrón, 1989). The U.S. government deprived locals entry for swimming or fishing of much of their own waters because of the military target maneuvers (Feliciano, 1976). The original old town of San Ildefonso de la Culebra was destroyed and wiped out by the U.S. Navy and residents were relocated to different areas of the island. A concerted effort was made by the military to drive residents completely off the island (Feliciano-Encarnación, 2009). For decades, the Culebrenses lived under the constant harassment of restless ship to ground and air to ground bombing activities and artillery practices at any time, women were harassed or sexually abused by military personnel, navigation, fishing and beach recreation were prohibited, and no forms of tourism or urban development existed in the island until the late 1970s. Under the strong leadership of former mayor, the Honorable Don Ramon Feliciano-Encarnación (1958-1980), who was also a fisherman, and with the legal assistance from a young, idealistic Harvard educated lawyer, Richard Copaken, 750 local families in both non-violent and physical protest managed to end the over 70 years of abuse of their islands for international military target practice in 1975 (Copaken, 2009; Feliciano-Encarnación, 2009).

With strong financial incentives provided by the US Coastal Zone Management Act, the Culebra Segment of the Coastal Zone Management Plan (1976) was created with emphasis to protecting Culebra's stellar coral reefs. In order to receive the Federal funding associated with the coastal zone management plan, the Government of PR agreed to put into place Law 66, 1975 - unprecedented environmental legislation that sought to balance

development to conservation. The plan was based on a low density zoning for Culebra. Law 66, 1975 also created the Culebra Conservation and Development Authority – a board comprised of Federal and local government officials intended to ensure Culebra's future development was locally controlled and sustainable. Culebra Island also got its own Land Use Plan in 1977. Therefore, the island rapidly got unique unprecedented land planning and regulatory tools. By the mid-1980s, and only a decade after the military abuse ended, and under the administration of former mayor Anastacio Soto-Ayala (1980-1996), Culebra enjoyed a steady unemployment rate of only 2%, with 0% involuntary unemployment. A high caliber repeat tourist visited the island specifically to enjoy nature, peace and tranquility, and the unique island culture. While project proposals increased in late 1980s to late 1990s, local government leadership staved off development pressures until the administration changed in 1996. At this time, the local administration of the late mayor, Abraham Peña-Nieves (1996-2000; 2004-2011\*died in October 2011), and under former governor Pedro Rosselló administration (1992-2000), shifted toward a fast tracked project approval and construction, compromising meaningful public participation and the island began feeling the irreparable harm of unplanned coastal tourism development.

The first visible large-scale resorts, Costa Bonita (now Sea Breeze Hotel after the latest of five bankruptcies) and Bahía Marina seeped onto the island without previous meaningful public participation. The area proposed for Costa Bonita was a hillside peninsula bordered by USFWS National Refuge mangrove wetlands, the outskirts of which were being considered for protection as a Federal Bird Sanctuary - Canal de Bruly. All neighboring property owners opposed the change in the protective zoning needed for the project to proceed, but the developer partnered with the PRTC and declared a state of "tourism" emergency. The emergency proclamation declared that Culebra needed more hotel rooms. This allowed a rule of exception to variance, and the protective zoning was eliminated despite public opposition, soil constraints and proximity to Federal Refuge. Coastal mangroves were removed and swimming pools were built inside the salt flats of the project, within the public domains of the maritime terrestrial zone. More significantly, this resort was built on areas considered as having a medium risk for unexploded ordnance (UXO), adjacent to an area investigated for chemical clean up - in an area formerly used as NAVY training grounds. In addition, this development was located on an apparent former Taíno indian village, still lacking an adequate archaeological evaluation.. Over the past decade overall tourism and housing construction on Culebra has largely represented a snake eating its own tail. While the delayed development on the island offered some hope of the incorporation of lessons learned from other islands, lack of municipal leadership and the failure of both local and federal agencies to implement their non-jurisdictional duties of oversight seem to have doomed the future of Culebra to the same short-sighted fate of unsustainable tourism development that harms the coastal resources of other Caribbean islands, including the main island of PR. Further large-scale housing projects, which are hidden under the eco-tourism umbrella, are under different stages in the permitting process. These include the 100 acre resort Villa Mi Terruño, villas at Posada del Coronel, the small resort Villas de Andrades, and the large-scale resort Villas de Carenero, which has also proposed the construction of the first large-scale private marina in Culebra.

In spite of being proposed as "sustainable" and "green", the project called Villa Mi Terruño

("Villas of My Native Land") proposed the first access-controlled urbanization for the island and included 110 luxury residences, two hotels and commercial space on less than 94 acres. But in early March 2012, the PR Appeals Court resolved in a lawsuit initiated by local non-governmental organization Coralatations that the Planning Board approved the project without complying with the density parameters established for Culebra. These special, low-density zoning parameters were implemented to protect the ecological integrity of the island and her beautiful coral reefs. Therefore, this stopped the project at least as it was originally proposed. There have also been several recurrent attempts to block historical public beach accesses by private owners at Bahía Mosquito, Playa Manzanillo, and the emblematic Playa Flamenco, some of which have resulted in futile legal actions against local residents for alleged trespassing. Further, state and federal regulatory agencies have issued illegal permits for construction in highly sensitive watersheds and steep slopes that have resulted in dramatic impacts from erosion and sedimentation on adjacent coral reefs, seagrass communities and turtle nesting beaches (Ramos-Scharrón et al., 2012). In addition, Cayo Norte, a small private key located north of Culebra, was recently sold in a bid to millionaire investor, Daniel Shelley, who also owns the largest marina in the Caribbean, Marina Puerto del Rey, located in Fajardo, PR. There are already permits approved to initiate development of the cay and to construct a pier. There is fear in the community that a large-scale resort and marina will be constructed on the cay. There certainly will be no hope for Culebra unless meaningful public participation in planning and responsible local and federal agency oversight is restored. Today Culebra has lost much of the natural value it possessed during the past decade, some via direct impacts to coastal resources, to climate change, and other due to lack of meaningful oversight or direct corruption of a legitimate planning process. The island serves as another example in the data base of islands that demonstrate sustainable tourism development fallen prey to short sighted corruption.

#### **4. The rapid-growing cruise ship industry: Increasing revenues, but for who?**

According to Murray (2005), cruise tourism has been the fastest growing sector of the tourist industry for the past decades. Since 1980, the industry has had an average annual passenger growth rate of 8.1% (Dowling, 2006). Cruise tourism has exploded around the Caribbean during the last two decades (Brida & Zapata-Aguirre, 2008). This growth is expected to continue into the future (CLIA, 2005; Dowling, 2006). However, the economic bonanza attributed to the cruise ship industry can be misleading because they are not corrected for leakage—the occurrence of tourist revenue flowing out of the country in which it was spent, a particular problem for many small islands (Loper, 2005; Squillante et al., 2004). One of the most critical concerns by residents from small island nations is the final destiny of economic revenues associated to the cruise tourism industry. According to Brida and Zapata-Aguirre (2008), more than 50% of land-based activities are sold on board by the own cruise ships. From the value paid by cruisers for on shore activities, the local tour operator is left with a level of only 50% to 25% of that value. Tourism service providers who want to appear in advertisements delivered on board (videos, brochures, etc.) have to pay significant amounts for it. Others incomes provide from private "dream islands", privatized islands property of each cruise line, most often within the territorial waters of developing island nations. This clearly reduces or eliminates the economic benefit to communities not to disembark at the

destination. As a result, unequal revenue distribution has been associated with social and environmental costs to local people (Diedrich, 2006, Diedrich & Buades, 2009), which have also to absorb the socio-economic and environmental burden of massive pulses of visitors to locations which often lack most of the necessary infrastructure to support such level of visitors. Such a wrong economic model drives even some of the alleged green tourism far from sustainability, often creating a situation of environmental injustice. There are also issues of tourist pack behavior. A key impact of cruise tourism is the delivery of substantial numbers of tourists to remote destinations (Davenport & Davenport, 2006), and its consequent localized pollution pulses on port cities that may often lack adequate infrastructure to cope with a high density of people, pollution, etc. Overcrowding caused by this behavior can inconvenience and annoy local residents, causing the locals to alter their daily behavior to avoid the central business district while cruise ships are in port (Loper, 2005). Also, local residents from port cities have complained about deriving little economic benefits but feeling a loss of quality of life on the other (London, 2005). Thus, socio-economic benefits vs. the cost of impacts need to be weighted in the formula, besides considering only the economic revenues, when strategies for expanding the tourism industry are considered by local governments.

Cruise ships operations also generate significant environmental pollution. This results in direct discharges to the marine environment, including sewage, gray waters, hazardous wastes, oily bilge water, ballast water, and solid waste (Brida & Zapata-Aguirre, 2008). Cruise ships often dump this waste, legally or illegally, into international waters, which are carried by currents throughout the Caribbean and Antilles. They also emit air pollutants to the air and water. The environmental costs of the sector are incalculable given that the cruise ship industry is unregulated and impacts are difficult to gauge. Even small-scale incidents such as propeller wash (i.e., Cozumel Island, México, 2005) and anchoring can produce substantial physical damage on coral reefs habitats (Dinsdale & Harriott, 2004; Rogers & Garrison, 2001). This represents an extremely high environmental and socio-economic cost for an operation which is still too far from sustainable. Further, local governments in many small island nations have recently invested large amounts of money in high quality infrastructures to attend the new lines of colossal ships and thousands passengers arrivals but without any assurance that the benefits of attracting cruises to a tourism destination are higher than the costs (Brida & Zapata-Aguirre, 2008). Therefore, the rapidly growing cruise tourism industry is actually forcing local governments from poor small nations to invest money on building new infrastructure to prevent large cruise lines from abandoning the destination.

## **5. The tourism trade-off in small tropical islands under climate change**

### **5.1 The globalized tourism industry: Is the enemy within?**

Tourism has irrevocably altered tropical islands in many ways. It is impossible to keep an island completely untouched, but in many cases the coastal tourism and urban development industries have done irreparable harm to fragile natural resources, which often have long-term socio-economic consequences and alter the livelihood of local communities (Diedrich, 2006). Globalized large-scale tourism operations (i.e., cruise ships, hotels, shore-based excursions) affect tropical islands culturally, economically, and environmentally. It may

often treat local cultures as spectacles for visitors. Ethnic groups are often viewed as a major “exotic” asset in attracting visitors (Pleumarom, 1995). That type of exploitation often generates more revenue to the tourism companies than to local communities (Diedrich, 2006, 2010), and according to McDaniel (2008), “tourism development can become the worst enemy of tourism development: The concept of tourism development being hijacked by for-profit developers without any interest in the conservation of natural resources, in sustainable practices or in fostering community development and integration into the tourism development model”. Under such globalized increasing economic pressure, local island governments often feel charged with promoting and further developing their island's tourism industry and infrastructure because of massive tourism's dominance in the economies.

Coastal habitat destruction for the construction of tourism facilities and urban development, dredging, filling, shoreline modification (i.e., beach renourishment, artificial beach and breakwater construction), urban pollution (i.e., stormwaters, sewage, oil), heavy boating, recreational misuse, and overfishing can cause irrevocable damage to the delicate ecosystems of the islands and always contribute to permanent water quality degradation, which in turn cause a aesthetical value decline of local coastal resources for tourism (Goenaga, 1991; Hernández-Delgado, 2005; Hernández-Delgado & Sandoz, 2011). Tourism can harm wildlife endemic to the islands via the indirect introduction of alien invasive species throughout habitat fragmentation, deforestation, and other forms of alterations of native flora and fauna. Alien species can threaten endemic species by competing for habitat space, disrupting the community trophic chain, or introducing foreign disease. Also, tourism pressure can result in significant land degradation. Important land resources include minerals, fossil fuels, fertile soil, forests, wetlands and wildlife. Increased construction of tourism and recreational facilities, as well as residential projects, has increased the pressure on these resources and on scenic landscapes. Direct impact on natural resources, both renewable and nonrenewable, in the provision of tourist facilities can be caused by the use of land for accommodation and other infrastructure provision, and the use of building materials. Forests often suffer negative impacts of tourism due to deforestation caused by fuel wood collection and land clearing for construction of infrastructure. More recently, off-road vehicles have become extremely popular during the recent decade in PR, resulting in localized increases in habitat fragmentation, increased erosion of steep slopes, sedimentation of watersheds, filling of critical habitats for riverine fauna, and oil pollution of nearly pristine rivers. Even the PRDNER approved in December 2011 a private concession to operate off-road “eco-vehicles” to an unexperienced company within the Guánica State Forest, which was also designated in 1982 as a Biosphere Reserve by UNESCO. Permit was issued without public hearings and without environmental impact assessments. But strong opposition by adjacent communities, environmental organizations and academics stopped the proposal in January 2012.

Construction of coastal tourism and urban infrastructure in small islands can also exacerbate problems of space, resource availability, and coastal access for local residents to live on, and as well as taking away from the natural beauty of the island itself. The millions of tourists and travelers annually consume local resources such as energy, water and food, which have a significant impact on the local environment and ecosystems. Tourists consume exorbitant amounts of water, electricity, seafood, as well as many imported goods. Under very high consumption rates it may cause shortages and price fluctuations in many resources on small

islands. Most islands with excessive water consumption often lack significant surface or underground sources of water to meet local pulse demands. Many large tourist resorts can potentially use on average five to ten times more water than residential areas in the Caribbean, and though many have resorted to expensive reverse osmosis to desalinate seawater, many local governments, such as in PR, have given high priority and supply water to tourism facilities and adjacent wealthy residential areas instead of securing a permanent water supply to local traditionally underserved communities. The tourism industry generally overuses water resources for hotels, swimming pools, golf courses and personal use of water by tourists. This can result in water shortages and degradation of water supplies, as well as generating a greater volume of wastewater, particularly, where water-consuming facilities have been established (i.e., golf courses). Golf course maintenance can deplete fresh water resources (Warnken et al., 2001). In recent years golf tourism has increased in popularity and the number of golf courses has grown rapidly, including PR, where there are already 20 golf courses. From these, 50% are located on the northern coast, 25% in the east, 10% in the west and south, respectively, and 5% in the central area. The largest concentration of golf courses is located in the coastal municipality of Dorado, with 5, followed by Río Grande with 4, Humacao with 3, and Fajardo with 2. In addition, at least 4 golf courses have been proposed for the NEC area in Luquillo. If approved, it will result in having a total of 10 golf courses in a 20 km stretch of coastline in northeastern PR. Golf courses require an enormous amount of water every day and, as with other causes of excessive extraction of water, this can result in water scarcity, as well as in significant impacts on adjacent wetlands, mangroves, rivers and coastal waters associated to habitat destruction, water diversification and the use of pesticides and fertilizers (McLean, 1993; Pleumarom, 1992). If the water comes from wells, overpumping can cause saline intrusion into groundwater. Golf resorts are also more and more often situated in or near protected areas or areas where resources are limited, exacerbating their impacts. Snow (1993) estimated that golf courses in humid areas across eastern U.S. may use between 10 and 20 MGY of water to maintain, while those across the arid southwest may require up to 500 MGY, amounts substantially larger than any regular community.

Tourist facilities, as well as large-scale urban development along coastal areas also increase pollution levels. Though many resorts have significantly improved their sewage treatment facilities, often using reclaimed water for irrigation purposes, there are still many areas where sewage is being emptied on adjacent beaches creating a significant threat to swimmers and to adjacent ecosystems from high fecal pollution (Kocasoy, 1995; Bonkosky et al., 2009). Also, ballast water from cruise ships can become a source of microbial contaminants. Many islands still lack adequate sewage treatment facilities, landfills, functional waste recycling programs, efficient sources of energy production or adequate massive transportation infrastructure. Therefore, waste minimization, improved energy efficiency, conservation and management of natural resources, including freshwater resources, wastewater management, hazardous substances transport, land-use planning and integrated coastal and tourism development management (with the integrated participation of local communities in planning and decision-making processes), design for sustainability, and partnerships for sustainable development are critical elements that are still largely lacking in the tourism industry across many small islands, including PR. Failing to recognize these elements will perpetuate the “enemy within” syndrome in the tourism industry.

## 5.2 Can sustainability be reached in a non-participatory globalized model?

The usual rapid economic revenue of non-sustainable, massive tourism activities is often one of the preferred tools for poverty reduction in developing countries, including many small island nations. But massive tourism often involves a chain of socio-cultural, economic, logistic and environmental problems. When nations consider tourism development, the potential for negative consequences is often overshadowed by the lure of economic benefits (Diedrich, 2006). When tourism development gets out of control, negative impacts are most likely to occur. In spite of the substantial economic benefits of the tourism industry, it can have three main types of effects, according to Gormsen (1997): (1) the development of seaside tourism including the changes of socio-economic and settlement patterns; (2) its cultural impact on the local population; and (3) its environmental aspects. Massive tourism may result detrimental on local water supplies, sensitive coastal landscapes, and socio-cultural identity. In many cases, tourism has often had significant permanent negative environmental impacts on nearly pristine natural environments, particularly when construction and operation impacts where dismissed by regulatory government officials as non-significant (Equation, 2009). Burak et al. (2004) have documented negative impacts of rapid tourism expansion in coastal habitats that include loss of aesthetic value, rapid population densification, increased construction of multistory buildings adjacent to coastal areas, pollution, and the permanent loss of adjacent fertile agricultural lands. Sewage pollution has been a concern regarding long-term degradation of coral reefs (Hernández-Delgado et al., 2010, 2011; Pastorok & Bilyard, 1985), and regarding risks to recreational users (Bonkosky et al., 2009; Kocasoy, 1989). The construction of coastal resorts and roads, marinas, jetties and other infrastructure often result in significant coastal habitat fragmentation and reduced biodiversity (M'Rabet et al., 2009). There is also increased literature documenting adverse impacts from infilling, sedimentation and over-fishing for marine curios (Hawkins & Roberts, 1994), intertidal trampling on shallow-water coastal habitats (Davenport & Davenport, 2006; Hawkins & Roberts, 1993), and from snorkeling and SCUBA diving on coral reefs (Davenport & Davenport, 2006; Harriott et al., 1997; Hawkins & Roberts, 1992; Hawkins et al., 1999). Davenport and Davenport (2006) also documented the negative impacts of recurrent mechanical beach 'cleaning' (i.e., removal of natural strandlines as well as litter) that is practiced throughout the world's sandy beach resorts, a practice which is also carried out across many known turtle nestling beaches adjacent to hotels and urban zones in PR (Hernández-Delgado, pers. obs.). Further, under extremely high exploitation by massive tourism at some sites, these authors also documented negative impacts from relatively innocuous activities such as swimming, surfing, sailboarding, dinghy sailing and 'extreme sports' (e.g., 'coasteering', kitesurfing), which are marketed for its environmentally-friendly nature, yet causes measurable deterioration in many shallow coral reef ecosystems despite good management practices.

In many instances, tourism can also result in socio-cultural and economic impacts which may involve the physical displacement of traditionally underserved small communities, shifting livelihoods and population increases from immigration or, less tangible in the form of changes in morals and traditions, and local increases in crime (Diedrich, 2006) and prostitution (Cabezas, 2009; Padilla, 2007). In some particular places, dramatic social impacts have included child exploitation (Equation, 2009). According to Bruyere et al. (2009), many communities perceive that local base communities receive the least benefits from tourism revenues, and that there is also a lack of representation of local communities in the tourism

sector employment. There are also substantial issues of carrying capacity and ecological sensitivity which need to be also kept in mind if tourism is going to become sustainable (Equations, 2009). Most often decisions regarding setting up a tourism strategy, selecting sites for projects, or establishing a carrying capacity or a limit of acceptable change for some tourism activities are often driven by a purely economic decision by private interests, instead of being based on empiric scientific-based and participatory processes. Even worst, planning and decision-making often lack a community-based participatory process. Community-based participation should be fundamental to integrate local stakeholder's vision, interests, perceptions, fears, livelihood, cultural, religious and heritage values in the tourism strategies decision-making processes. Community participation and integration with local government in the planning and decision-making processes has been shown to be paramount to foster compliance and to advance conservation and management of marine protected areas (Appeldoorn & Lindeman, 2003; McConney & Pomeroy, 2003). Perceptions of environmental resources determine not only how a resource is utilized and managed, but also its relative value to the community (Pollnac & Crawford, 2000). The value that a community places on natural resources can have significant implications on how those resources are used and managed. For projects that seek to use coastal resources (i.e., hotels, private marinas, pier development, etc.) it is important to primarily understand which resources a community places values on and which they do not. But local resident perceptions of factors influencing the status of coastal resources are rarely taken into consideration by the tourism industry prior to the construction of any project, particularly in small island scenarios. Cinner & Pollnac (2004) showed that wealthier residents have demonstrated a better understanding of the indirect activities that affect coastal resources while poorer residents were more concerned with meeting basic needs and, thus, may not be able to be concerned with aspects of conservation. Tourism can alter the way local residents or even the government value and use marine ecosystems. According to Diedrich (2006), before tourists discovered Belize, many coastal communities were primarily dependent on fishing and farming for survival. Nowadays, many of these are becoming increasingly dependent on tourism. Local communities subjected to massive tourism have shifted their historical perspectives and values of coral reefs from subsistence to rapid economic revenue from tourism. But there are increasing concerns regarding the impacts of tourism fishing in many areas (Gartside, 2001), as well as regarding the impacts of tourism in free-ranging marine wildlife, including cetaceans, dolphins, turtles, sharks, rays, etc. (Birtles et al., 2001). In addition, there is frequent political sensitivity and security issues linked to many tourism development activities. In many instances, decisions regarding the approval of tourism projects might be more linked to political influences and politically-driven decisions instead of sound tourism development strategies implemented through participatory processes. The lack of clear local-based tourism strategies and lack of data and data-based analysis (economic, tourist profile and arrivals, employment and revenues based data) on which such plans and recommendations are made may usually lead to wrong decisions (Equations, 1999) when only globalized approaches are followed.

### **5.3 Current trends and impacts of climate change in Caribbean tropical islands**

Climate change has become a major concern to humankind, particularly for small island nations. According to the Intergovernmental Panel on Climate Change (IPCC, 2007), due to the weaknesses of islands (geographical isolation, reduced territory and limited natural



resources) these territories are extremely vulnerable to changes and variations in climate, especially precipitation and sea level rise. Although a significant number of island nations across the Caribbean have made substantial advances in terms of adaptive planning strategies to face problems associated to climate change, PR is still way behind on that regards with a government administration that is still in some kind of denial stage of potential threats that the island might face in the near future. The most likely impacts of climate change across the Caribbean may largely affect the coastal tourism and residential construction industries, and may include: (1) increased beach erosion rates and coastal property loss; (2) saline intrusion into coastal aquifers; (3) increased frequency of extreme weather events (i.e., droughts, flash floods and landslides); (4) altered freshwater availability; (5) recurrent massive coral bleaching events and mass coral mortalities similar to those witnessed during 2005 (Hernández-Pacheco et al., 2011; Miller et al. 2006, 2009); (6) less productive agricultural systems and fisheries; (7) changes to biological systems/reduction in biodiversity as it has been already modeled to occur at least for Caribbean coral reefs (Hoegh-Guldberg, 1999); (8) irreversible damage to coastal amenities and infrastructure; (9) reduction in long-haul passengers due to ethical concerns associated to carbon footprint, regulatory taxes, etc.; (10) changes in preferences of the tourism market; (11) declining aesthetical value of coastal areas as a result of coastal erosion and water quality decline; (12) increased costs of mitigating sea level rise for beachfront properties; (13) increased vulnerability of beachfront properties and public infrastructure to hurricanes; and (14) increased cost of insurance for beachfront properties, a trend that has already occurred in the U.S. (Mills, 2005).

Climate variability particularly affects rainfall patterns (González-Hidalgo et al. 2002; Peterson et al. 2002) and is an important feature for water resources in the tropics. In the actual debate about climate change, water has become more prominent at the regional and global scale. At the present time, water heads most global political and scientific debates that usually tackle the conflicts about this resource (water geopolitics), its management (man as a hyper-consumer, and the right to have access to water), and water pollution (human activities that may put this resource at risk). Climate change may cause significant fluctuations in the distribution of wind and humidity patterns that may also influence known diurnal rainfall patterns across islands (Roy & Balling, 2005), therefore, producing long-term changes in surface and groundwater availability for local communities as well as for tourist facilities. Méndez-Lázaro (2010) analyzed rainfall trends in PR in the context of climate change, and its relationship with regional and global climate variation in recent decades (1955-2007). The analysis indicated that the precipitation of the island does not show a unique spatio-temporal pattern. However, a slight increase was detected in the southern region, while a decrease was observed in the western region. Overall, regressive tendencies in the wet summer months and increases in the historically drier winter months were more commonly observed. These observations are consistent with those of Neelin et al. (2006) and of Sanderson et al. (2011) which using climate modeling approaches showed that there will be a significant decline in total rainfall across the wider Caribbean.

We have also to pay attention to the different phenomena that control climate at the wider Caribbean regional scale. Large-scale atmospheric events such as the North Atlantic Oscillation (NAO), *El Niño* Southern Oscillation (ENSO), and *La Niña* can have paramount influences in the precipitation patterns on regional and sub-regional scales, which may make difficult the interpretations of climate variability across the Caribbean and South

America (Giannini et al. 2000; Liang, 2004; Ropelewski & Halpert, 1987). Giannini et al. (2000) found that declining sea surface atmospheric pressure in the North Atlantic result in increasing rainfall patterns across the Caribbean by affecting wind patterns across the region, and also indirectly affecting sea surface temperature (SST). This can result in doldrum oceanographic conditions (low winds, slower currents, increased SST) that may further result in significant coral bleaching events and coral mortality events (Eakin et al., 2010; Hernández-Pacheco et al., 2011; Miller et al., 2006, 2009). Giannini et al. (2000) also demonstrated that high pressure positive anomalies across the North Atlantic can cause stronger trade winds, which make the SST get fresher, and produce less rainfall in the Caribbean. However, as soon as the atmospheric conditions are getting back to normal, there is an increase in convection and, at the beginning of the rainy season, precipitation events are getting stronger, especially across the Greater Antilles. Flooding has become more likely during May and June of the first year of the warm-phase, whereas excessive rainfall was also observed in Cuba during the last winter (January-March) of the first year of the ENSO (Giannini et al. 2000). In Costa Rica, the intensification of the Caribbean Trade Winds registered during the summer of the ENSO, as well as the topography, are fundamental factors that increase the precipitation in the Caribbean coast, reducing simultaneously in the Pacific coast (Giannini et al. 2000). Similar to the results and patterns found in PR according to Centella et al. (1999), the annual precipitation in Cuba did not show significant changes in a long period of time, though a slight change was noted in both islands in the precipitation annual behavior, presenting an increase in the winter months and a decrease in the summer months. On the contrary, an important increase of the winter precipitation was registered, and a slight decrease was noted in the summer precipitation. There is also some evidence suggesting that climate change may result in an increased frequency and/or intensity across the Atlantic, particularly following the current increasing SST trends (Mann & Emanuel, 2006; Shapiro & Goldenberg, 1998). There has been an increasing trend in hurricane frequency since 1995 (Nyberg et al., 2007). The combination of strong hurricanes, high SST, and massive coral bleaching has been shown to be detrimental for coral reefs across the Caribbean (Gardner et al., 2005; Wilkinson & Souter, 2008) and given current climate change projections, these combined factors might be detrimental for the Caribbean coastal and marine biodiversity as well (Cambers et al., 2008). Losing coral reefs due to increased environmental degradation, in combination with recurrent massive coral bleaching and mass mortality events may represent losing its tourism and aesthetic value, its food production sustainability, its role as a buffer against greenhouse gas emissions, as a source of natural products with pharmacological value, as well as its role as a natural buffer against wave action and coastal erosion, particularly under current sea level rise trends (Veron et al., 2009). This would imply an increasingly negative economic impact to the tourism industry as there would be an increasing need to establish physical protective measures against coastal erosion (i.e., breakwaters) and to renourish eroding beaches adjacent to hotels. There will also be an increased risk of coastal flooding during hurricanes, which would in turn increase insurance expenses for beachfront properties (Mills, 2005).

## **6. A sustainable alternative model of tourism development for tropical islands**

Tourism and urban development across coastal areas in PR have followed a non-sustainable model that have caused irreversible negative impacts on a variety of natural resources, and

have largely degraded coastal habitats, and caused often unaccounted socio-economic impacts, including the loss of traditional underserved community livelihoods. Experiences throughout the world show that poorly planned and managed tourism that fails to support its environment base will eventually be economically unsustainable. With the potential for self-destruction, achieving a more sustainable tourism option is the most important issue facing tourism (Whitmore & De Lacy, 2004). Also, if tourism is to sustain itself in the coming years, its best bet would be to address climate change through responsible tourism, encompassing all economic, social and environmental aspects. Pleumarom (1995) suggested that responsible tourism is holistic and it requires commitment to economic, social and environmental principles that reflect the following: (1) a commitment to foster local employment and sourcing (this would help reducing revenue leakage from the community); (2) respect for local cultures and support for community-based development (view local culture as an integrated attraction for visitors and not as a marketing product); (3) protection of natural resources (prevent sacrificing natural resources at the expense of tourism exploitation and urban construction); (4) efficient use of resources (establish limits of acceptable change); (5) responsible waste management (minimize waste production through prevention, reuse and recycling programs); and (6) a commitment to continued improvement (foster base-community integration and participation). Considering the combination of long-term cumulative impacts along coastal areas and the threats associated to current climate change trends, there is an imperative need to foster the establishment of an alternative sustainable development model. But according to Hall (2001), sustainable development of coastal tourism, as well as urban development, should be dependent on: (1) good coastal management practices (particularly regarding proper siting of tourism and urban infrastructure, and the provision of public access); (2) clean water and air, and healthy coastal ecosystems; (3) maintaining a safe and secure recreational environment through the management of coastal hazards (such as erosion, storms, floods), and the provision of adequate levels of safety for boaters, swimmers, and other water users; (4) beach restoration efforts that maintain the recreational and amenity values of beaches; and (5) sound policies for wildlife and habitat protection.

Increasing evidence shows that an integrated approach to tourism and urban planning and management should be necessary to achieve sustainable tourism. It is only recently that there has been a growing recognition of the importance of combining the needs of traditional urban management (transportation, land use planning, economic development, etc.) with the need to plan for tourism. Any sustainable approach for development must involve six integrated elements: (1) economic efficiency (tourism and urban construction should be viable, viability of enterprises, satisfaction of demand for product and services); (2) social equity (benefits for local communities, increased local employment, improved life quality, improved local revenue, public participation, respect socio-cultural values, quality employment for the community, establish linkages between local businesses and tourism); (3) environmental conservation (biodiversity conservation and/or preservation, rational use of natural resources, natural resource conservation from an inter-generational perspective); (4) meaningful community-based participation (planning and decision-making processes should be completely participatory in order to be democratic, improved community-based participation on business, co-management of protected areas, stronger community presence and control in tourism/urban development and decision-making rather than having decisions

being imposed by external forces); (5) stand by accepted international standards (tourism and urban construction should follow accepted international practices, such as setting setbacks of at least 200 meters from the shoreline to buffer for increasing sea level rise due to climate change; guidelines for tourism and urban development, tourism operations, environmental impact assessment, monitoring of cumulative impacts, and establishing limits to acceptable change should be uniformed); and (6) deal cautiously with risk and uncertainty (in situations where environmental impacts of activities are not known, the preferred option should be to proceed cautiously or not at all, until the likely impacts can be determined and minimized).

Diedrich (2006) made also important recommendations to foster the development of alternative approaches on the tourism industry, where many of them also apply to the urban construction industry. Many of these are very pertinent to PR and include: (1) continue to encourage and facilitate local entrepreneurship and small business development (sustainable tourism can only be achieved in healthy, prospering communities); (2) continue to involve local communities in all stages of tourism planning and development (local resentment towards tourism, which may result from not being involved in the development process can have a negative effect on the experience of the tourist and decrease the competitiveness of the tourism market); (3) increase public infrastructure and pollution mitigation capacity in communities to accommodate growth in tourism and associated coastal development (it is essential that increases in tourism and urban development be accompanied by a growth in amenities and infrastructure necessary to accommodate the additional tourists/residents and the associated waste); (4) establish initiatives to improve environmental standards and develop Best Practices for hotels, tour operators, and land developers (take the appropriate measures to reduce ecological footprint of projects); (5) implement stronger regulations for the sailboat charter industry relating to environmental conduct (minimize recreational impacts on coral reefs and other related habitats); (6) embrace cruise tourism as a real and significant component of the tourism market that, if properly managed, should provide more revenue to local businesses and communities (it is important to take action now to ensure that this type of tourism has minimal negative impacts and generates maximum benefits to PR by minimizing revenue leakage and protecting local businesses); (7) continue to develop and improve conservation and education programs at local and national levels, particularly in relation to Natural Protected Areas (conservation, education and alternative livelihood programs are important for the continued success of sustainable ecotourism); and (8) establish and enforce limits of acceptable change in all Natural Protected Areas (these are important tourism attractions so their effectiveness is not only crucial to preserving their natural resources, but to PR's success as a tourism destination).

We also strongly suggest to recognize that PR is in a critical stage of coastal and urban development where actions today will govern the future of the country as a tourism destination (tourism and urban development has been envisioned as one of the principal solutions to the actual economic crisis, but the proposed model is still far from sustainable; actions being planned and implemented may have a very high cost unless a more sustainable approach is considered). Further, there is still a nearly complete lack of basic scientific research of impacts of the tourism and urban construction industry in PR (most of the information available can be found on contracted environmental impact documents paid by the industry itself, where most of the documents find no significant impacts of projects; there is no evidence of long-term monitoring of impacts; PR should take advantage of its

strong academic institutions and research institutes to foster the development of sound scientific research of long-term impacts). Finally, climate change impacts must be integrated into all viability analysis of any future coastal tourism and urban development project (there is a strong need to address what would be the long-term impacts of climate change for coastal areas, as well as to develop and implement a national climate change adaptation plan).

## **7. Conclusions**

Coastal tourism and urban development in PR have become a paramount motor of the island's economy. Most of this development during the last two decades has largely relied on a variety of changes in local environmental, planning and zoning regulations which have reduced the burden of permitting processes to developers, but that have also resulted in a dramatic increase in construction in ecologically-sensitive areas, in significantly reduced community participation, and in the creation of a false sense that only through enhanced construction on ecologically-sensitive sites PR will only remain as a competitive tourism destiny. There are significant case studies of how much have inadequately planned tourism and urban construction impacted local coastal communities in PR. In spite of that, the long-term environmental impacts of most tourism and urban construction projects on coastal habitats have still remained largely undocumented. Current construction trends are still following a completely non-sustainable approach, without meaningful community-based participation and integration, and without meaningful revenue retribution to local communities. Further, climate change has already had recent dramatic and irreversible impacts on local coral reefs, and in beachfront property loss due to beach erosion as a result of increased sea level rise. Therefore, it is critical to consider a precautionary alternative approach for future coastal tourism and urban development on the island. We demand the state government of PR enforce their regulatory role by considering the negative and destructive impacts of coastal tourism and urban construction on the environment and local communities. Further, we strongly encourage the government to incorporate local communities in tourism policies and land use planning frameworks, as well as in the implementation of long-term monitoring of coastal tourism and urban construction impacts.

There is also a need to set up mechanisms to establish ecological and social carrying capacity, or limits of acceptable change on different locations. We strongly encourage the formulation of policies geared to conserving the natural environment rather than opening them up for relentless exploitation by development tourism or urban construction activities. We strongly recommend the government of PR a moratorium in further fostering non-sustainable coastal construction until an environmentally- and socio-economically sustainable strategy is implemented. All recently approved permits, as well as permit applications still under consideration, should be reanalyzed under more strict parameters to ensure sustainability, as well as meaningful community-based participation. We also demand the immediate adoption of adaptation policies to climate change impacts, particularly of initiatives and measures to reduce the vulnerability of coastal natural and human systems against actual or expected climate change effects. There is still an opportunity to ensure that today's investment in coastal tourism and urban development will not compromise the availability and quality of resources for future generations. Further, there is still a chance to use a precautionary approach in our investment in coastal development to minimize the risk and vulnerability against climate change-related impacts.

But the costs of our errors now will certainly be prohibitive for future generations to mitigate, and it would only be a matter of common sense and political will of present generations to prevent such a risk. After all, the long-term cumulative impact of our wrong decisions would probably result in affecting the tourism value of the island and that would be a very high price for future generations that will also have to cope with increasing pressure from climate change.

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# Nautical Tourism and Its Function in the Economic Development of Europe

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## 1. Introduction

Tourism as an industry, and nautical tourism as an integral part of it, is an important sector whose indirect effects are more important than the direct, thus supporting the development of many other industries. Within the last 30 years, the three core industries of nautical tourism (the marina, charter and cruise industries) have been continuously showing high growth rates. In this time of crisis, with its lack of inventiveness and investment, nautical tourism and its sectors become a new opportunity for development. Its growth can be clearly seen at local and regional levels, and its constituent parts are becoming potential local economic leaders. This research focuses on the three core segments of nautical tourism (the marina, charter and cruise industries) which have not been sufficiently studied either theoretically or economically.

The aim of this paper is to demystify these three industries of nautical tourism, to indicate the potential for development, especially in Europe, and to contribute both to the scientific and practical economic thinking on this topic. The goal is to suggest to investors the real and unused potential for development, and the fact that investment in the industry of nautical tourism is highly profitable.

Methodologically, decades of research, experience in the economic sector and the analysis and synthesis of research serve as a foundation for this work. An additional groundwork for the conclusions presented in this paper is research into current trends in all aspects of nautical tourism.

The basic hypothesis is the following: there is no doubt that all three industries of nautical tourism are highly profitable, especially the marina and cruise industries. The best evidence for this claim is provided by an economic analysis of the current situation, though there is still a lack of scientific study regarding this hypothesis.

This paper consists of two main parts. The first relates to the theoretical study, definition and positioning of nautical tourism in the European economies and markets. The second part covers specific and practical explanations and analysis.

## 2. Concept and definition of nautical tourism

**Nautical tourism** as a phenomenon is an aspect of tourism in general, from which it has developed as a subtype. The question of defining nautical tourism should thus be considered

in the context of a general definition of tourism. Etymologically, *nautical tourism* is a combination of two notions, *nautical* and *tourism*. The concept of tourism is known and sufficiently studied in many papers<sup>1</sup>, so there is no need for further analysis. The second term *nautical* developed from the Greek word *naus*, meaning ship, boat or seamanship. In modern terms, *navigation* is a set of practical and theoretical knowledge and skills necessary for a boat skipper to sail safely and successfully from the port of departure to the port of arrival. The term *navigation*, together with the associated term *maritime*, in its broader sense, signifies seafaring. That is the reason why the term *maritime tourism*, and other concepts denoting nautical tourism, such as the English *yachting tourism* or German *nautische Tourismus*, are used in international communication. Apart from these, the term *maritime tourism* has recently become more common, thus stressing the maritime component of nautical tourism. The focus of *yachting tourism* is on the yacht as a symbol of luxury at sea which is perhaps more concerned with symbols of status than an interest in seafaring. This contributes to a clearer definition of the term nautical tourism, which is actually more a part of the tourist, rather than the marine, industry. In practice, especially at universities, nautical tourism is claimed by faculties of both economics and maritime studies, each for their own reasons.

Among various definitions<sup>2</sup> of nautical tourism there are several prescriptive ones. Defining nautical tourism may be a matter of concern in the specific context of national legislation, for example in Croatia, which in its *lex specialis* "Act on the Provision of Tourism Services"<sup>3</sup> defines nautical tourism and explains what activities can be included under that heading. All these definitions have their particular purpose, so should not be neglected but rather understood and built upon.

It is necessary to create a definition that best suits the scientific and practical needs of research and work in the industry of nautical tourism. Taking the definition of tourism given by the Swiss W.Hunziker and K.Karpf as a starting point, and by using the specifics of nautical tourism practice, it is possible to offer the following definition:

*"Nautical tourism is a sum of poly-functional activities and relations that are caused by the tourists-boaters' stay within or out of the ports of nautical tourism, and by the use of vessels or other objects related to the nautical and tourist activities, for the purpose of recreation, sports, entertainment or other needs".<sup>4</sup>*

This definition has elements of a *real*, *conceptual* and *nominal* definition, since it clarifies the essence of things, determines the content, and explains the meaning.

Why is this definition acceptable given the circumstances in which nautical tourism occurs?

1. In order to apply the *criteria of comprehensiveness* as much as possible, we avoided the trap of a detailed analysis of nautical and tourist activities. Various analyses<sup>5</sup> have

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<sup>1</sup> Kunziker, W. i Karpf, K. "Die Grundriss der Allgemeine Fremdenverkehrslehre", 1942. Definition is accepted by AIEST and WTO

<sup>2</sup> Luković, T. & Gržetić, Z. "Nautičko turističko tržište u teoriji i praksi Hrvatske i europskog dijela Mediterana", HHI – Croatian Hydrographic Institute Split, Split 2007, page 19-28.

<sup>3</sup> National "Law on The Provision of Tourism Services" 68/2007, article 44

<sup>4</sup> Luković, T. & Gržetić, Z. "Nautičko turističko tržište u teoriji i praksi Hrvatske i europskog dijela Mediterana", HHI – Croatian Hydrographic Institute Split, Split 2007, page 26.

<sup>5</sup> For example TOMAS NAUTIKA 2007., research for one part of the Mediterranean (Croatian coast of the Adriatic), which is conducted by the Institute for Tourism in Zagreb every three years.



shown that *navigation* is not a specific requirement for nautical tourism. Some tourists, for example, may take a charter boat but remain on board without leaving port. Moreover, cruising as a global business and a aspect of nautical tourism is included in this definition, avoiding a restriction to ports only, but introducing vessels as a means in this segment of tourism. Therefore, the word *navigation* is replaced by *use*, which is more comprehensive and thus more suitable.

2. Boaters do not in general limit themselves to marinas. It should be taken into account that many prefer to anchor in bays, or use ungoverned or private moorings, preferring to retain some independence from commercial facilities. Hence the inclusion of the phrase "*or out of the ports...*". The growth of nautical tourism and the range of activities it involves carry the risk of saturation of coastal regions, and it is important to recognise the values of sustainable development if these areas and their attractions are to be preserved.
3. Apart from the essential term "*vessel*", we inserted "*and other objects associated with nautical tourist activities*" because of the increasing diversification of such activities. Thus, for example, overnight stays while sailing increasingly involve accommodation on a fixed site, which is an integral part of many Mediterranean marinas. Other activities and types of vessels (for example tourist submarines and bathyscaphes) are occasionally available, and they are classified within the field of nautical tourism, as they are associated with marinas in terms of location.
4. In addition to sports, recreation and entertainment, to cover the whole range of recognised interests we included the term "*and other needs*". This was done because wider motive-based demands are expanding on a daily basis and it is a part of the growing, strategic management of marinas which offers the highest level of quality in nautical tourism.

Basically, this definition incorporates all the elements that are generally included in the concept of nautical tourism. Other authors have noted many specific features, but this new definition is closer to the objective phenomena that can be observed across the whole range of nautical tourism activities. However, it should be noted that tourism and nautical tourism are *derived concepts* that represent a range of activities susceptible to change. That is why we say that nautical tourism is a multidisciplinary activity that cannot be unequivocally specified.

In the interests of simplicity and for practical daily usage of the term, we propose a shorter version of the definition: **Nautical tourism is a poly-functional tourist activity with a strong maritime component.**<sup>6</sup>

This simple and practical definition emphasises the main characteristics of nautical tourism that places it in the tourist industry, but involving some measure of seafaring skill and knowledge.

### 3. Classification of nautical tourism

Considering the above mentioned basic definition of nautical tourism, which states that **nautical tourism is a poly-functional tourist activity with a strong maritime component**,

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<sup>6</sup> From reviewed lectures "Nautički turizam" held in 2006 by professor Luković, PhD at the Department for economy and business, University of Dubrovnik

its classification should be observed from the scientific and practical aspect. Such a form of analysis and classification is widely used, and all important studies, such as in Germany<sup>7</sup> and England<sup>8</sup>, have applied it. Since this study is linked to such wider research we suggest that the most appropriate classification of nautical tourism would be as follows:

NAUTICAL TOURISM INDUSTRY					
SECONDARY	MAIN ACTIVITIES				ADDITIONAL
<ul style="list-style-type: none"> <li>• Diving</li> <li>• Surfing</li> <li>• Rafting</li> <li>• Diving-bells</li> <li>• Rowing</li> <li>• Fishing</li> <li>• Adventurous tourism</li> <li>• “Robinson” tourism</li> <li>• Lighthouse tourism</li> <li>• Etc.</li> </ul>	Harbours for nautical tourism	Charter	Cruising		
	<ul style="list-style-type: none"> <li>• Berths</li> <li>• Moorings</li> <li>• Dry marinas</li> <li>• Marinas:               <ol style="list-style-type: none"> <li>1. Category</li> <li>5. Category</li> <li>6. Category</li> <li>7. Category</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>• Motor yachts</li> <li>• With skipper</li> <li>• Bare boat</li> <li>• Sailing yachts</li> <li>• With skipper</li> <li>• Bare boat</li> </ul>	Cruisers: <ul style="list-style-type: none"> <li>• Large world cruisers</li> <li>• Local cruisers</li> <li>• (traditional): One-day cruising</li> <li>• Several-days cruising</li> </ul>	Cruiser harbours: <ol style="list-style-type: none"> <li>a. Large cruiser harbours: Specialized ports, members of „Med-Cruise“</li> <li>b. Non-specialized ports</li> <li>c. Ports for local traditional craft:               <ul style="list-style-type: none"> <li>- Coastal ports used by small settlements</li> <li>- Island ports</li> </ul> </li> </ol>	Shipbuilding of mega-yachts Shipbuilding of small sailing vessels Production of equipment for nautical tourism Skipper services Information services Sailing schools Research institutes and educational centres Other services
	SUBJECT OF THE STUDY				

Source: the author T. Luković

Table 1. Classification of nautical tourism

<sup>7</sup> See: Bonn Institute study – dwif/BTE 2002., see: Luković, T. & Gržetić, Z. “Nautičko turističko tržište u teoriji i praksi Hrvatske i europskog dijela Mediterana”, HHI – Croatian Hydrographic Institute Split, Split 2007, page 126.

<sup>8</sup> See: Welsh Enterprise Institute University of Glamorgan Business School: “A Study That Applies the VoE Framework to the Marine and Coast Environment of Wales”, 2006, also: Luković, T.: “Sukobljene ili sukladne strategije razvoja europskog nautičkog turizma”, “Pomorstvo” University of Rijeka, Scientific Journal of Maritime Research, Vol.23 No.2., Rijeka, December 2009, page 341-356.

This classification of nautical tourism, which emphasises its three basic types: (1) marinas, (2) charter and (3) cruising, is justified by the specific characteristics and distinguishing features of these industries.

The state recognised commercial ports of nautical tourism, or more popularly **the marina industry**, are an important part of any European economy, regardless of whether a country has access to the sea or not. The attractions of water are a dominant feature in tourism, hence the justification of the German term "Wassertourismus" or water tourism. Nautical tourism can occur in all the waters of the world, so in addition to the sea, it is present on lakes, rivers and canals, i.e. in both salt and fresh water. An analysis of the marina industry is made more difficult by the lack of a unique European system of marina registration. Different sources provide very different data on the number and capacity of marinas, though that need not affect the general conclusions regarding their importance and role in Europe.

The charter industry, as a subtype of nautical tourism, is generally associated with marinas and it would not exist without them. Charter, in terms of renting and providing services related to work on the vessels, expands the range of its activity, in addition to which hiring a professional skipper is quite common. It is estimated that one charter yacht in five includes the hire of a skipper.<sup>9</sup> As far as capital goes, charter is the least developed industry within nautical tourism, while at the same time involving higher uncertainty and risks due to its structure and business methods.

In relation to capital, cruising is the most developed industry, not only in the context of nautical tourism, but compared to all other industries. The cruising industry offers a rich and varied range of potential regarding vessels, including 300 large international cruise ships, an increasing number of small luxury cruisers (up to 200 passengers), and about 10,000 local traditional vessels, or 'old-timers'. Potential offers consist of excursions or trips lasting one or several days. Such cruises include ports that may or may not be specialized for the reception of cruise ships, so the cruise industry deserves particular attention in terms of research and economic analysis. With about 20 million passengers on large cruisers in 2011 and about twice as many on traditional old-timers worldwide, and with a ten-year increase in passengers carried of over 2.5 times<sup>10</sup>, with approximately 150,000 employees working directly in the cruise industry, and twice as many in related industries and with a turnover of 34.1 billion euros in related industries, the cruise industry has a significant role not only in many national economies, but also in the global economy. The European contribution to the global market in 2010 was around 20-30%.<sup>11</sup> The continuity of development which has been consistently increasing during the past 30 years, with average annual growth rates of 11%, indicates that this industry has grown considerably faster than national economy averages, and has become an important industry in the European and global economy.

#### 4. Main features of nautical tourism industries

The main features of the three core industries of nautical tourism, differentiating them from other industries are the following: (1) they are strongly connected with the sea and fresh water

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<sup>9</sup> <http://www.europeancruisecouncil.com>

<sup>10</sup> Passenger Shipping Association: Discover Cruises – Annual cruise review, 2006

<sup>11</sup> European Cruise Council: "The cruise industry, a leader in Europe's economic recovery", "Contribution of Cruise Tourism to the Economies of Europe", Edition 2011, page 3.

activities, and (2) they generally take place under some kind of local concession. In addition to a strong connection with the sea and navigation, the nautical tourism business requires some measure of seafaring skills. The sea and other water bodies are a particular aspect of the destination to which these industries must adapt. Conducting a business under concession has an effect in two ways, depending on whether the concession is (1) direct or (2) indirect. For example, in the marina industry there is a direct concession implemented through a concession contract. In the charter and cruising industries, the concession is indirect or hidden and is implemented through a variety of resources for the maintenance of waterways etc.

In addition to the specific circumstances typical for nautical tourism and its sub-industries, there is a strong element of *seasonality*, which is a characteristic of all types of tourism. This seasonal aspect of the industry demands particular management skills and problem-solving strategies to maintain business continuity. Certainly, the impact of seasonality is not absolutely negative, and although it may show some degree of variation through the sub-industries of nautical tourism, but remains always a key feature of the industry.

The connection between the industry and sub-industries of nautical tourism with the destination can create a complex interdependence and mutual impact; this effect is very variable but can be extremely strong. Seen from a market perspective, the nautical tourism market can be considered in terms of *familiarity or novelty*, and it can be classified into:

- A market that is new for business and for boaters - the new market; today it is largely theoretical, although there are some parts of Europe without developed tourism and they are potential new markets.
- A market that is new to boaters, but although recognised by local businesses circumstances have prevented its commercial development - **an effectively new market** (national parks, military zones in Italy and Croatia which have potential as marinas, but to which until recently entry was not permitted; for example particular political destinations like Brijuni in Croatia).
- A market that was known to boaters, but for various reasons have not been commercially developed - **potentially new markets** (bays without infrastructure, most of the Greek coast without sufficiently developed marina industry).
- A market that is developing and expanding its features, and becoming a part of the market supply of nautical tourism - **developing new market** (suitable Italian, Austrian and German lakes, as well as some Mediterranean tourist markets, like Kaštela and Skradin in Croatia).

Some nautical industries influence the development of a certain site or region depending on the market, i.e. the destination which is their focus. That fact refers to all European markets, but with variations in the type and degree of influence. This topic will be analysed further in the text.

Since the charter and marina industries are closely connected, they will be dealt with as such in this paper. This study does not refer to the characteristics of the supply and demand market because they are already well known<sup>12</sup>, but it will consider some less recognised characteristics of the development of nautical tourism and the economy in general.

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<sup>12</sup> Institute for tourism Zagreb: "Tomas nautika 2007" and "Tomas cruising 2006"

#### 4.1 The marina & charter industries

Marinas are the commercially most important ports of nautical tourism, and their general features are worth exploring. It is hard to give specific data on the size, type and capacities of the marina industry in Europe because there is no professional association that would collect, process, research and unify the data, and encourage the development of the industry. We can nevertheless estimate that Europe has about 4,400<sup>13</sup> salt water marinas, of which more than 1,600<sup>14</sup> are of high quality with 400,00<sup>15</sup> berths that meet the highest standards. If we take into account about 600 fresh water marinas, and those belonging to markets for which there is no data, it is estimated that Europe has over 5,000 marinas with more than 500,000 berths. Estimates of the marina industry capital amount to 60 billion euros, taking everything into account, from the berths themselves<sup>16</sup> to the supporting facilities. If we add charter capital to this, it is clear that this represents a considerable investment on the mega European economic level. These two nautical industries have been insufficiently investigated, and they stand on their own in terms of development, so the need for further research relevant to their development is evident.

Marinas can be classified according to<sup>17</sup>:

- a. The level of equipment:
  - standard, with basic conveniences,
  - luxury, with high level of conveniences,
  - recreational, with the possibility of using additional sport, recreational and entertainment facilities
- b. Types of construction
  - American type
  - Atlantic type
  - Mediterranean type
- c. Position of maritime zone
  - open
  - semi-enclosed
  - enclosed
- d. Marina ownership
  - private
  - municipal
  - public
- e. Location
  - sea
  - lake
  - river
  - canal

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<sup>13</sup> [www.portbooker.org](http://www.portbooker.org)

<sup>14</sup> ADAC: "Marinaführer, Deutschland, Europa", 2010

<sup>15</sup> ADAC: "Marinaführer, Deutschland, Europa", 2010

<sup>16</sup> The value of an unfinished investment per berth is about 20,000 euros, but there are additional investments worth five to seven times more than the berth itself.

<sup>17</sup> See: Luković, T. & Gržetić, Z. "Nautičko turističko tržište u teoriji i praksi Hrvatske i europskog dijela Mediterana", HHI – Croatian Hydrographic Institute Split, Split 2007, page 74.

Each of these classifications suggests its own purpose and context for research. Since the marina industry is a part of almost every national economy, its importance is reflected through the facilities it offers on the market. Analysis of the marina industry points to the considerable variations that occur across destinations and the way in which marinas adapt to them. Given that starting point, the varied role of marinas in Europe can be classified as follows:

- marinas that independently develop their potential within their own area (some marinas in Croatia, as well as anchorages and moorings, and Greek marinas)
- marinas whose facilities extend beyond the usual limitations, thus developing and involving the locality (Marina Frapa),
- marinas part of whose attraction is their link with a major urban centre (Split, Dubrovnik, Zadar, Italian marinas on the Adriatic coast, city marinas in Greece),
- marinas that are part of a larger tourist region (Genoa bay, Côte d'Azur, the beginning of the Spanish coast in the Mediterranean),
- marinas that have a sustainable coexistence with industrial and other economic zones (Spanish marinas in the Mediterranean)
- marinas that are linked to wider sports facilities, partly through which they realize their commercial potential (the entire Mediterranean coast, especially Spain).

Given the above classification and the analysis of marina locations which influence the destination and general development, it can be seen that there are two basic models for the influence of marinas on the destination, i.e. locality and region. That effect is associated with the level of development of a destination, and with the strategic development plan for the marina in the destination. Mutual opportunities and interests of the subjects of development meet here. These two models are both worth researching, and so will both be analysed and explained later.



a. Empuriabrava–the biggest marina-city in Europe



b. Marina Frapa, the world's best marina in 2006 and 2007

Source: Internet, <http://www.immocostabrava.com/en> & <http://www.marinafrapa.com/hr>

Fig. 1. Marinas in Europe (Mediterranean)

An analysis derived from experience and related to the investment capital aspect of the marina industry shows that few experts are aware that when building a marina on the Mediterranean (Mediterranean type) the initial price of an unfinished berth is about 20,000€,

while a fully equipped berth can reach a price of 40,000€. Marinas belonging to other markets, particularly fresh water marinas, have significantly lower investment costs, and are generally of lower attractiveness. Through descriptive analysis, the ROI (return on investment) in marinas is seen to be between 6 and 8 years, depending on a number of factors. In developed markets the role of the State is to support growth, while local authorities, together with investors, can build a model of sustainable development. In less developed markets, or economies in transition, development is more difficult and disorganized, which places added burdens on the investment.

**The charter Industry** is connected with the marina industry through berths and the utilization of marina facilities. The business operations of yacht charter companies are specific and complex. There are a number of small companies on the market operating with one or more vessels, but there are also companies operating with thousands of vessels. Charter companies generally offer two alternative packages:

1. Bareboat charter without skipper
10. Vessel charter with skipper.

In addition to these two packages, charter companies sometimes hire skippers through skipper associations that operate independent of the charter companies. It is interesting how the demand for these two types of charter seem to reverse every 5 to 7 years, but retain a ratio of about 3:1. Charter company fleets consist of vessels that can be (1) motor and (2) sailing boats. A yacht charter fleet is formed in various ways, but the most common is through the leasing of private yachts provided by owners for charter companies by virtue of a contract. In such cases of leasing, business tends to be very risky, and small companies are often faced with problems. For example, in Croatia in 1996 the demand for boats fell abruptly due to the state of war in Serbia and Kosovo. Companies with charter fleet acquired through leasing could not meet repayments, so practically overnight the banks became owners of a large charter fleet. This problem has eventually been solved, but not without consequences for the development of the charter industry in Croatia.

Large charter companies operate in attractive tourist destinations, offering a wide range of yachts and services. Demand tends towards larger vessels regardless of whether sail or motor. If we take into account the definition<sup>18</sup> *that a yacht is a vessel longer than 12 metres, and mega-yacht longer than 24 metres (80 feet)*, then there is an increased demand for these types of boats. One advantage of the charter business compared to the marina industry is mobility. Large charter companies can deal with seasonality by moving their fleet from an off-season destination to one where the season is starting. Marinas do not have that possibility. Small charter companies cannot use that strategy of diversification, so they must have other ways to overcome the adverse effects of seasonality. Studies show that on average in 50% of cases charter companies use the services of tourist agencies to rent their vessels.<sup>19</sup> The charter industry business, especially with a fleet on lease, is quite difficult, and there are several important principles and rules derived from experience. For instance, a charter company must have about 10 yachts to keep a maintenance team of 10 workers. Likewise, for a charter

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<sup>18</sup> Definitions generally accepted on the Mediterranean (<http://www.poslovni.hr>)

<sup>19</sup> Gračan, D. & Zadel, Z. & Rudančić-Lugarić, A.: "Four Stars Charter Quality' in charter service of Croatia", *Naše more, Znanstveni časopis za more i pomorstvo*, Vol. 58. 1-2, 2011. str. 64-73

company to break even, yachts must be rented for at least 10 weeks in a season. Anything below that number means operating at a loss.

Country of Build	No. of Yachts	Country of Build	No. of Yachts
Argentina	7	New Zealand	37
Australia	56	Norway	19
Austria	1	Oman	2
Bahamas	1	Philippines	2
Belgium	5	Poland	11
Brazil	11	Portugal	2
Burma	1	Singapore	3
Canada	78	South Africa	10
China	3	Spain	27
Croatia	1	Sweden	26
Denmark	31	Taiwan	10
Egypt	3	Thailand	5
Fiji	2	Turkey	77
Finland	13	UAE '	1
France	53	UK	171
Germany	145	Ukraine	1
Greece	34	USA	509
Hong Kong	9	USSR	3
Indonesia	5	Yugoslavia	8
Italy	443	Zimbabwe	1
Japan	26	Unknown	29
Malaysia	1		
Mexico	1		
Netherlands	359	TOTAL	2,243

Source: Malcolm Wood, David Robinson: Market report Italy, 2006

Table 2. Number of mega-yachts over 30 metres in 2005 by country of manufacture

In 2010 there were 6,000<sup>20</sup> registered mega-yachts in the world, of which 4,419 were over 30 metres<sup>21</sup> in length. The direct effects of the charter industry in the global market generate an annual turnover of around one billion dollars.<sup>22</sup> Mega-yachts have become a status symbol and their number is constantly increasing. The leading countries involved in mega-yacht building are the USA, Italy and the Netherlands, together accounting for approximately 58%

<sup>20</sup> [http://www.nmsc.gov.au/media/pages\\_media\\_files/files/MS05-Lance%20Cushion%20-%20Superyacht%20Base%20Australia.pdf](http://www.nmsc.gov.au/media/pages_media_files/files/MS05-Lance%20Cushion%20-%20Superyacht%20Base%20Australia.pdf)

<sup>21</sup> <http://www.superyachtintelligence.com/vesselsummary.asp>

<sup>22</sup> <http://www.ezadar.hr/clanak/najam-mega-jahte-i-60000-eura-tjedno>



of the world production of mega-yachts. Although there are no precise statistical data, more than 60% of mega-yachts are owned by charter companies. The price of yacht charter depends on the size and level of equipment of the boat. For example, a one-week charter of a 17-18 metre yacht costs around 20,000€, while it can cost 60,000€ for a 30 metre mega-yacht. The charter of large mega-yachts can reach an amount of 200,000€ per week. Viewed in terms of value, the price of mega-yacht charter is determined by its length and the quality of workmanship and equipment installed. There are two types of luxury yacht manufacturers: (1) those in mass production and (2) those producing on commission. The average price of an 18 metre (60 feet) long motor yacht is 1.2 to 2 million euros, depending on the manufacturer and equipment. Yachts produced in the USA, Scandinavia and Great Britain are particularly known for the quality of workmanship. These yachts of a better quality are more expensive, so that a 21 metre yacht can cost from 2 to 3 million euros, while one of 35 to 37 metres in length can cost from 10 to 22 million euros, depending on the manufacturer. A budget analysis shows that the cost of building a yacht does not generally exceed one third of its final price, which means that this is a very lucrative business. 40 to 60 metre yachts generally cost about one million euros per metre, and there are no restrictions on price for yachts longer than that. In the world of mega-yachts, there is a constant demand for bigger and better equipped yachts. In the list of the largest yachts in the world in 2009, the length range varied from the 162 metre motor yacht *Dubai* to the 65 metre *Wedge Too*, the smallest in this category. Of these hundred yachts in the world, twenty are located in the USA, the largest being 138 metres, and the smallest 48.8. Yachts are dispersed across all continents except Africa. On the Adriatic, the largest mega-yachts generally available for charter are the metres (Benetti Classic 34M) or 29 metres long (Sunseeker Predator). The 54 metres long *Seagull II* stands out as an exception.

*Skippers and their services* are an important segment in the charter industry options. From the moment the skipper takes the helm he is responsible for the yacht and the people on it. Certified skipper must have experience in all aspects of operating a yacht, must be trained and skilled in navigation and familiar with maritime regulations. The yacht charterers are generally responsible for the itinerary, destination ports, food and other things, although some charter companies offer that as an additional service. An RYA Day Skipper<sup>23</sup> or similar certificate with and a VHF radio licence are generally considered a minimum requirement. Certificates that prove a skipper's competence vary from country to country, making it more difficult to introduce consistency and order in this industry.

The price of a skipper service depends on his qualifications and on the size and value of the yacht he operates. The initial price of skipper with Yacht Master category A licence (for yachts up to 100 GT) is 130€ per day, so the price for a week is about 1,000€. A skipper with Yacht Master Category B licence (yachts up to 500 GT) can negotiate his price per day with the owner or mega yacht charter. Skippers in England command the highest initial price of 200 € per day.<sup>24</sup>

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<sup>23</sup> The RYA was founded in November 1875 as a Yacht Racing Association (YRA). Its primary goal was to standardise the rules determining the measurements of racing boats, so that sailing boats of different classes could compete. The price of membership was then two guineas, and was available for former and current owners of racing yachts of 10 or more tons.

<sup>24</sup> <http://www.vjesnik.hr/Article.aspx?ID=4BC04C74-3D6E-45A6-801B-3CD76F21C4C7>

The successful function of a skipper depends very much on his psychological and personal profile. Not only should he have a thorough knowledge of yacht management, but must also be familiar with the waters he passes through and be able to select appropriate anchorage for the tourists on board, depending on their wishes. The mental qualities of a skipper are key to the success of the charter.

## 4.2 The cruise industry

The cruise industry, in a narrow sense, uses two main instruments (1) cruisers, ships specialised for cruising and trips, and (2) ports that provide berths and are connected to attractive destinations.

Cruise ships, specialised for the transport of passengers/tourists, differ according to the type of service to which they are adapted by their size and construction.

TOURIST CRUISING INDUSTRY			
Secondary activities	MAIN activities		Supporting activities
	Cruisers	Ports	
Shipyards for large cruisers Shipyards for small cruisers Shipyards for old-timer replicas Manufacturers of equipment and special products for cruises and services Others	Cruisers owned by large companies: <i>Large cruisers</i> <i>Small cruisers</i>	Specialised ports for large cruise ships, members of MedCruise  Non-specialised ports for large cruise ships	Specialised tourist agencies Scientific and educational institutions specialised in training Research institutions supporting development Others
	Cruisers owned by small enterprises: <i>Old- timers for one or several day cruises</i> <i>Small cruisers for one or several day cruises</i>	Small ports suitable for small cruisers and local old- timers	
	SUBJECT OF RESEARCH		

Source: The author, Luković T.

Table 3. Basic classification of cruising industry

The cruising tourism industry should be considered in its totality. Manufacturers, without whom the development of the main industry of cruising tourism would be impossible, form secondary or additional activities. Supporting activities make sure that development is successful and with their services they provide assistance.

Cruise ships specialised in passenger/tourist transport differ by the type of service to which they are adapted by their size and construction. In the field of shipbuilding, some shipyards are increasingly oriented and specialized in large and well-equipped cruiser production.

In international waters there are currently about 300 large cruisers which can be classified according to various aspects, but this study will focus on the classification by passenger capacity and quality of service<sup>25</sup>:

<sup>25</sup> Berlitz "Complete Guide to Cruising & Cruise Ships 2006", Douglas Ward, London, 2006, page 154.

- Boutique Ship (50-200 passengers)
- Small Ship (200-500 passengers)
- Mid-Size Ship (500-1.200 passengers)
- Large Resort Ship (1,200-4,000 passengers).

In relation to the quality of service, cruisers can be divided into four categories according to the quality of lifestyle of the passengers:

- Standard: affordable food and services,
- Premium: slightly more expensive and better in quality than the previous category,
- Luxury: more expensive and better in quality than the previous two categories, with a high level of personal comfort and better food, and a crew that is trained to focus on passenger welfare.
- Exclusive: the best service adapted to a passenger's personal needs, with prices in line with the high-quality service.

Increasingly large and more luxurious cruisers compete in terms of capacity and the diversity of their facilities. Concurrent with the development of large cruisers, there is also an increase in the building of smaller luxury ships with a capacity of around 200 passengers. The price of a package directly depends on the number of passengers, i.e. a larger boat means a lower price. Quality of service plays an important role in pricing, so that, for example, the "Green Star", awarded every year in Miami in recognition of quality is highly valued by the cruise companies.

Italian shipyards stand out when it comes to building small luxury cruisers.<sup>26</sup> The production of both large and small cruisers for cruise companies and corporations occurs in a highly competitive market. At the same time, the development of cruising in small traditional craft of local types, usually run as part of a small or family business, is becoming more common and is still an unexplored sub-type of the cruise industry. Everywhere in the world, including Europe, there is an expansion of navigation in local and regional waters, and with it what might be called the *small cruising* business. On the seas, rivers, lakes and canals of Europe we find boats that are a product of a hundred or thousand year old culture and environment of a region. The differences are evident, and it is that diversity that is part of the attraction of cruising in the fresh waters and seas of Europe and worldwide. Traditional Mediterranean boats, from Greece, Italy and Croatia to Spain, France, England and the Netherlands and the countries of Northern Europe, differ widely. In the dictionary of maritime cruising such vessels are often referred to as *old-timers*. Their existence and development are important not only for the growth of small enterprises, but also for the preservation of old and forgotten craft and of traditional local shipbuilding and for the preservation of culture and identity. When the variation in construction and design of the old ships replicas that can be seen in all Mediterranean regions are compared with the similar group of old-timers on the Baltic Sea and European coast of Atlantic, then significant differences are evident.<sup>27</sup> They all, however, have the same purpose which is to supply the

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<sup>26</sup> The main world producer of small cruisers are the Italian Fincantieri, then the Finnish and Aker Finnyards and Kvaerner Masa, the German Meyer Werft and the French Chantiers de l'Atlantique. They are mega-yacht manufacturers and between them built 19 of the 21 mega-yachts built this year.

<sup>27</sup> Luković, T.: "Cruising by old timers, a chance for local and regional development in Europe", the first CRS conference, Bremerhaven, 2009.

market for a cruise with a distinctive attraction. One or several days cruising on an old-timer is a different experience from a cruise on a large or small luxury cruisers.



a. Croatian old timer (Kornati)



b. Dutch old timer (Voledam)

Source: Taken by the author Luković, summer 2009

Fig. 2. Traditional regional cruisers (old-timers) in Europe

In addition to the old boats and their replicas (old-timers), many small and medium family enterprises augment their cruising fleet with small cruisers of a more modern type, and thus become a noteworthy competition to the larger cruising companies. Recognizing the potential for development of the small cruiser market, many larger companies are developing a fleet of new, luxury small cruisers. Some studies<sup>28</sup> indicate that in the small cruiser business the fleet and ship capacities are very important, but insufficiently explored, while globally such fleets exceeds the number of 10,000 traditional old cruisers. In general, competition in the cruise ship market becomes more and more dynamic, and new forms of offer become more evident.

Besides large and small cruisers on the European seas, cruising with specialized freshwater cruisers of all sizes is also very important. The largest cruisers on the navigable rivers of Europe exceed 1,500 passengers. Freshwater, like sea cruising, has a supranational character, meaning that some international investors have cruisers sailing on European rivers. Unlike sea cruising, large freshwater cruising is organized and led by such large tourist agencies as TUI. The European Union, as a single market without borders, functions well in the case of river cruising, as European borders are frequently crossed. Such routes pass through Germany (Regensburg - Straubing - Windor - Passau), Austria (Linz - Wachau - Vienna), Hungary, Romania and the port of Salina where the Danube flows into the Black Sea. River and lake cruises are organized as either a one day tour, or as several days cruising, with an average price of 138€ per day<sup>29</sup> per person, full board. River cruising in Europe is a highly developed form of tourism, with the tourist companies and crew providing plenty of entertainment and excursions to distinctive destinations during the cruise. In terms of cruising, the busiest navigable rivers are the Danube, Elbe, Weser, Rhine and Main and another.

<sup>28</sup> Luković, T. *ibid*

<sup>29</sup> <http://river-cruise-fleet.com> & <http://www.danube-river.org>

However, a key aspect of this subject remained relatively neglected; that is the destination ports for cruise ships. The tourist cruising business could not exist without such suitable ports.

The ports, after the ships themselves, are the second most important factor in cruising. Ports can be classified as:

1. ports specialised for the accommodation of large cruisers, and
11. (2) ports that are not specialised for large cruisers.

*Ports specialised for cruise ships* stand out for their efficient organization, and have the role of connecting the passengers/tourists with attractive local destinations. Some non-specialised ports for cruise ships do not recognise this form of tourism as an opportunity for growth, while some other ports are very specifically prepare for and focused on cruising. Specialised ports support the development of destination management for which cruising is an important tourist activity. These ports are a result of an orientation towards tourism of a destination and its management. Such ports have several characteristics:

- They gradually “push out” the traditional traffic of passengers from the high-quality areas in the port where liners and other types of ships for cargo and passenger transport previously docked. Passenger transport gives way to the more profitable cruise business,
- Frequent and large-scale investments in port facilities, whether in the port itself or its vicinity
- In the area of the port under customs and police control there can be additional attractions aimed at cruise passengers,
- Tourist agencies have an important function in terms of their provision of opportunities for tourists on a cruise; such provision is generally related to the transport of passengers from cruisers to attractive local destinations,
- Many activities at the locality are focused on the development of products and services for this kind of tourism,

World (2008)				Mediterranean (2009)		
	Ports	passengers	calls		Ports	passengers
1	Consumet	2,569,000	1.008	1	Naples	1,154,742
2	St. Thomas (USV)	1,847,000	730	2	Civitavecchia	1,082,487
3	Grand Cayman	1,553,000	570	3	Barcelona	971,226
4	Nassau	1,472,000	687	4	Dubrovnik	901,389
5	St. Maarten	1,346,000	619	5	Balearic Islands	789,509
6	Naples	1,237,000	660	6	Livorno	754,965
7	Juneau	1,024,000	620	7	Tunisian Ports	752,246
8	Ketchikan	942,000	502	8	French Riviera ports	707,929
9	Livorno	849,000	565	9	Marseille	456,000
10	Dubrovnik	844,000	698	10	Madeira Ports	425,433

Source: The new MedCruise Statistical Reports, 2010 Edition

Table 4. Top-10 largest world's and Mediterranean ports specialised for big cruise ships (2008 and 2009)

*Non-specialised ports* for large and small cruisers offer mooring facilities, but all other services are only sporadically organized and depend on what is available at the destination. Reasons for that are numerous and range from the existence of some other locally important activity for the destination to the lack of attraction of the destination. Hence, we notice that the port is a reflection of a destination and it directly relies on it.

The main objective of the cruise business is the same as for all other businesses, profit. As market competition is becoming stronger, various strategic alliances are formed in order to enhance business results. An example of a large, very successful and well organized strategic alliance of cruise companies is “Carnival UK” (<http://www.carnivalukgroup.com>) which manages 98 large cruise ships.



a. Cruise passengers try to enter the Old Town of Dubrovnik



b. MSC cruiser in the port of Venice

Source: Internet

Fig. 3. Problems in the cruising season

While cruise companies and strategic alliances fight for better business results, passengers, with their personal motives for travelling, are gradually losing their significance as individuals in the cruising industry, which is becoming a form of mass tourism. Companies, often aggressively, try to restrict the passengers' consumption to what is available on board. Thus the destination, as a primary motive for travelling, is slowly losing its importance. As cruise companies do business in direct competition with each other, it is not only the passengers that become less important, but the destinations also become subordinated to the company profits. At the same time, realizing the developmental and financial possibilities introduced by cruising, ports connected to high-quality destinations develop rapidly and expand facilities that can be offered at both port and destination. Their development is mostly based on financial potential and interests, and is rarely connected to the investments of the big cruise companies. Nevertheless, the development of specialised cruise ship ports, together with the recession, has provoked a new way of thinking and initiated new forms of cooperation and strategic alliances. In particular, as a result of passenger dissatisfaction with the reduced opportunities to experience the destination<sup>30</sup>, newly organizational forms of

<sup>30</sup> Luković, T. & Božić Fredotović, K.: “Cruiser bids and offers cruise destinations in the competitive or partnership?”, Third international conference, Cruise Research Society, ICC3, Dubrovnik, 2011

collaboration between port, destination and cruiser<sup>31</sup> have begun to emerge. This leads to a gradual introduction of some basic elements of successful business cooperation where the satisfaction of the passenger/tourist once more becomes the main priority. Port and destination on the one hand, and the cruise ship on the other, are the places where passengers spend money, and it is in their mutual interest to encourage satisfaction in tourists who are then more likely to return.

The development of cruising in Europe is supported by four international organizations: (1) European Cruise Council, (2) Cruise Europe, (3) MedCruise, and (4) Euroyards.

1. The *European Cruise Council* (ECC), based in Brussels (Belgium), is an association of leading European cruise companies with 30 permanent and 34 associate members. The ECC is the counterpart of the similar American Cruise Line Industry Association (CLIA) which is partly responsible for the high degree of development of the cruise industry in the Central American market<sup>32</sup>. The ECC promotes the interests of all cruise operators and collaborates with EU institutions such as the European Commission, the European Parliament, the Council of the EU and their permanent representatives. The ECC also cooperates with the European Maritime Safety Agency (EMSA). The ECC protects the interests of its members through its close connections with other European bodies such as: the European Community Shipowners' Associations (ECSA), the European Sea Ports Organisation (ESPO), and the European Travel Agents and Tour Operators Association (ECTAA). The ECC also promotes the development of the European cruising industry through cooperation with a number of regional bodies, such as Cruise Baltic, Cruise Europe, Cruise Norway and MedCruise.
2. *Cruise Europe*, based in Stryn (Norway), is an association of cruise ship ports in Northern and Western Europe. It is focused on future development and supports and sets standards for the quality of ports by networking between them and conducting research for its members.
3. *MedCruise*, based in Barcelona (Spain), was founded in Rome in 1996, and it acts as an association of Mediterranean ports specialised for cruise ships. It numbers 55 members with 78 Mediterranean ports, including those in the Black and Red Seas, as well as the ports of the so-called Middle Atlantic. The association has 20 associate members, tourist boards, port agents, and other cruise industry bodies. In such a way the field of interest and work of MedCruise extends to the entire cruising industry. MedCruise is working to increase the efficiency of the cruising industry, and to build sustainable relations between cruising industry bodies and to promote its development.
4. *Euroyards*, based in Brussels (Belgium), is an association which gathers leading builders of cruise ships, off-shore and specialized vessels, yachts, ferries, chemical tankers, and specialized cargo ships. Its members employ about 50,000 workers and annually generate a 13 billion euro turnover. All Euroyards shipyards are members of the Community of European Shipyards Associations (CESA).

The cruising industry, in terms of ports specialized for small cruisers and large cruise ships owned by big companies, is very well organized and has been described as "The Cruise

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<sup>31</sup> Luković, T. & Božić Fredotović, K.: "Seasonality – factor of crisis or development in cruise tourism.", Second international conference, Cruise Research Society, ICC2, Plymouth, 2010

<sup>32</sup> Ross K. Dowling: "Cruise ship tourism", Cowan University, Australia, CABI, 2006, page 4.

industry, leader in Europe's economic recovery".<sup>33</sup> By contrast, the industry of small private cruisers and ports is relatively lacking in organisation and still underdeveloped. It is an area that offers considerable scope for further research and development.

## **5. The regional concept of sustainable development and the role of nautical tourism**

After the abolition of borders between European countries and the creation of a single market in the EU, the opportunity was created for new models of economic growth of industries and for their unification on a larger scale. That pointed to a new European concept of growth with a prevailing regional market approach. Such a concept, particularly related to general tourism, and thus specifically to nautical tourism, promoted the idea of a destination whose development should be planned and managed. As a result, a new importance was given to destination management, which, in the developed European economies, is an aspect of a decentralized self-governing system of growth. In so doing, the state transfers its authority to lower levels of management, which tends to encourage market-oriented development. That concept is based on the fact that local and regional authorities are more aware than centralised government can be of the particular requirements for development of their market. That concept of strengthening regional and local self-governing requires a developed, functional, and stimulating model of sustainable development. The main bodies, and their responsibility in connecting the varied interests of all parties of the destination, are far more transparently apparent in that model. In this manner, in particular in nautical tourism, visiting sailors and tourists are in the spotlight, which is crucial for a market-oriented development.

The model of sustainable development (Figure 5) shows a case where a marina is a leader of local development, as is quite common in the Mediterranean region<sup>34</sup>. In the sustainable development model, whose role is to support and integrate ecological and ethical (social and economic) aspects, good communication is a key to success, and it takes place in the context of the rule of law and the personal competencies of the entities.

As previously explained, indirect effects of nautical tourism on regional economic development are considerable, and economic analysis confirms that they are generally much greater than the direct effects. Seen from a macro aspect, nautical tourism contributes to the overall economic development in two ways:

1. the development of nautical tourism being greater than the general rate of economic growth, a relatively significant impact on that general rate is achieved. In that case, nautical tourism encourages economic development, i.e. its faster growth.
2. the development of nautical tourism affects not only the rapid development of existing activities in a country or region, but also the growth of new activities that are horizontally (excursions, underwater photo safari, customer service etc.) or vertically (small enterprises, shipbuilding etc.) associated with it. In this way, a significant number local inhabitants are employed in various sectors, and their direct or indirect goal is to serve the visiting tourists. Frequently the number of local people employed in

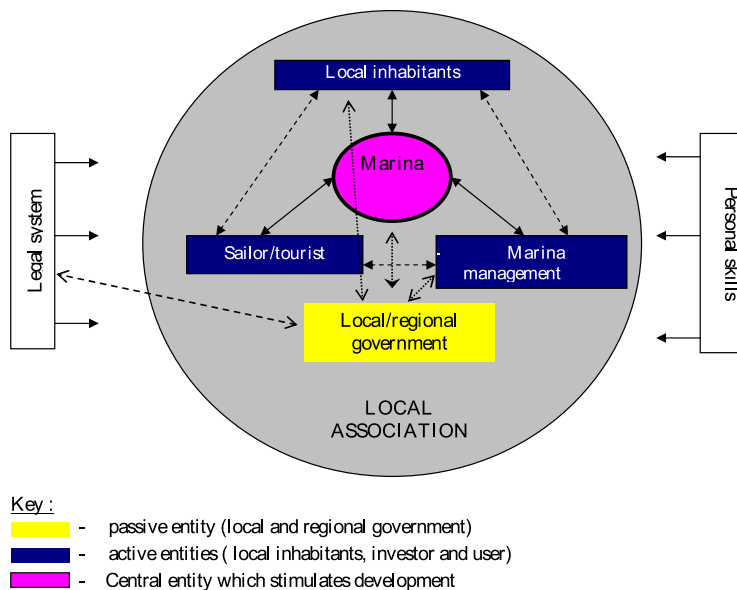
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<sup>33</sup> <http://www.cruise-norway.no/viewfile.aspx?id=3186>

<sup>34</sup> Model explained in Section 4.1.



this way is many times greater than those employed directly in the nautical tourist industry. That kind of development is particularly crucial to the economy of the islands in all the seas of Europe, and particularly for the preservation of the island way of life.



Source: T. Luković<sup>35</sup>

Fig. 4. Separate and common competencies of the main entities in a model of sustainable development, exemplified by a marina as a leader in local development

A regional concept of the contribution of nautical tourism to the economic development on the mega European level should be viewed in the context of market distribution, and thereby receptive and emitting markets should be distinguished. One of the chief characteristics of such approach is a national framework of GDP, i.e. the specific GDP from tourism. In the *receptive tourist market* economies, GDP exceeds 4% in the economic structure and even reaches an amount in excess of 10%, while in the *emitting tourist economies* it does not exceed 4%. That indicator is variable and has a national character as for big markets, such as the emitting German market, the absolute size of the GDP from tourism far exceeds the same in smaller economies of the receptive tourist market. Nevertheless, this indicator should be taken into consideration.

Since the receptive markets are very active, and they meet all four characteristics of active markets<sup>36</sup>, they are a potential opportunity for the realization of market demand, and therefore should be studied. In this context, nautical tourism plays an important role in all economies that are receptively oriented. That role is manifested in three ways:

<sup>35</sup> Luković, T. & Gržetić Z.: "Nautičko turističko tržište u teoriji i praksi Hrvatske i europskog dijela Mediterana", HHI Split, Split 2007, page 123.

<sup>36</sup> Four conditions of an active market: demand, ability to pay, willingness to consume and free time for consumption.

- *Nautical tourism, from the perspective of a receptive country*, is an important source of currency inflow. It is considered to be a specific form of export (a so-called invisible export). All the money foreign visitors spend in a country contributes to the balance of payments of the host country. Currency inflow from tourism is particularly important for developing countries, i.e. countries in transition. Some countries, like Croatia, have developed nautical tourism to the extent that they can compete on the competitive international market. In order to achieve better results, most of receptive tourist countries in Europe offer state subsidies which encourage investments in facilities intended for tourist services. These are implemented through various reliefs, grants, benefits, low interest rates and other measures. Still, the real effects come through new investments in the nautical tourism industry which is highly profitable, but unexplored.
- *Nautical tourism, seen from a social point of view*, facilitates the intermingling of nations and the transfer of information, knowledge, culture and lifestyle. In fact, nautical tourism makes a considerable contribution as foreign tourists and their equipment, such as cameras, attract the interest of local inhabitants, which can initiate some level of cultural interchange of ideas. The impact of tourism in general, and nautical tourism in particular, on the overall development of a certain area or country in a social sense is reflected in the interests and education of young people. That factor of social and economic development is immeasurable, but at its best is certainly a significant factor in the process of social change.
- The *multiplying* effect of tourism should not be neglected: it results from the fact that money spent by tourists does not remain in the place of consumption, but continues to circulate and have a chain effect on economic events. Accordingly, money circulates on the national and supra-national level within an entire economy, flowing from one business to the other, from industry to industry, and the more it circulates the bigger are its economic effects. According to studies in the U.S. economy, a dollar invested in tourism effectively multiplies by a factor of 4.2. In Croatia, the multiplier is 3.2, meaning that the income from foreign tourists is effectively multiplied by a factor of 3.2 in the total economy. A similar effect applies in all receptive European countries.

Consequently the European concept of regional development is fully justified, especially in the context of tourism and nautical tourism, and the outcomes are a result of the political and economic market-oriented concept of the European Union. However, the real effects are yet to be observed since the EU, as a single market, is only just beginning to take shape and there are still huge differences between the European national economies of East and West. Still, these discrepancies confirm the hypothesis about the development possibilities in Europe when observed through the economic theory<sup>37</sup> by which differences in the level of development between countries can be positive and stimulating because they provide new opportunities and thus stimulate growth and the flow of investment to the less developed economy.

## 6. Nautical and tourist markets in Europe

The nautical and tourist market of Europe represent a range of differences in terms of the factors that are shaping it. In that context the differences in terms of climate, culture and tradition have special importance.

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<sup>37</sup> Thurow, C. Lester: "The Future of Capitalism", William Morrow and Company, Inc, New York, 1996, where this is called a theory of *punctuated equilibrium*.

It is appropriate to use the classification of the five major markets in Europe for the study of nautical tourism:

1. The Mediterranean
2. European Atlantic Coast
3. Baltic Sea and Arctic
4. European Lakes and Inland Waterways
5. The Black Sea

Once again, it must be stated that data on nautical tourism are scarce, so all available sources should be used to the maximum.

In the marina industry, Europe has something to boast about. Spain has Empuriabrava on the Costa di Sol, the largest marina-city (over 5000 berths) in Europe. France has the 5-star Port Camargue with 5,010 berths, the highest quality marine, specifically recognised by the ADAC. Italy has the highest number of marinas in the Mediterranean. Greece has the greatest potential for development in nautical tourism considering the length of its indented coast and islands. Dutch marinas and waterways are located below sea level. Marinas in England are among the best of European marina systems. Germany has a number of marinas inland and the on the coast of north Europe. Norway has the highest number of marinas in Europe, and also the most ice-covered marinas. Croatia has the marina Frapa in Rogoznica, the world's best marina in 2006 and 2007. The fact is that there are a lot of reasons for European nautical tourism to be thoroughly studied, so that the quality and achievement of its market diversity could be transparently presented on the global demand market.

## 6.1 The Mediterranean

Nautical tourism in the Mediterranean is highly dynamic and developed. *The marina industry* has been developed through a number of marinas, tourist organizations, and all other participants in the industry. The mild Mediterranean climate gives, especially for tourists from the cold North of Europe, the opportunity to go on vacation almost all year round, though the summer season remains particularly popular, so that Mediterranean nautical tourism still has a very strong seasonal character.

Given the scarcity of data on the number of categorized high-quality marinas in the Mediterranean and Europe, we will use the ADAC and other sources. The average size of a marina, in terms of berth number, is 430 berths per marina.

In the Mediterranean there are over 1,000 marinas of all kinds, such as sports marinas, private, and commercial.

*The charter industry* can only be estimated from the fact that in the Mediterranean, charter companies have thousands of boats and yachts and approximately 500 mega yachts. Skippers, as active participants in the charter business, have their associations and guilds in some Mediterranean countries, and their activity is therefore gradually acquiring a legal framework.

The Mediterranean *cruise industry* stands out in terms of ports for tourists from cruise ships, i.e. in relation to high-quality destinations that attract tourists from around the world. Cruisers under all flags sail into the Mediterranean ports, but the Italian Costa company stands out as a local Mediterranean cruise company. Small and traditional cruising is a developed and important segment of small business growth in the Mediterranean coastal area.

1	Marinas & Berths	France (46)	Greece (37)	Croatia (47)	Italy			Spain			Turkey (26)	Malta (4)	Montenegro (3)	Slovenia (3)	Total Mediterranean (398)
					Mediterranean coast (44)	Adriatic coast (71)	Islands (33)	TOTAL (148)	Mediterranean (59)	Malorca & Ibiza (25)					
2	0-100	1	19	4	7	7	4	18	1	4	5	1	2	1	56
3	101-500	18	15	38	24	53	23	100	33	13	46	2	0	0	236
4	501-1000	17	2	4	10	8	5	23	17	8	25	1	1	2	78
5	1001-2000	6	1	1	3	3	1	7	8	0	8	0	0	0	24
6	2001-5000	3	0	0	0	0	0	0	0	0	0	0	0	0	3
7	> 5001	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8	Berth total*	41,845	6,642	13,416	17,752	2,448	11,635	53,835	33,535	9,806	43,341	1,108	837	1,475	171,158

Source: The author T. Luković with reference to ADAC.

Table 5. Marinas on the Mediterranean

## 6.2 The European Atlantic coast

The European Atlantic coast is exposed to strong winds and waves, with tides that can vary in the range of over 8 metres. Under these conditions, ports and marinas are built within a strong breakwater system that protects the port from the sea. Consequently, marinas, as well as berths, are constructed in a special way, so the term "Atlantic marinas" is used in the specialized dictionary of nautical tourism.

In this region, nautical tourism is very well developed in spite of the climate, which is a consequence of the high degree of development of countries in this part of Europe.

In relation to the number of marinas and given the climatic conditions, it may seem surprising that there are 486 high category marinas in this part of Europe, as stated by the ADAC. The total capacity of these 486 marinas is 168,408 berths. The average size of marina on that market is 346.5 berths.

*The charter business functions in the context of marinas, and is most highly developed in the central and southern regions of this market.*

*Cruising on large cruise ships is somewhat less developed compared to the Mediterranean, but the English market is a leader regarding educational centres and universities specialised for the training of cruise staff (Plymouth, Southampton etc.). Small, local cruising business functions in accordance with climatic and other conditions.*

Marinas & Berths	Belgium (19)	Denmark (116)	England* (36)	France (79)	Netherlands (120)	Germany (40)	Portugal (21)	Spain (26)	Sweden (29)	TOTAL European Atlantic (486)
0-100	8	23	5	5	33	26	2	3	7	112
101-500	9	71	25	32	69	14	16	16	15	267
501-1000	2	22	4	27	16	0	3	6	5	85
1001-2000	0	0	2	13	2	0	0	1	2	20
2001-5000	0	0	0	2	0	0	0	0	0	2
> 5001	0	0	0	0	0	0	0	0	0	0
Berth total*	4,781	33,282	12,723	51,127	36,151	4,093	6,770	10,344	9,137	168,408

Note:

\* For England we only have data from ADAC which applies only to marinas on The English Channel

Source: the author T. Luković with reference to ADAC.

Table 6. European Atlantic coast

## 6.3 The Baltic Sea and the Arctic

Nautical tourism in the Baltic and Arctic has been developed in a special climatic environment. Countries in that area have the world's highest living standard, which is reflected in the level of development of nautical tourism.



a. Ice-covered marina, Finland



b. Cruise port and marina Warnemuende (Germany)

Source: the author Luković, T.

Fig. 5. Baltic marinas

	Marinas & Berths	Germany (127)	Poland (14)	Sweden (61)	TOTAL (202)
1	0-100	57	10	37	104
2	101-500	64	4	24	92
3	501-1000	5	0	0	5
4	1001-2000	1	0	0	1
5	2001-5000	0	0	0	0
6	> 5001	0	0	0	0
7	Berth total*	24,525	1,198	7,297	33,022

Note:

\* ADAC has not incorporated marinas of some Baltic and Arctic countries; we will therefore complete this classification with marinas regardless of their quality:

Russia – no data

Lithuania – 5

Latvia – 29

Estonia – 91

Finland – 155

Norway – 963

Source: the author T. Luković with reference to ADAC.

Table 7. Baltic and Arctic\*

The brevity of the summer and sailing season has led to a small number of high-quality commercial and well-equipped marinas. These marinas are functional and intensively used in summer, but ice-covered in winter. According to ADAC, the average size of a high quality commercial marina is 163.5 berths, which is a relatively small number for Europe. Nevertheless, sailing in Scandinavian countries is very well developed, and the number of boats is almost equal to the number of inhabitants, which is an understandable consequence of the local lifestyle and tradition.

*Chartering* is relatively underdeveloped and seasonal.

*Cruising* is highly developed in terms of both ports for large cruise ships and major cruising companies which operate in all markets of the world.

## 6.4 European lakes and inland waterways

The market of continental nautical tourism in Europe is represented by the supply and demand on the freshwater areas, rivers, lakes and canals. All types of nautical tourism are equally developed, i.e. marinas and cruising are the focus.

As a rule, and almost without exceptions, marinas are organised as clubs, with evident commercialization. They are located in all European countries, but a significant number of countries lack transparent marina statistics. Such countries are Slovakia, the Czech Republic, Hungary, Romania, Moldova, Ukraine, Belarus, Bulgaria, and countries of the eastern Balkans. So the data used in this study give only a vague hint of the real importance of nautical tourism in continental Europe; in other words, they analyze only the western European market. Despite that incomplete data, 623 continental marinas indicate that the largest number of high-quality marinas in Europe is located here. At the same time, the fact that the average capacity of a marina on the continent is 94.6 berths suggests there is room for future development.

*Chartering* is not developed so much because sailors tend to have their own boats; only marinas connected to tourist camps or bigger places offer charters. Almost always it is a one-day charter.



a. Cruisers departing from the port Passau



b. Marina and cruise port Roebel (Germany)

Source: taken by the author Luković, T.

Fig. 6. Continental nautical tourism in Europe Table 7. Marinas on the largest rivers, lakes and channels in Europe\*

*Cruising* is developed and takes place on all European navigable waterways. The Danube, Elbe and Main are suitable for navigation, so multi-day cruises are more widespread. The fact that Europe abounds with beautiful and historically important destinations makes it ideal for the development of the cruise industry, so it can be said that continental cruising has an international character. Very often, big cruise ships are in the hands of international capital and companies. Large and medium-sized cruise ships offer multi-day cruises throughout the elite destinations of continental Europe, such as Vienna, Budapest, etc. As far as cruise management is concerned, it is important to emphasize one feature typical for the European continent. International sources of capital and owners come from various countries but, with mutual interests regarding capital, are willing to invest in the construction and purchase of cruisers, and they do not do business alone, but make considerable use of travel agencies. TUI agency is specialised for this and it manages most of the large and medium-sized cruise ships operating on the waterways of Europe.

1		Lakes in Mecklenburg Vorpommern, Germany.	River Elbe (Germany)	River Weser (Germany)	River Rhine, Neckar, Mosel (Germany)	River Main (Germany)	Rhine-Main- Danube	Danube (Germany)	Chiemsee (Bavaria, Germany)	Bodensee (Germany)	Bodensee (Switzerland)	Bodensee (Austria)	Danube (Austria)	Poland, lakes	Netherlands (lakes)	France, rivers	Italy (Lago di Garda)	Σ Marinas & Berths
2	Number of marinas	121	48	43	153	28	8	18	1	24	4	2	26	9	53	75	10	623
3	0-100	102	39	37	132	23	8	17	-	7	-	-	19	4	19	66	6	484
4	101-500	19	7	6	21	-	-	1	1	16	4	1	7	5	27	9	4	128
5	501-1000	-	1	-	-	-	-	-	-	-	-	1	-	-	6	-	-	8
6	1001-2000	-	1	-	-	-	-	-	-	1	-	-	-	-	1	-	-	3
7	2001-5000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	> 5001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Berth total*	8,189	5,412	2,770	9,255	1,091	250	651	450	5,407	1,545	719	2,352	1,262	14,427	4,410	976	59,166

Note:

\* Except for countries in Table 7., there is no information on marinas or other aspects of nautical tourism. This particularly applies to the countries of Central and Eastern Europe.

Source the author T. Luković with reference to ADAC.

Table 8. Marinas on the largest rivers, lakes and channels in Europe\*



## 6.5 The Black Sea coast

As with to the countries of Central and Eastern Europe, there are no data for the Black sea market. It is a known fact that the Black Sea has highly developed general, as well as nautical, tourism, but unfortunately there are no available data. However, that is not a reason not to mention it and thus suggest room for future studies.

## 7. Development possibilities – Research of demand and specificities of development

Market-oriented research implies a study of supply and demand, its level of development and dynamics of movement, as well as other market characteristics. The previous section dealt with supply in the market of nautical tourism, so in order to have a complete market analysis, it is necessary to look also into the demand.

Demand is clearly a significant factor and worth quantifying since it determines the opportunities to which suppliers can adapt. Although mostly spontaneously, at least in the marina industry, supply has successfully adapted to demand though it is generally the case that demand still exceeds supply. If analysed from the aspect of economic development, it means that there is room for new investments in the field of supply.

### 7.1 Demand as a growth factor

In respect of the market, potential for growth of any industry, including nautical tourism, depend on market trends, i.e. on the demand to which supply should be adjusted. In assessing the potential for development, it is necessary to analyse both the supply and the demand. The basic characteristics of supply are presented and quantified in Section 6, while the demand requires further analysis for an assessment of the market. Studies are scarce in the field of analysis of demand, though studies by some European institutes contribute to the knowledge of demand. In Europe there are periodic studies conducted by: the Institute for Tourism in Madrid, the Institute in Bonn, *dwif* consulting GmbH Berlin, and occasionally universities for their state or county, such as the Welsh Enterprise Institute at the University of Glamorgan Business School. Valuable research, such as that by TOMAS-nautical science and TOMAS-cruising, carried out every 2 to 3 years by the Institute for Tourism in Zagreb, should be added to those mentioned above. TOMAS<sup>38</sup> studies of demand in nautical tourism can be found on the websites<sup>39</sup>.

Due to the continuous 30-year-long research in nautical tourism carried out by the Institute for Tourism in Zagreb, it is possible to form some conclusions on the growth of demand in nautical tourism and on the potential supply that adjusts to it. Regarding the results of the demand analysis, and taking into account the fact that in the last 30 years the average annual growth rate of all types of nautical tourism has exceeded 10%, along with the fact that general tourism has shown no signs of “industry fatigue”, further growth of marina and cruise industry is to be expected.

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<sup>38</sup> Detailed characteristics of the demand in nautical tourism can be seen on these links.

<sup>39</sup> [http://www.iztg.hr/UserFiles/Pdf/Tomas/2007\\_TOMAS-Nautika\\_2007.pdf](http://www.iztg.hr/UserFiles/Pdf/Tomas/2007_TOMAS-Nautika_2007.pdf) & <http://www.mint.hr/UserDocsImages/TOMAS2006-cruising.pdf>

## 7.2 Models of development of the growth of nautical tourism and its role in the economy of Europe

The question is: *How does the development of nautical tourism affect economic growth in the European economic circumstances?* In practice, there are two basic models of development that have been recorded, studied and quantified in theory:

- Model a. – in this model the marina has no role in development. The marina is just one product of a spectrum of tourism facilities that is stronger in capital and to which it is subjected. This model can be found on the Cote d'Azur, e.g. Nice, which is saturated with tourist facilities. In this model, marinas, charter and cruising serve only to complement a stronger market, chiefly comprising hotels.
- Model b. – a marina, or cruise port, acts as a leader in the economic development of the locality or region. This model is widely present in the Mediterranean, but also on all the coasts of Europe. The influence of a marina is crucial in the less-developed areas, and, as in concentric circles, it becomes a centre of extended development. Examples of this model is can be found throughout the Mediterranean, but also in the Baltic, where cruising and marinas have become leaders of development in tourism and the economy in general.

The first model functions throughout Europe, though particularly in the Mediterranean, wherever a marina is located near a large city. Being a part of the city environment, there is no need for the marina to develop additional facilities of its own because everything is already available in the city. There is only one example where a marina 'conquered' an already developed tourist destination, and achieved a scale that dominates the local tourism environment. That is the Spanish marina 'Empuriabrava' on the Costa Brava which is a project of the Immo-Center Group company. The impact of Empuriabrava is such that the city and destination have completely surrendered to its influence, and it has become a symbol of a whole lifestyle and business in this part of Europe.



a. marina Baia Des Anges (Nice), operating in conjunction with the hotel complex



b. Marina Frapa (Rogoznica) as a local leader

Source: the author Luković, T.

Fig. 7. Models of the role marinas play in the economic development in Europe

The second model, where marina or cruise port is an initiating factor the development of the area, is interesting because of the perspective it offers on growth potential in a time of

economic crisis and efforts to find the way out of it. That model developed spontaneously, under the influence of the market, but many European economies have not yet recognized it, so it remains as a potential source of future development. If we consider the European model of regional and local development, where the planning and support for development is transferred from the state to local and regional government, then the marina phenomenon should be studied as a clear example of the theory being put into effective practice.

The second model is particularly relevant to strategies of future development in Europe, on the grounds that such development takes a significant role in the promotion of regional development in a way that can be of central interest to local and regional government. An opportunity is thus provided for a strategy of diversification that can extend to the macro-economic level of development with an obvious positive potential.

### **7.3 How to get to the top in nautical tourism within 10 years time**

All investors are looking at the relevant calculation of ROI (return on investment) before investing, and wondering when and how they might recover the invested capital.

In a time of global crisis, with a surplus of money in the market of financial capital, the investment risks have become too great. All this has resulted in an increase of interest on investment, and investment has almost stopped. But is the crisis the reason for the lack of investments? The crisis actually offers new opportunities for development in the eyes of a truly visionary manager. The question is *where to invest the significant capital?* Given the situation on the market and according to the predictions of analysts familiar with the situation in nautical tourism, the answer is: *"Immediately invest in nautical tourism."* Someone might say that such an answer is frivolous, but it is valid and justified. Still, we should put that argument aside for potential investors who are willing to pay good money for a serious explanation of ROI and for the management of investments in nautical tourism.

Here we will offer a good example of how a visionary with a good idea can reach the top in spite of numerous obstacles, such as an economy in transition, a country at war, a global crisis, a bad reputation of the country on the international stage, general disorder in the country, a lack of staff, the isolation of the destination, and so on. Common sense would suggest that success in such a context would be only a utopian ideal, but practical reality has demonstrated the opposite, and thus reflects and confirms the development strength of nautical tourism.

#### **The example of the marina Frapa (Rogoznica, Croatia)**

The owner of the marina, Mr. Franjo Pašalić came to Croatia during the war in 1992. Several years later he invested in the construction of the marina in the almost abandoned locality of Rogoznica, near Šibenik (Croatia). An artificial island was constructed together with the first pontoons which in 1996 accommodated the first yachts in an unfinished marina. Using only reinvested income the marina has developed over the past 10 years and now offers substantial and attractive facilities for visiting sailors. Strategically, the marina has focused on the elite global demand market and today offers facilities of the highest quality. The question is what happened to the destination and the marina over the 10 years of its existence in Rogoznica?

Development indicators	Before the marina (Year 1996)	Marina in business (Year 2005)
Local population	350	over 2,000
Average age of the population	over 70	about 40
No. of employees	30	800
No. of small and medium-sized companies	10	100
Price of land (per m <sup>2</sup> )	€ 10 - 20	€ 150 - 300
No. of restaurants	1	8
No. of cafes	2	15
No. of shops	2	9
No. of exchange offices	0	2
No. of medical centres	0	4
Primary schools	0	2
Natural resources preservation (ecology)	preserved	preserved

Source: research by the author Luković, T.

Table 9. 10 years of marina Frapa in Rogoznica

Although it is hard to believe that in 10 years the life of a practically dead locality can be revived and raised to a high level, nevertheless it has happened here. Maybe it also occurs, if a bit less dramatically, in all localities where a marina or cruise port becomes an economic and development leader. All the local inhabitants are employed, and the destination is generally being rapidly developed.

Marina Frapa has the role of a leader and is a moving force in the development of Rogoznica. Thanks to the marina local development has been dramatically boosted. The scale and quality of the marina initiated the development of the destination, and the Frapa marina has reached the top in the quality of service it offers. As confirmation of these claims, it is worth noting that in 2006, at the world marina contest in Madrid, between 300 marinas from 60 countries, Frapa received the award of the best marina in 2006. The same happened the next year in Switzerland. The organizers then changed the statute so that the award could not go to the same marina three times (!)

This example illustrates how in completely adverse conditions and in a time of global crisis nautical tourism can open up the possibility of genuine economic success.

A similar situation can be seen in Dubrovnik, a town of about 40,000 inhabitants. The cruise port of Gruž (Dubrovnik) is the 10<sup>th</sup> port in the world in terms of the number of cruise passengers, and the 3<sup>rd</sup> in the Mediterranean. Due to the developed of cruising, the inhabitants of Dubrovnik have safer jobs and security of livelihood.

This model is present at all places where nautical tourism has been developed, particularly where it is associated with a noteworthy tourist destination. Europe abounds in good destinations, not only on the coasts, but also inland, which indicates the still insufficiently explored development opportunities.

## 8. Conclusion

In this time of global financial and economic crisis, development in all industries, especially when seen in terms of new investments, has effectively halted. Reluctance to invest and a general lack of confidence have spread to investors, managers and commercial banks. The crisis of ideas and uncertainty over invested capital, along with the increasing challenges that management has to face but cannot adequately respond to, has shaken the global economy. Europe, which has tried to unite its economy and develop its own economic model right from the earliest stage of its unification, is facing serious difficulties and there is as yet no light at the end of the tunnel.

But is everything so negative?

The fact is that every crisis presents new opportunities for development; but it is a fact that has to be recognized and taken advantage of. The industry of nautical tourism has resisted the negative effects of crisis and maintained a rising trend of development. Certainly, changes occur in nautical tourism; for instance trips have become shorter, though more frequent. The capacities of yachts, marinas, cruisers, ports and attractive destinations are being used in better ways, and the demand for "value for money" has become more crucial.

What is currently on offer in nautical tourism meets all these demands, and ensures its development. At the same time, there is still considerable space for investment in marinas, the charter business and cruising throughout Europe, and such investment is capable of realising significant returns that is not dependant on exceptional management. The areas of nautical tourism, particularly marinas and ports for large cruise ships, support an emerging European model of sustainable regional development, in which they can take the role of local and regional leader.

Thus nautical tourism demonstrates that this could be seen as much as a crisis of ideas as a real economic crisis. There are two key entities with solutions to offer: visionary investors and managers. The demands they have to face are these: to know more, to learn more, to study more, to see further and better than others, and to develop trust and confidence with hard work. The cognitive skills of investors and managers, together with education, are a response to the crisis and the only way in which solutions to it can be found.

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# Sustainability in the Management of World Cultural Heritage

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## 1. Introduction

In tourism, objects with cultural significance are usually among key tourism attractions, including the ones listed under the World Heritage List. Being designated as a World Heritage Site (WHS) for monuments, areas, or natural landscapes, is a privilege because the international visibility of the site as a tourism attraction will likely increase through the promotional and informational activities conducted by the government, tourism industry players and the World Heritage Committee (Drost 1996; Li, Wu and Cai 2008). Timothy and Nyaupane (2009) pointed out that visits to cultural and historical resources have become one of the largest and fastest growing sectors of the tourism industry.

Heritage means something of inheritance or something that has been passed down from previous generations. It can cover historic buildings or monuments as well as natural landscapes. It also covers traditions, knowledge and work of arts – known as intangible heritage. Heritage as defined by Throsby is the different forms of cultural capital<sup>1</sup>, which represents the community's value of its social, historical, or cultural dimension (Benhamou 2003).

UNESCO adopted the Convention Concerning the Protection of the World Cultural and Natural Heritage in 1972. The purpose of the Convention is to ensure the identification, protection, conservation, presentation and transmission to future generations of cultural and natural heritage of outstanding universal value<sup>2</sup>. The Convention states that the World Heritage Committee (WHC) should coordinate the process of designating the sites through a system known as inscription, which includes an evaluation of the resources by experts against a set of known criteria. The aim of the inscription is to encourage conservation of the resources within designated sites and surrounding buffer zones on a local level and also to foster a sense of collective global responsibility via international cooperation, exchange and support (Leask 2006).

For the Convention to achieve its purpose of ensuring the identification protection, conservation, presentation and transmission of cultural and natural heritage to future

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<sup>1</sup> Cultural capital as cultural resources with inherent characteristics that usually inspire or give rise to the production of other cultural goods (Throsby 2003).

<sup>2</sup> The outstanding universal value is translated into ten criteria for evaluating sites nominated for inscription on the World Heritage List.

generations, the concept of sustainability needs to be applied in the management of the World Heritage Site. The concept of sustainability is based on the concept of sustainable development that was put forward in 1987 via the work of the United Nations World Commission on Environment and Development (WCED), as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The Commission's report *Our Common Future* introduced the idea of sustainability as a means of integrating economic and ecological concerns in long-term development strategies.

While the concept of sustainability that was first presented in the WCED's report emphasized ecological concerns, the idea of sustainability had been extended to the arena of cultural development through the report of the World Commission on Culture and Development (WCCD), *Our Creative Diversity*. The report promoted the long-term needs of future generations for access to cultural resources (Throsby 2003), hence the notion of cultural sustainability had emerged.

Throsby (2003) argued that although the Brundtland definition of sustainable development provides an encapsulation of the essential concept, it is incomplete as a basis for considering the relationship between sustainability and culture. He suggested six principles in which sustainable management of cultural resources might be assessed: (1) material and non-material well-being; (2) intergenerational equity; (3) intragenerational equity; (4) maintenance of diversity; (5) precautionary principle; and (6) maintenance of cultural systems and recognition of interdependence (Throsby 2003 : 184 - 186). The first five principles were derived from the concept of natural capital and the notion that natural resources should be managed in a way that provides for the needs of the present generation without compromising the capacity of future generations to meet their own needs, as in the Brundtland Report.

The principle of material and non-material well-being implies that the flow of cultural goods and services provides both material benefits in the form of direct utility and non-material benefits in the form of non-market cultural goods whose value can be estimated in economic and cultural terms. Intergenerational equity refers to fairness in the distribution of welfare, utility or resources between generations, which relates directly to preservation and wise utilization of the resources. On the other hand, intragenerational equity refers to fairness in access to cultural resources and to the benefit flowing from them, viewed across social classes and income groups. Maintenance of diversity means the diversity of ideas, beliefs, traditions and values that will lead to the creation of more varied cultural goods, such as artistic works. The principle of precautionary principle states that decisions that may lead to irreversible change should be approached with extreme caution.

The sixth principle, maintenance of cultural systems and recognition of interdependence implies that no part of any system exists independently of other parts. Throsby (2003) proposed that this final principle draws together the entire concept of cultural sustainability since failure in sustaining cultural values that provide people with a sense of identity will place cultural systems in danger.

## **2. The case of borobudur temple compounds world heritage site**

From this point on, this chapter discusses sustainable management of a World Cultural Heritage in the view of principles of cultural sustainability as identified by Throsby (2003). It



uses the case of Borobudur Temple Compounds World Heritage Site in Central Java, Indonesia, drawing from a research conducted on the heritage site and its vicinities. The research, focusing on the management and conservation of the World Cultural Heritage, and the interactions between the heritage site and the communities, was conducted during 2007 to 2009 with the following data collection methods: survey, focus group interviews, and interviews to representative of organizations that were involved in the management of the heritage site and surrounding areas.



(Courtesy of Borobudur Heritage Conservation Institute)

Fig. 1. Borobudur Temple (Candi Borobudur)

The temple compounds are one of the prime tourism attractions in Indonesia. It became a World Heritage Site in 1991, and includes multiple locations, i.e. Borobudur Temple (the main temple); Mendut Temple and Pawon Temple, which are smaller but similar in architecture. Built in the 8<sup>th</sup> century, these ancient and magnificent Buddhist temples are located in Magelang Regency, Central Java Province. Borobudur Temple has a shape of a stepped pyramid consisting of nine super-imposed terraces and crowned by a huge bell-shaped stupa. The lower structure consists of six square terraces. The temple's displays one of the largest ensembles of bas-reliefs describing the life of the Buddha and many other Buddhist stories. In October 2010, eruptions of Mount Merapi (one of the most active volcanoes on earth) caused five to six centimeters thick white ash covering the entrance, stupas and parts of the temple. Borobudur Temple was temporarily closed at the time because of the emergency situation and to allow ash-cleaning activity.

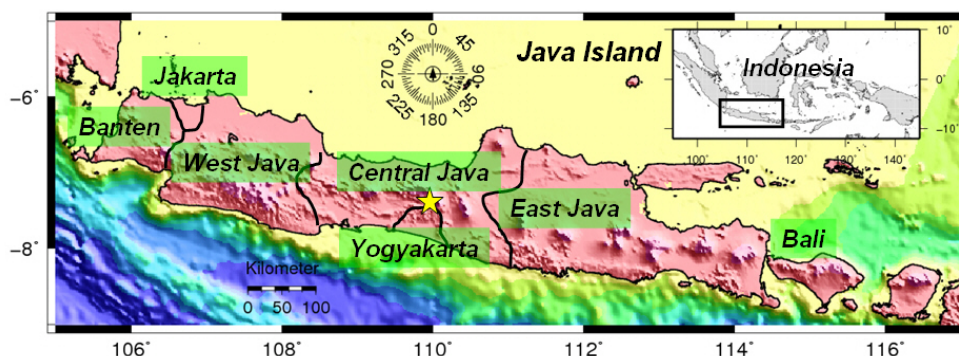
Indonesia, which signed the World Heritage Convention in 1989, currently has three cultural WHS and four natural WHS with Borobudur Temple being the most visited WHS in the country. Around 2 million visitors visit the temple every year with an approximately 80% of the visitors are Indonesian nationals. It was listed as World Heritage Site Number 592 in 1991 under the following criteria:

- Criteria 1: The site represents a unique artistic achievement, a masterpiece of the creative genius.
- Criteria 2: The site has exerted great influence, over a span of time, or within a cultural area of the world, on developments in architecture, monumental arts or town-planning and landscaping.
- Criteria 6: The site has directly or tangibly associated with events or with ideas or beliefs of outstanding universal significance.

To accommodate visitors coming to the main temple, Borobudur Temple Recreation Park was built specifically in 1985. The development of the park has resulted in the displacement

of two villages, with some conflicts arising in the process. The recreation park also includes museums, an audiovisual theatre, kiosks and stalls, area for cultural performances, and car and coach parking.

Many of both the international and domestic tourists use Yogyakarta (43 kilometres from the compounds and the second most important tourism destination in Indonesia) as a base for their visit to the region.<sup>3</sup> The length of stay for the majority of visitors is rather short (3 - 4 hours) although there are also visitors (international and domestic) who spend a few days in various accommodations available in the Borobudur vicinity.<sup>4</sup> The Local Government of Magelang wants visitors to stay longer and spend more of their travelling expenditure in Borobudur. However, the majority of visitors still generally perceive Borobudur Temple as the only attraction in the area despite efforts from some community members to develop other potential attractions in the rural setting.



Note: This map was created using GMT Software (Wessel and Smith 1991)

Fig. 2. Location of Borobudur Temple Compounds World Heritage Site in Central Java Province; Borobudur Position Relative to the Neighbouring Yogyakarta Province

### 3. Viewing the principles of cultural sustainability in the management of Borobudur World Heritage

The first principle as defined by Throsby (2003) is the principle of material and non-material well-being. Material well-being implies the production of material benefits in the form of direct utility to consumers, deriving from economic and cultural value sources (*ibid*). In the case of Borobudur Temple, the material benefits relate closely with tourism that generates income for communities living in the locality and for the government. Tourism in Borobudur had contributed quite significantly to local government's tax revenue and to the growth of value added from services and tourism related sectors' (such as trade, hotel, and restaurant sector, and transportation and communication sector) shares into Gross Regional

<sup>3</sup> Yogyakarta is renowned for cultural tourism evolving around the Sultanate's palace and remnants of the colonial era in its historic buildings. The city also has other attractions such as beaches in the southern part of the city (and the island of Java) and Merapi highlands in by the infamous Merapi Volcano in the north.

<sup>4</sup> Accommodations in the Borobudur vicinity range from a luxurious international chain resort, hotels, guesthouses, and homestays.

Domestic Products (GRDP) within the Borobudur District (Kausar 2010). It has stimulated the development of infrastructure in the area and business opportunities over the years, which is indicated from the growing number of shops, restaurants and galleries (ibid). Tourism has contributed also to employment, although the employment is mostly in the informal sector characterized with low and unstable income. Another form of material well-being is how the presence of Borobudur Temple has inspired people to make art works, which relate to the temple.

However, there are still many remaining issues with regards to the economic impacts of tourism in Borobudur. For instance, tourism has not encouraged the growth in the agriculture sector – a sector in which more than 40% of the workforces are involved (Kausar 2010). Growth in the service sector, which has been induced by tourism, is not accompanied by a growth in agriculture sector. The decline in the agriculture sector is evident from the decreasing share of value added from this sector to the district's GRDP in the recent years. This indicates that the growth in the service sector, which has been induced by tourism, is not accompanied by growth in the agriculture sector.

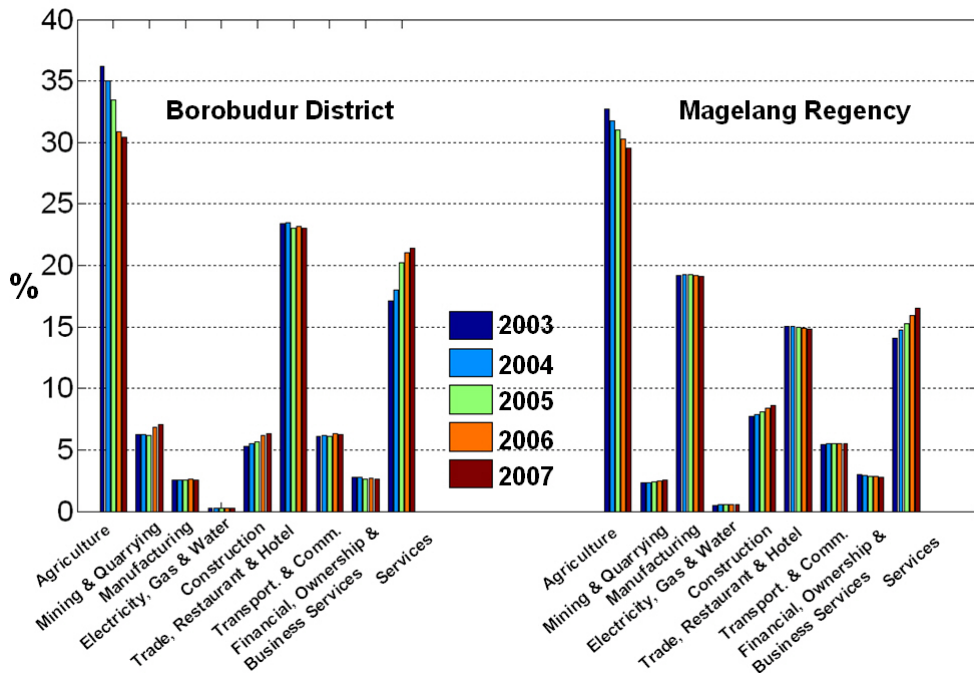


Fig. 3. Trend of Sectors' Share to GRDP in Borobudur District and Magelang Regency (2003 - 2007)

Figure 3 shows the comparison sector's shares to GRDP in Borobudur District and Magelang Regency between 2003 - 2007. It is revealed from this figure that decline of agriculture share to GRDP is faster in the Borobudur District than in the Magelang Regency as a whole.

Non-material well-being relates to the temple's function as a place to worship for Buddhists, a source of pride for the communities, and perhaps a sense of identity – although this last one needs further investigation.

The second principle of intergenerational equity relates directly to preservation and wise utilization of the resources. The restoration of Borobudur Temple began in 1973 and was completed in 1983, under the coordination of UNESCO and involving a national executive agency and an international supervisory committee. A zoning system was then developed, allocating the monument and its surrounding areas into a core conservation zone, a park – designated to accommodate visitors, and surrounding areas in which some regulations are applied. The preservation of the temple is the responsibility of a government agency called Borobudur Heritage Conservation Institute (BHCI), which reports directly to the Central Government. Local government is responsible for managing areas surrounding the park where residents live, whereas a state-owned company manages tourism and recreation inside the recreation park.

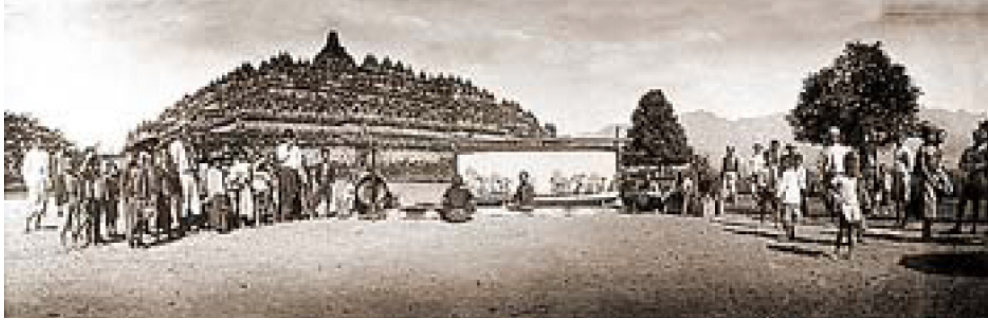
With regards to preservation, there are still some problems concerning visitor management. For instance, visitors sometime behave in ways that jeopardize the conservation state that BHCI is trying to maintain. Garbage problem, overcrowding, visitors trying to climb the stupas are some of the daily problems that must be addressed through a better coordination between BHCI and the state-owned company, PT Taman Wisata<sup>5</sup>.

The third principle, intragenerational equity or fairness in access to cultural resources and to the benefit flowing from them, implies the continuation of multiple uses of cultural resources. This means that heritage sites should not be utilized solely for tourism. However, Millar (2006) argued that universal ownership of WHS by the peoples of the world often results in stressing more on the global interest such as mass tourism at the expense of local people's interest. In the case of Borobudur, the development of Borobudur Recreation Park as an access to the heritage site and as a place to facilitate visitors' needs seems to fulfill global and national interests for conservation, access to the site, and for tourism as an income generator for the country. Survey and interviews that had been done as part of author's study in the area revealed decreasing sense of ownership or feeling of attachment to the site, which may indicate that the exclusive utilization of Borobudur for tourism or tourists is at the expense of other social groups. Indeed the temple does not have much relevance as a place to perform religious rituals for the majority of people living around it who are Muslims. However, old pictures, which are documented by BHCI and stories that are passed down from older generations suggest that a long time ago, Borobudur has been the setting of communities' activities and events. Figure 4 shows puppet (wayang) performed in the field with Borobudur Temple as the background. Nowadays, with fences separating the Borobudur Recreation Park from the communities, Borobudur Temple and its immediate area rarely becomes a place for communities' cultural activities.

Another issue related to the principle of intragenerational equity is the limited impact of tourism that is felt by the communities. This issue has been raised since 2003 when Borobudur was celebrating twentieth anniversary of its restoration (Adishakti 2006). On this occasion, some local community members made a declaration that questioned the role of

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<sup>5</sup> The full name of the state-owned company is PT Taman Wisata Candi Borobudur, Prambanan dan Ratu Boko.



Courtesy of Borobudur Heritage Conservation Institute

Fig. 4. Communities' puppet show at Borobudur

management bodies, especially that of the state-owned company, mandated to manage the recreation park in managing the site and in ensuring tourism benefits for local communities. In 2005, some villages' administrators in Borobudur District also voiced their concerns that the state-owned company had been concentrating tourism within the park without trying to disperse visitors to the nearby villages. Both events indicate that there are some concerns from both the communities and their leaders about the state-owned company's rights to manage tourism in the heritage site. A monitoring mission was carried out by UNESCO's World Heritage Committee and suggested the need to bring more benefits from the heritage site to the wider rural development context (Boccardi et al. 2006). In the last two years (2010 – 2011), however, there are more efforts to improve the livelihoods of rural community in Borobudur, such as through training on the production of snacks and handicrafts. Key organizations in the area with the supports of UNESCO organize these activities. Another recent development is handicraft demo organized by the state-owned company, PT Taman Wisata where handicraft makers participated. Visitors and tourists could even try to create their own handicrafts during this event.

The fourth principle of sustainable management of cultural resources is the maintenance of diversity. Throsby (2003) stated that diversity of ideas, beliefs, traditions and values would lead to the creation of a more varied culturally valuable artistic works in the future. Artistic works in the form of handicrafts have been flourishing in several villages across Borobudur area with each village having its specialty products. The handicraft industry has been one of the industries that is benefited by tourism in the area and by the flow of information from the outside world that inspires the creation and regeneration of art products while still maintaining their traditional characteristics. Many people working as handicraft makers, however, still expect supports from the organizations involved in the management of the heritage site and its surrounding areas in the forms of training and access to credits.

The precautionary principle, as the fifth principle, relates closely to the second principle, intergenerational equity. This principle implies that any decision concerning the cultural resources that may lead to irreversible change should be approached with extreme caution. In the case of Borobudur, it is not sufficient to discuss this matter in light of the conservation efforts that are undertaken in the heritage site. Carrying capacity of the temple should always be taken into consideration in managing heritage tourism. In addition, organizations involved in managing the temple and its surrounding must be



cautious in determining number of visitors to be targeted. While potential income from tourism is always tempting, the number of visitors that exceeds the carrying capacity will jeopardize the temple's state of conservation. One of the challenges in making decision that adopts the precautionary principle is the fact that each organization involved in the management of the heritage site has differing interests. PT Taman Wisata is more business orientated, while the local government's main interest is contribution of tourism to regional original income, hence it is understandable that two organizations may want more visitors to come in order to raise revenue, profit, and to contribute to local economy. On the other hand, BHCI's as a conservation agency is more concerned about the adverse impact that the visitors may caused to the temple. Having different organizational purposes is a situation that cannot be avoided in a domain where several stakeholders are involved. Therefore improved coordination and collaboration in setting mutual goals while recognizing existing problems is very important (Selin and Beason 1991; Jamal and Getz 1995; Wilson and Boyle 2006).



Courtesy of Candirejo Tourism Village, Borobudur

Fig. 5. Tourism and Cultural Activities in Candirejo Village, Borobudur District

The last principle, maintenance of cultural systems and recognition of interdependence amongst elements of the system, draws together the entire concept of cultural sustainability. Soeroso (2007) and Kausar (2010) suggested that conservation in Borobudur should not focus

only on the conservation of physical aspects of the heritage but to other intangible heritage. Conservation related to the physical aspects of the heritage is inherent in the principles of intergenerational equity and precautionary principle. On the other hand the conservation of intangible heritage relates more closely to the intragenerational equity, which allows the continuation of multiple use of the heritage and maintenance of diversity in ideas, beliefs, tradition and values. Communities' access to their heritage, the heritage site's function as a venue for communities' cultural activities will maintain their sense of attachment to the site and will allow the heritage to always function as inspiration of artistic works. The continuous creation and revitalization of artistic works are some of the ways to achieve material well-being since the artistic works can be used for tourists or visitors consumption.



Courtesy of Borobudur Heritage Conservation Institute

Fig. 6. Two Reliefs Found in the Walls of Borobudur Temple, One Illustrating Rice Paddy and the Other Illustrating a Farmer with His Cattles. This indicates that agriculture has been an important sector in the area since many centuries ago.

In maintaining cultural systems and recognizing the interdependence amongst elements of the system, it is also paramount to take into account the basic characteristics of local people. The communities in rural Borobudur are basically an agriculture-based society. However, research revealed that tourism has not encouraged the growth in the agriculture sector (Kausar 2001). Agriculture, though still the primary sector in the local economy is growing less than the service sector. Both harvested area and rice production has been decreasing in the Borobudur District. Analysis land use change over the years even pointed out that the conversion of land from rice fields to other purposes accelerated from the mid 1990s, after Borobudur was inscribed in the World Heritage List (Winarni 2006). Leaving out agriculture in a development that is more pursued toward growth in service sector induced by tourism, may threaten the viability of the local cultural system.

#### 4. Conclusion

It can be concluded from this chapter that the six principles of cultural sustainability is interdependence. The example of Borobudur Temple Compounds World Heritage that is

presented in this chapter suggested that to achieve sustainability, management of a cultural heritage should consider all of the aspects of cultural sustainability. Communities are the actual guardian of the heritage site, thus maintaining communities' sense of ownership and attachment through to the site is crucial for heritage conservation in the long run.

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# Tourism in Rural Areas: Foundation, Quality and Experience

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## 1. Introduction

In a post-modern society rural areas and the countryside have grown in both importance and appeal. For this reason, academics and politicians have become interested in understanding the *rural tourism* phenomenon since it was recognized as a development tool of often economically and socially depressed rural areas (e.g., Gilbert, 1989; Blaine & Golan, 1993; Dernoï, 1991; Greffe, 1994; Page & Getz, 1997; Sharpley & Sharpley, 1997; Frochot, 2005). *Rural tourism* is further identified as a potential opportunity to diversify the product portfolio of declining mass tourism destinations (Sharpley, 2002) or to enhance the positioning of these destinations or of countries associated with a comparable image, such as Portugal, with its “sun and beach” tourism in the Algarve.

Simultaneously, in the last two decades there has been an increasing tendency for the urban population to choose rural zones for holiday purposes, coinciding with and possibly stimulated by a trend towards splitting holiday periods along the year and an increase in short distance travel (Yagüe, 2002). This market pressure towards the development of new and diversified *rural tourism* products and experiences leads to business opportunities. Together with the chance to integrate these products within a wider economic, social and cultural local and regional basis, they constitute the foundations of the aforementioned development potential (Kastenholz, 2004).

Like urban or seaside tourism, the appeal of *rural tourism* also lies in the range and quality of attractions and facilities. *Rural tourism* should correspondingly adapt to current market mechanisms, which are becoming extremely competitive and are dominated by powerful communication techniques, in a context of strategically developed marketing action (Moutinho, 1991; Gannon, 1994).

In this vein, the chapter addressed sets out to conceptualize and characterize *rural tourism* in two European Countries (Portugal and Spain), taking into account the principles of quality management and brand quality, as well as tourism experience. The chapter concludes with a proposal for an integrative model of antecedents and outcomes of *rural tourism* experience and quality. The main reason behind the choice of Portugal and Spain lies in the fact that they are pioneers, in particular Portugal, in implementing rural lodging. In fact, the first Manor house or Housing Tourism was launched in 1979 in Covilhã (North Portugal's inland). However, legalization of this type of accommodation only materialized in 1982.

## 2. Rural tourism conceptualization

The reasons that attract people to the rural area have largely to do with the image of rurality, the traditional, romantic idea of a lifestyle that is both plain and simple, the search for peace and solitude, and the increasing interest in free outdoor activities. Thus, the nostalgia for one's origins, the appeal of the most basic aspects of life and the need to restore the old ties with the nature of rural areas prove to be most appealing, especially for those who lead an urban lifestyle, one which is anonymous, congested, highly organized increasingly complex and inhuman (Krippendorff, 1987).

According to EU (European Union) data, one quarter of the EU population moves to the countryside for a holiday. In this way *rural tourism* has been regarded as a factor of tourism development, the enhancement and rebalancing of rural economic and social development, in a word: promoting the sustainability of rural areas. Since joining the European Economic Community in 1986, Portugal and Spain have benefited from programs providing funds to support the development of *rural tourism*. Among programs with the highest incidence on this issue we highlight LEADER I and II. LEADER I figures in the Committee for Agriculture, Fisheries and Rural Development as an alternative for areas affected by the rural community redevelopment Common Agricultural Policy (CAP). The program, developed between 1991 and 1994 signified that a purpose-made local action group would, in an average-sized, previously defined area, develop innovative, integrated programs, approved by the general public. The local group occupies the office of promotion and entertainment, whilst the business area is the ultimate beneficiary of aid. The projects are reviewed by the group itself, which awards and pays aid. Public Administrations play the role of assisting and supervising the program (Mejias, 1995). In June 1994, LEADER II was approved. This program affords Community support in the form of global grants or integrated operational programs to enable the rural actors to undertake changes, in accordance with the following objectives:

- Acquisition of skills through consultation of the interests of the population concerned;
- Rural innovation programs which implement projects that contain three basic features: a contributive innovation to the local context, demonstration effect and transferability (Madariaga, 1999).

Conceptually, *rural tourism* may be regarded as tourism in the countryside, a form that embraces the rural environment as pivotal to the product offered. The Organization for Economic Cooperation and Development (OECD, 1994) defines *rural tourism* as any "tourism taking place in the countryside". In this context, rurality is the "central and unique selling point in the *rural tourism* package" (OECD, 1994, p.15). Lane (1994) suggests that, ideally, *rural tourism* should, apart from being located in rural areas, be functionally rural, small in scale, traditional in character, organically and slowly growing and controlled by the local people.

## 3. Characterization of rural tourism in Portugal

As an identifying criterion of *rural tourism* in Portugal, it may be said that it is located in a rural area, avails itself of natural factors, social and cultural features specific to each rural area, nature reserves, landscape and the existing values, besides preserving the typical architecture of the site.

In Portugal, *rural tourism* (or TER, which means *tourism in a rural area*) is characterized by an area of scattered and fragmented markets, which include Housing Tourism, Rural Tourism, Agritourism, Country Houses, and Village Tourism. These types or modalities of lodgings share common features: small in size, family-type forms of exploitation, use of existing buildings and structures, situated outside urban centers or in small towns. **Housing Tourism** lodging is made up of manor houses or residences of recognized architectural value, of appropriate size, with a concern for quality furnishings and decor. **Rural Tourism** lodgings are rustic houses typical of the rural area, standing within a settlement or not far away from it. **Agritourism** (farmhouse) shares the particularity of enabling tourists to participate in the farming activities, or complementary forms of animation, enjoyed in the owners' dwelling. **Country Houses** (cottages) are private homes and shelters located in rural areas that provide a hosting service, whether they be used as a dwelling by their owners or not. The fifth type, **Village Tourism**, was recognized in 2001 by the Portuguese General Direction of Tourism, now designated as Turismo de Portugal (TP means Tourism of Portugal). It is characterized by a hosting service provided in a set of at least five private homes within a village and operated in an integrated manner, irrespective of the fact that the home is used as a dwelling by the legitimate owners or not. The Manor house was the first type launched in 1979 in Covilhã (North Portugal's inland). However, legalization of this type of accommodation was only implemented in 1982.

The number of rural lodgings and accommodation capacity has evolved positively. On average, between 1991 and 2002 the number of lodgings grew at an average recorded rate of 23.7% per year. Although the average annual growth in the number of beds was 30.5%, between 1991 and 1994, it should be noted that there was a more marked variation. In the 2002-2005 period the number of lodgings increased by 21.6% and the number of beds by 15%. In the early Nineties half the number of available beds belonged to Housing Tourism. Figure 1, which displays data from TP (Turismo de Portugal), reveals that the number of rural lodgings remains almost constant at the close of the first decade of the 21<sup>st</sup> Century.

However, over the last two decades the number of beds related to *rural tourism* has enjoyed a sharper rise. In 2002, the figure stood at 38.1% relative to the number of beds of this modality as compared with 31.4% in the previous period of 1991-1997. In 2005, the relative number of beds regarding Rural Tourism remained constant at 38%. But when it comes to Housing Tourism its relative weight fell to 26.3%. In 2005, Agritourism occupied third place with a relative weight of 17.1%, followed by Country Houses (16.2%) and lastly, Village Tourism (2.4%). With the exception of Village Tourism (previously characterized as being a set of private homes and not specifically the setting of an established unit), the larger lodgings fall under Agritourism, with its average of 12 beds per facility. In 2008, the modality of Rural Tourism remained in first place as regards lodging supply.

The North has been and continues to be the region enjoying the highest accommodation capacity (circa 4600 beds). The Centre occupies second place with circa 2500. Third place goes to the Alentejo, with a supply of circa 1800 beds covering the five types. Data from TP also show that more than two fifths of lodgings, both of Housing Tourism (46.7%) and of Rural Tourism (49.7%), are located in the North. Nearly three fifths of the number of Farmhouse businesses (Agritourism) is divided between the North (32.4%) and the Alentejo (30.3%). Bed and Breakfast facilities are primarily located in the North (28.4%) and Centre (25.0%) and, secondly, in the Azores (19.8%) and Madeira (14.7%). But as the number of

beds encompassed by this modality is greater, its relative weight in the Alentejo (19.0%) outstrips the center (17.3%) and the Azores (12.8%). Finally, for the years addressed, the month with the highest occupancy rate was August, followed by July. Tourists were almost all of Portuguese origin, and were followed by the Spanish. It is worth noting that English tourists prefer the North whilst German tourists prefer the South.

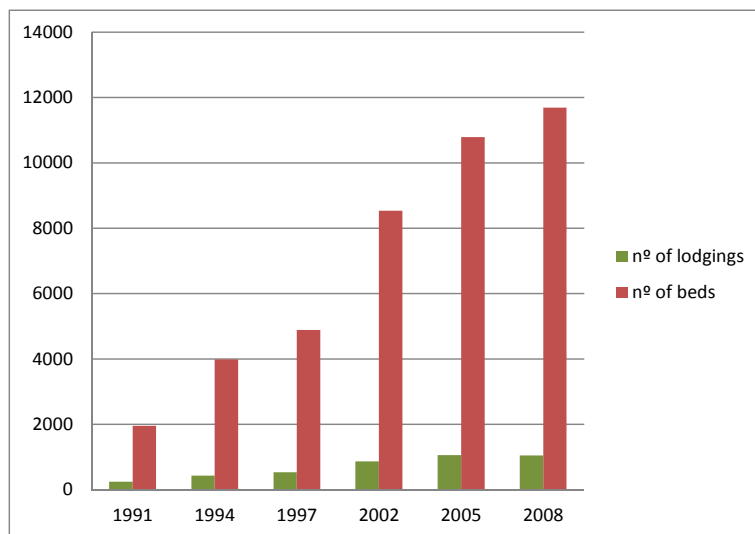


Fig. 1. Evolution of *rural tourism* accommodation capacity in Portugal

#### 4. Characterization of rural tourism in Spain

In Spain the foundations of this form of tourism are to be found in the 80's of the 20<sup>th</sup> Century, although its principal development occurred over the 90's - and since then has grown every year. *Rural tourism* has a very different geography to mass tourism of hotels and apart-hotels. The mass tourism of sun and beaches are located along the Mediterranean coast, whereas *rural tourism* spreads to the interior of Spain and is particularly focused on the North, especially in the communities of Cantabria and the Pyrenees. The number of beds for all *rural tourism* lodging represents no more than 2% of the total offer of tourist facilities. Nevertheless, for Spain's image, it is of great strategic value, since its tourist offer becomes more diversified and therefore more attractive.

*Rural tourism* lodgings are defined as establishments or homes ("*viviendas*") for tourist accommodation, with or without other ancillary services, and recorded in the corresponding registry of tourism lodging of each Autonomous Community. These lodgings share certain characteristics: they are located in rural areas; they are buildings boasting the architectural typology of the zone or are integrated in farms that maintain active farming and offer a limited number of beds and bedrooms to accommodate guests and meet certain infrastructural and basic equipment requirements.

In Spain there are currently over 30 forms of rural houses in regulated *rural tourism*, although they may be basically grouped into two types of Rural Houses (Cottages) and a

third type called a Rural Hotel (Soret, 1999). As mentioned by Soret (1999), there are other forms of very specific accommodation, sometimes limited to a single autonomous region. Such are the cases of Rural Camping, Rural Tourism Centers or Rural Youth Hostels. The entrepreneurs are mostly rural residents, whose main occupation has been agriculture, livestock breeding or some other profession different from tourism. Before the 80's, Spain did have a traditional form of tourism in rural areas, characterized by second homes and the use of family homes.

The first planned experience in *rural tourism*, which emerged in the 60's of the 20<sup>th</sup> Century, was named after the program *Vacaciones en Casas de Labranza* (Vacations in Farmhouses) and were intended as a way of revitalizing certain declining rural areas. This program enabled farmers and ranchers to access economic aid with a view to improving their homes and facilities, although it continued to promote this new offer in the marketplace by developing a guide to all Farmhouses. The program lasted several years before disappearing, a victim of a time when the ideal vacation was sun and beach tourism. During that time many townspeople preserved their own homes or ties with rural families, and the intention of many owners who joined the program was purely to improve houses for their own use.

The first consistent experiences of *rural tourism* in Spain resulted from the use of funds provided by the European Economic Community (nowadays, European Union-EU), whose intention is to diversify economic activities in rural areas (Soret, 1999). Application of EU regulations fell to the Ministry of Agriculture of the Autonomous Communities. Initially the development of tourist activities was highly concentrated in certain autonomous regions, namely: the Basque Country, Cataluña and the Balearic Islands. The offer was limited to Agritourism (Farmhouse tourism), i.e. the offer of agro-pastoral and forestry activities, along with the opportunity for tourists to know more about them.

In the 1989-1993 period, Spain was, after Ireland, the European Union country to receive most funds for the development of *rural tourism* in the less developed regions and whose GDP (Gross Domestic Product) was less than 75% of the EU average. The EU (European Union) program, Leader I, benefitted 53 rural areas, in particular through the creation and rehabilitation of infrastructure for tourism lodging. Subsequently LEADER II and PRODER (a Spanish venture with similar intentions to LEADER) was approved. These programs also include support for *rural tourism*, although the planned investments were lower than in LEADER I. The agrarian administrations in the autonomous communities in Spain play a key role as regards LEADER II, since they have to bear the main functions of advising, monitoring and supervising the Local Action Groups (Mejias, 1995). They also establish the regulations, the incentive to increase offer through economic aid, and stimulate demand through promotional campaigns. Some governments of the autonomous regions bordering on the coast, conventionally regarded as destinations for sun and beach tourism, saw an opportunity in the rural areas to create a different, diverse tourism market, by associating *rural tourism* with an offer of quality. As an example, Andalucía created Tourist Villas. These accommodations, publicly owned and privately managed, are located near rural and natural areas of great value.

The standards set up by the administrations that were developed enabled Country Houses to be legalized. The first type of *rural tourism* lodging emerged in Catalonia in 1983 with the

designation of Residencia Casa-Pagès (Pagès House Residence). Three years later the Aragon Community regulated the mode of Vivenda de Turismo Rural (Villa Rural Tourism). The Basque area was the third region, in the eighties, to follow the footsteps of Catalonia with the Alojamiento turístico-agrícola (Agricultural Tourist Accommodation). This was followed by Navarra (1990), the Balearic Islands and Asturias (1991), Extremadura, Galicia, Murcia and La Rioja (1992), Castilla and León (1993), Castilla-La Mancha and Valencia (1994) and Andalucía (1995).

The growing interest in providing the tourist market segment that embraces the rural interior as an alternative or complement to other destinations led Madariaga (1999) to examine its development from the existing data at international, national (Spain), regional and local level for the year 1994. Fuentes (1995) also conducted an analysis covering 1994 of the key characteristics of demand for *rural tourism* in Spain, through telephone interviews over three months, involving 1466 people living in the different Autonomous Communities. The results of these studies highlight the following:

- The population center with over 100 000 inhabitants and with higher rates of exit to rural areas were Catalonia, C. Valencia, Madrid, and the Basque Country.
- Tourists from Catalonia and Cantabria use the hotel as the host facility, Aragon tourist lodge in Rural Houses, and those of Murcia and Navarre prefer Camping.
- The hill communities (Aragón, Asturias and Catalonia) and those inland (Andalucía, the Balearic Islands, Cantabria, Castilla-La Mancha, Extremadura and Galicia) are the most commonly visited by tourists from rural areas.
- Travel to the rural areas tends to be massive, repetitive and heterogeneous
- 1. Given the high percentage of those who have made at least one trip, without considering the residents of urban centers with less than 100 000 inhabitants, immigrants and foreigners, nor those who travel just for one weekend.
- 2. Since most tourists made two or more trips to rural areas and 25.6% made three or more trips.
- 3. Because behaviors differ depending on the urban centers
- Most tourists belong to the middle and upper social class and have secondary-higher education. Tourists are principally motivated by:
  - The birthplace or the family residence.
  - The calm, relaxing place
  - The interest in sightseeing, touring, performing outdoor exercises and enjoying the festivals.
- July and August are the months *par excellence* when *rural tourism* is practiced, followed by the period of Holy Week (Easter).
- Most tourists are accommodated in the houses of relatives, or friends, or in second homes (homeowners).

Furthermore, data from Spain's National Institute of Statistics (INE) reveal that in 2001 the number of lodgings in *rural tourism* represents a small fraction, i.e. 3.2% (5996) of total lodgings (including hotels, campsites and apartments) and 2% of the total number of "plazas" or beds available. In 2005, there were 9 633 rural lodgings and 83 927 beds (see figure 2).

Over the last two decades, the highest occupancy rate has been July, August, and Holy Week (Easter). The tourists are almost all Spanish, followed by Portuguese and Germans.

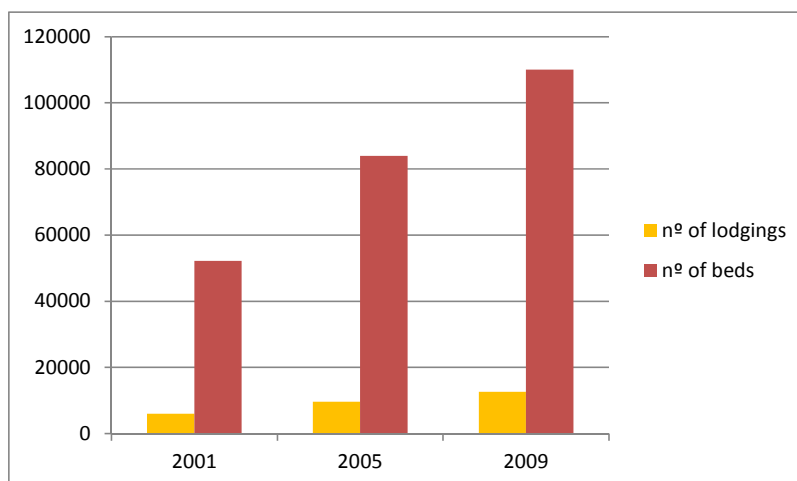


Fig. 2. Evolution of *rural tourism* accommodation capacity in Spain

## 5. Quality in rural tourism

In the early 90's of the 20<sup>th</sup> century, the economic and political crisis, changes in tastes, the increased demand and new trends in demand and diversification serve as a catalyst in terms of concerns for the quality of tourism businesses. They tended to develop a culture of quality in company management and to use quality tools to improve communication internally, as well as with customers in order to identify their needs and bring the company closer to the tastes and interests of demand.

Nevertheless, not all the tourism industry has taken advantage of the effort. This initiative requires the deployment of quality in areas of management and human resources to reposition or restructure their businesses in order to increase productivity, improve efficiency and quality of services whilst other businesses exhibit quality only as a cosmetic improvement or as a panacea for sales. In such cases there are no real, genuine improvements.

The application of quality management in the tourism sector is not without its misgivings and objections, often the result of inertia to change. In this sense, some argue that standardization and certification can be understood as a loss of differentiation and added value of brands. Others argue that this involves an additional burden to the already excessive administrative regulations, in other words, more bureaucracy, beyond the fear of possible interference of public bodies who may not know about the real sector and the constraints of the market.

However, management with no regard for the main principles of total quality<sup>1</sup> can lead to arbitrariness, abuse, neglect and customer dissatisfaction. The main principles of Total Quality Management are: Leadership (create an environment that ensures its success); Training (regular training since quality-employees should receive regular training in quality methods and concepts); Customer Focus; Decision Making (decisions based on measurements); Methodology and Tools; Continuous Improvement); Company Culture (work together to improve quality); and Employee Involvement and Empowerment.

Standardization of quality does not mean that every tourist offer should be undifferentiated and homogeneous. Each tourist product, and even each hotel or rural lodging, should have appropriate requirements and mechanisms to achieve customer satisfaction, in a context of continuous improvement. In an environment of market globalization and deregulation, and of increased tourism offer, the frustration of tourist' expectations, which is resolute and informed, leads to a reduction in demand and a loss of competitiveness. Quality is a guarantee of excellence and adds value to products or tourist destinations.

The success of quality policies in rural destinations requires global intervention, i.e., Integrated Quality Management (IQM) at the destination. Thus, each destination will have to define strategies with its key partners to implement good practices and the continuous development of a tool to monitor and evaluate quality in order to adjust the quality policy to the economic, social and environmental context at the destination. Integrated Quality Management has its reference to the European Model for Total Quality- EFQM Excellence Model (European Foundation of Quality Management), which constitutes the basis on which to evaluate companies. However, its merits are focused primarily on the possibility of allowing companies to practice self-assessment and provide organizations with a benchmarking tool. This latter aspect is particularly important as it offers a global comparison of the company with another winner of the Award of Excellence.

### 5.1 RURALQUAL scale

Two groups of research have been studying the construct of perceived service quality: the Nordic School and North-American School. The emblematic model of the Nordic School is the Image Model or Perceived Overall Quality (Grönroos, 1990, p. 41), which regards the quality perceived by customers as the result of a comparison of the service image that customers have prior to receiving the service with the image in their mind after experiencing the service. Thus, Grönroos (1990) considers that the quality experienced by a customer is based on two dimensions (technical quality and functional quality), moderated or influenced by the corporate image, which acts as a filter. However, The North-American School (Parasuraman, Zeithaml and Berry, 1988) defines service quality as the customer's assessment of the overall excellence or superiority of the service. The Gaps Model (Parasuraman *et al.*, 1985) proposed four possible gaps that could occur in the process to provide the service. Gap 5 is a function of the four initial gaps, which represents the difference between initial expectations and the perceived service experienced by customers:

- GAP 1 - the difference between the customer's expectations and management perceptions of customer expectations;
- GAP 2 - the difference between the firm's quality specifications and management perceptions of customer expectations of the service and its quality;
- GAP 3 - is the difference between the quality of the service delivery and quality specifications;
- GAP 4 - is the difference between the quality of the service delivery and the quality promised in communicating the service.

Moreover, in both models the service quality perceptions result from a comparison between customer expectations and service performance. The service expectations could influence the image, personal needs, friends' word-of-mouth, firm publicity, own past experience, and



so on. We can say that when expectations rise, for the same service delivered, the less the perceived quality will be.

Among all the models developed by academic researchers to measure service quality, the pioneer work of Parasuraman, Zeithaml and Berry (1985, 1988) can be considered as the most popular framework for assessing service quality. Starting with the definition of service quality as the customer's global vision regarding the excellence or superiority of the service, they develop an instrument to measure service quality, namely SERVQUAL, based on a comparison of the previous expectations of the users of the service and their perceptions in relation to the received service. The authors suggest that the reduction or elimination of that difference, gap 5, depends on an efficient management of the service firms.

As critics of the SERVQUAL scale, Cronin and Taylor (1992; 1994) proposed the SERVPERF scale, based on performance-only (perception of the result) of the service, without keeping in mind the customers' initial expectations. As for the dimensionality of the service quality construct, Parasuraman, Zeithaml and Berry (1985) propose the existence of five dimensions in their SERVQUAL scale: reliability, responsiveness, empathy, assurance and tangibility. The literature review of the proposed dimensional structures seems to indicate that they differ mainly at aggregation level (Brady and Cronin, 2001). Therefore, some authors mention that service quality is a specific concept of the industry addressed (Babakus and Boller, 1992), suggesting that the number and the nature of the dimensions of service quality are directly related to the service analyzed. In this sense, many researchers have opted to adapt the SERVQUAL scale to the tourist sector or to propose alternative measure scales. In this way, scales for several sectors of business have appeared, such as: LODGSERV for measuring service quality in hotels (Knutson *et al.*, 1990) or LOGQUAL (Getty and Thompson, 1994), or even HOTELQUAL (Falces *et al.*, 1999), DINESERV proposed for restaurants (Stevens *et al.*, 1995), HISTOQUAL for historical houses (Frochot and Hughes, 2000) and ECOSERV measuring the quality perceived by eco-tourists (Khan, 2003).

Following this line of research, Loureiro (2006) proposes a scale of 22 items, designated RURALQUAL, based on the SERVQUAL scale of Parasuraman *et al.* (1985, 1988, 1991) for the rural tourist sector, but asks consumers to evaluate performance-only, as proposed by Cronin and Taylor (1992, p. 58-66). The reason supporting this choice was justified by a review of existing studies which appeared to demonstrate the superiority of perception statements only over other existing measures and particularly over the gap measure. Indeed, Cronin and Taylor (1992) demonstrated that the unweighted performance-based measure of service quality (SERVPERF) contributed most to the variation observed in the global measure of service quality. These results have been supported by several other studies (e.g., Armstrong *et al.*, 1997; Suh *et al.*, 1997; Fick & Ritchie, 1991). The use of the performance-only scale is also justified by the dynamic nature of the customer's expectations and by the increased effort expected of the tourist to complete two questionnaires, one before using the lodging (expectations) and another afterwards (perceptions), which would considerably reduce the number of tourists willing to collaborate in the measure of quality.

Table 1 shows the six dimensions of RURALQUAL (see also Loureiro and Miranda, 2008; Loureiro and Miranda, 2009; Loureiro and Kastenholz, 2011). The dimension, called Professionalism, refers to well-presented meals, clean and neat appearance of employees, and their readiness to attend customers in a kind and personalized way. The dimension

Reservation includes items reflecting aspects of reservation of the accommodation. The third dimension, referred to as Tangibility, groups items regarding aspects of cleanliness, comfort and acclimatization of rooms, furniture, and other aspects related to the lodging's physical environment. Complementary Benefits includes items referring to the decoration, easy parking and access to the lodging. Rural and Cultural Environment covers items reflecting the possibility of immersion in the region's rural way of life, such as typical gastronomy, fairs, special festivities and other aspects of cultural and recreational interest. Finally, Basic Benefits refers to the natural beauty of the place, the calm setting, the typical architecture, and the employees' awareness of their duties.

Professionalism	The rural lodging food is well presented and flavoursome.
	The rural lodging employees have a clean, neat appearance.
	The clients are treated cordially and affably.
	A personalised attention is provided to each client.
Reservation	Arrival schedules are established but are quite flexible.
	Room reservation is easy to make.
	The reservations are confirmed in the most convenient way for the client, other information of interest is also forwarded (e.g. access map).
Tangibility	The rural lodging facilities are in good condition
	The rural lodging facilities and rooms have comfortable furniture.
	The rural lodging has a pleasant temperature.
	The rural lodging facilities and rooms are clean.
Complementary Benefits	The decoration uses materials and objects of local tradition.
	Access to the rural lodging is easy.
	The lodging offers easy parking.
Rural and Cultural Environment	The clients are integrated in the region's rural lifestyle.
	Typical gastronomy of the region is included in the menu.
	Access to cultural, recreational and/or sports activities is facilitated.
	In the surrounding region there are fairs, local festivities, and other forms of cultural interest.
Basic Benefits	The lodging employees are aware of their duties.
	The lodging architecture has the region style.
	The lodging is located in an area of great natural beauty.
	The lodging is located in a calm place.

Table 1. Dimensions and items of RURALQUAL scale

## 5.2 Brands for quality in tourism

According to AMA (2011), a brand can be defined, as “a name, term, design, symbol, or any other feature that identifies one seller's good or service as distinct from those of other sellers. The legal term for brand is trademark. A brand may identify one item, a family of items, or all items of that seller. If used for the firm as a whole, the preferred term is trade name”. Following such a perspective, a brand adds value for the consumer and the firm, .reduces the perceived risk to purchase the product (good or service), and has a particularly important role when, in advance, it is difficult to evaluate the performance of the product (De Chematony and McDonaid,, 1994). Moreover, a brand, as a reference point, can facilitate recognition and promote customer loyalty. The brand also

differentiates the products and can even transfer their identity to consumers in order to involve them. With regard to the firm or company, the brand is a competitive advantage with its own system identity and has commercial value (Aaker, 1996; Kapferer, 1992). A strong brand can sell the product at a higher price and can develop a powerful sense of belonging among employees in a firm or company.

In the field of *rural tourism*, the Spanish Tourism Quality Plan (STQ), conceptualized by the Secretary of State for Trade, Tourism and Small and Medium Enterprises (SME) proposes the development of a common methodology for all tourism sub-sectors that are involved in the quality improvement of its products. The plan put into action now, envisages the following strategies:

1. Support to build systems that ensure the management and quality improvement of goods and services in different sub-sectors in tourism (quality measurement should refer to the service delivery, facilities and equipment).
2. Support to give rise to a unique brand, the Spanish Tourism Quality brand (the goal is to support recognition of the brand image of Spain as a destination for quality).
3. Support the participation of the Spanish business organizations in the international standardization institutions for quality.



Fig. 3. Brand of the Spanish Tourism Quality

According to Navarro (1999), the design of a unique quality identity for the tourism industry signifies the development of a common methodology to offer a similar level of standards, accreditation procedures and certification, and control. The rural lodging that achieves the required quality level can employ the "Q" of quality.

In Portugal, TURIHAB, a company created in 1983 in Ponte de Lima (the Minho - North of Portugal) by a group of ten owners of rural lodgings, now covers the entire Portuguese territory, with more than 100 rural lodgings, launched a *rural tourism* quality identity. *Solares de Portugal* (Manor Houses). This product, in terms of lodgings, consists of Ancestral Houses (heritage) Farm Houses (Quintas & Herdades) and Rustic Houses. Internationally, TURIHAB promotes rural lodgings and other tourism activities (such as green tours, wine, and handicrafts).

**Ancient Houses (heritage)** - Manor houses characterized by a classical architecture, built between the 17th and 18th Century, and houses of heritage value associated with certain periods and movements in history. Ancient houses are filled with ancient furniture and paintings and sculptures of famous artists (Housing Tourism).

**Farm Houses** - (Agritourism) are characterized by the existence of a farm, whose main house could fit into the classical architecture, heritage or rustic character.

Rustic Houses - are located in rural environment, characterized by using local materials, simple architecture and small size, simple but comfortable furnishings (Rural Tourism).



Fig. 4. Brand of quality of lodgings in rural areas

Following the creation of the brand in Portugal, TURIHAB decided to establish a quality brand at European level, Europe of Traditions. In an initial phase it operated with partner groups in the Netherlands, France, Great Britain and Ireland. Europe of Traditions focuses on personal hospitality and the enjoyment of traditions and culture. Later, Europe of Traditions was extended to Germany, Hungary, and Slovenia. Currently, they are establishing a bridge to Brazil through Europe of Traditions- a transatlantic vision.

## 6. Rural experience

The seminal work of Holbrook and Hirschman (1982) offers a new approach to the consumer behavior field, by regarding the consumption experience as a phenomenon directed toward the pursuit of fantasies, feelings and fun. Consumers feel, think, do, and act and emotions play a role in choosing a brand, a store, or a product.

The first decade of the 21<sup>st</sup> Century marks the appearance of different contributions focused on consumer experience (e.g., Addis and Holbrook, 2001; Carù and Cova, 2003; LaSalle and Britton, 2003; Milligan and Smith, 2002; Ponsonby-McCabe and Boyle, 2006; Prahalad and Ramaswamy, 2004; Schmitt, 1999; Schmitt, 2003; Shaw and Ivens, 2005; Smith and Wheeler, 2002). Thus, consumer experience is a continuum ranging from experiences that are mainly created by the consumers, to experiences that are developed by companies, passing through experiences that are co-created. In the last situation, companies provide artifacts, contexts, and the right environment to help consumers to create their own experiences (Schmitt, 1999; Carù and Cova, 2003; Carù and Cova, 2007). The consumer molds the artifacts and raw materials to obtain his/her own experience.

In this vein, researchers have been presented with different perspectives of consumer experience with some common dimensions. Schmitt (1999) proposed a model that identifies five experiential facets: sensory experiences (sense); affective experiences (feeling); creative cognitive experiences (thinking); physical experiences, behaviors and lifestyle (acting); and social-identity experiences that result from relating to a reference group or a culture (relating). Fornerino et al. (2006) identify five dimensions of experience: sensorial-perceptual, affective and physical-behavioral (i.e., components) and social and cognitive (facets). Later, Gentile, Spiller, and Noci (2007) present six components of consumer

experience: Sensorial (sense-see, hearing, touch, taste and smell can generate pleasure, excitement, satisfaction, sense of beauty); Emotional (moods, feelings, emotions that can generate affection); Cognitive (related to thinking or conscious mental processes); Pragmatic (resulting from a practical act of doing something); Lifestyle (the system of values and beliefs leads to the adoption of a lifestyle and behaviors); Relational (relationship between a consumer with other people or also with his/her ideal self).

Customer experience originates from interactions between a customer and a good/service, a company, or part of its organization (LaSalle and Britton, 2003; Shaw and Ivens, 2005) or even a brand. However, customers can relate with other customers during the consumption experience. Therefore, the evaluation depends on the comparison between a customer's expectations and the stimuli provided by previously mentioned interactions.

As regards the tourism field, Otto and Ritchie (1996, p. 166) state that the tourist experience "can be described as the subjective mental state felt by participants" implying holistic evaluations of affective expressions and representations of experiential, hedonic and symbolic benefits. The *rural tourism* experience can be regarded in the light of this perspective. Rural tourists come to the countryside to escape urban areas and mass tourism. Thus, the rural experience is the subjective and emotional mental state lived by rural tourists in their interaction with people (friends, family, couple, inhabitants, and service providers) rural places, rural resources, facilities, and rural activities and festivals.

## 7. Integrative model of experience and quality in rural tourism

The process of decision-making and the preparation of *rural tourism* create expectations among potential tourists. The image of *rural tourism* in the tourist's mind prior to each real experience encapsulates the perceptions of *rural tourism* as reflected by the associations (lodging, space, activities, landscape, people, travel, advertising) held in the tourist's memory. So associations are the informational nodes linked to the *rural tourism* mode in memory and contain the meaning of the rural for tourists.

Past experience memories, word-of-mouth, marketing communications (statements, pictures, advertisements posted in destination and lodgings websites; communications in travel agencies, advertisements in newspapers, the radio, TV and so on), and expectations are factors that influence the rural experience. In other words they are precursors of the experience, the pre-experience. In addition, self-expression, attachment to *rural tourism* experience and rural place identity are other constructs that play the role of antecedents of the *rural tourism* experience and perceived quality.

Self-expression represents the tourist's perception of the degree to which the specific *rural tourism* place or destination enhances one's social self and reflects one's inner self. When the tourist searches for information about a locality, place, rural destination, and lodging, he/she tends to select the place with which he/she identifies himself/herself. The tourist should prefer the rural place that plays a significant role in shaping his/her identity. Thus, tourists tend to identify themselves with rural places that reflect their personality, symbolize the kind of person they are inside, and are consistent with the social group they belong or aspire to.

Attachment per se was first studied in parent-child bonds, but has proven to be a robust theoretical framework for looking at romantic love (Hazan and Zeifman, 1999). In consumer

research, consumer-object bonds have also been widely studied (Kleine, Kleine III, and Allen 1995; Wallendorf and Arnould 1988). Place attachment means an affective bond between people and specific places (Hidalgo and Hernandez, 2001; Williams and Patterson, 1999; Williams and Vaske, 2003) through accumulated experiences in the place (e.g., Stedman, Beckley, Wallace, and Ambard, 2004; Smaldone, Harris, Sanyal, and Lind, 2005; Worster and Abrams, 2005; Ednie, Daigle, and Leahy, 2010).

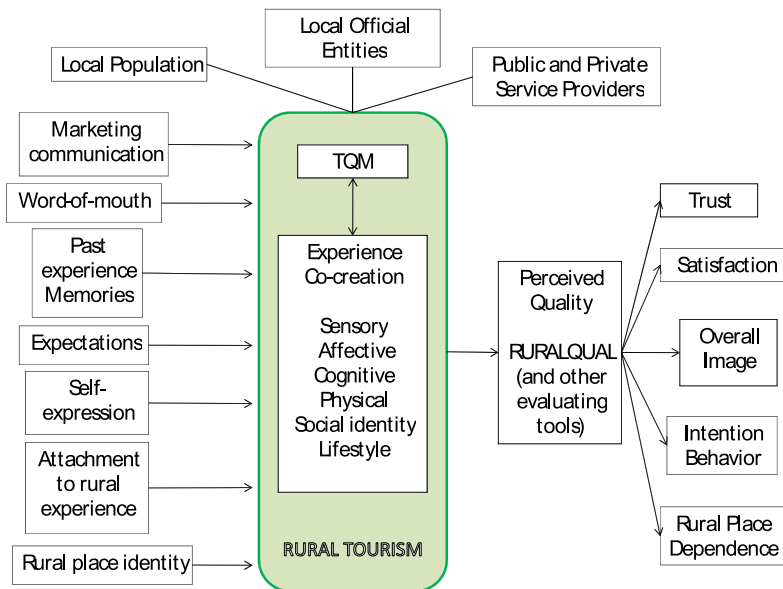


Fig. 5. Antecedents and consequences of rural experience and quality in *rural tourism*

Place attachment can be regarded as having two distinct dimensions: place identity and place dependence (e.g., Williams et al., 1992; Backlund and Williams, 2003). Therefore, place identity refers to a symbolic or affective attachment to a place. Place dependence can be defined “as a person’s assessment of a specific place and the awareness of the facilities and uniqueness and other forms of functionality dependence, and how these can meet the needs and the goals of the tourist” (Hwang, Lee, and Chen, 2005, p.146).

In this vein, attachment to rural experience will be an affective bond or link between the tourist and tourist groups (such as a couple or family), and a *rural tourism* experience. The rural experience involves the rural place, landscape, festivals, rural activities, local population, local official entities, lodgings, restaurants, and other public and private service providers.

Rural tourists who enjoy a good rural experience, perhaps a remarkable one, who favorably evaluate the quality of the place, festivals, rural activities, lodgings, and others facilities will be satisfied. Satisfaction is associated with meeting expectations (through the perception of a “fair service” and the resulting good feeling) (Oliver, 1981). Oliver (1993) demonstrated the existence of significant relationships between positive affective experience (interest and joy) and satisfaction/dissatisfaction responses. Thus, tourist satisfaction can be defined as an

overall emotional and cognitive evaluation or judgment after consumption or experience (Bigné et al., 2001; Loureiro and Miranda, 2008; Loureiro and Kastenholz, 2011).

Morgan and Hunt (1994, p. 23) define trust as “confidence in an exchange partners’ reliability and integrity”. Therefore, trust is the belief that a party’s word or promise is reliable and a party will fulfill its obligation in an exchange relationship. So, the partners could, on the one hand, be the tourist and, on the other hand, the local rural population, entities, and service providers. As Loureiro and Miranda (2008) point out: satisfaction exercises a positive effect on trust and both influence tourist loyalty.

Loyalty has been regarded as “a deeply held commitment to re-buy or re-patronize a preferred good/service consistently in the future, thereby causing repetitive same-brand or same brand set purchasing, despite the fact that situational influences and marketing efforts have the potential to cause switching behavior” (Oliver, 1999, p.34). Several previous studies mention that loyalty may be distinguished among behavioural loyalty, attitudinal loyalty and composite loyalty (considering the aforementioned two constructs). Consequently, in consumer research, the term customer loyalty is often measured by indicators like the “intention to continue buying the same product”, “intention to buy more of the same product”, and “repeat purchase” (behavioural measures) or “willingness to recommend the product to others” (attitudinal indicator, reflecting product advocacy). Thereby, in the tourism field, behavioural loyalty can be measured as the future likelihood to come back to the destination (Kozak and Rimmington, 2000; Kozak, 2001; Kozak and Beaman, 2006; Yukse, Yukse, and Bilim, 2010; Loureiro and Kastenholz, 2011). Attitudinal loyalty can be regarded as the willingness to recommend the rural place, lodging (Loureiro and Kastenholz, 2011), or even the experience to others and thus positive advocacy.

A favorable experience and a positive service evaluation can lead to a positive overall image. Thus, the overall image in the tourist’s mind will be the perceptions about *rural tourism* as reflected by the associations retained in the tourist’s memory after living the experience.

## 8. Conclusion and implications

In this chapter a literature review was conducted in the field of *rural tourism* regarding characterization of this type of tourism and the presentation of quality, *rural tourism* experience as core concepts. Furthermore, a model showing an overview of the antecedents and consequences of rural experience and quality in *rural tourism* was proposed.

This conceptual model will contribute new knowledge to the area of *rural tourism* research. For academic researchers, such knowledge illustrates that the identification with the rural and its characteristics, marketing communication, word-of-mouth, and *rural tourism* attachment can lead to a favorable evaluation of quality and a positive rural experience. When tourists enjoy a good experience, especially if they perceived the experience to be beyond their expectations, then they will be satisfied and trust in the local *rural tourism* population, entities, and facilities, they will be more inclined to return to the place or will try to find a similar *rural tourism* experience. Thus, the overall image will be positively encoded in their minds.

For rural local official entities, public and private service providers, and even the local population of rural destinations, the anticipated outcomes should offer an insight into the

potential for rural area sustainability to help to provide a good rural experience and offer a good level of service quality.

Future research should test the model on several rural areas in different countries. This comparison between countries should enable one to detect common features, as well as specificities, and refine the model, thus providing a broader insight for both researchers and managers.

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# Islands and Tourism Development: A Viewpoint of Tourism Stakeholders of Lesvos Island

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## 1. Introduction

When discussing about island economies and societies, one is always troubled as to the definition and measurement of an "island". In terms of definition, the word *island* relates to the old French loanword *isle*, which itself comes from the Latin word *insula*<sup>1</sup>. In terms of measurement, the main components of an island seem to be "*smallness*" and "*remoteness*". Because of these components, unique development problems arise in island economies and societies, especially if they are located far from their major markets.

*Smallness* can be defined in terms of the physical size (land area), population and GNP (or GDP), or a combination of these variables as attempted by Kakazu (1994), depending upon the purpose of the analysis. *Remoteness*, due to the discontinuity of the geographical space, seems to be the most distinguishable characteristic of all island societies. Kakazu (2007) suggested that, the measurement of an island has to take into consideration additional factors, like "isolation", "migration", and "external sources of income (especially *tourism*)", in order to better understand, analyse and classify island areas.

It is noted that the Island Regions of the European Union drafted a Manifesto (2005) that pursued an objective, set in motion by Article 158 of the Treaty of Amsterdam (which article assigned particular importance to reduction of the backwardness of less favoured regions as a means to achieve the goals of economic and social cohesion). They suggested that effective consideration of the *handicaps* faced by EU Island Regions (like: isolation from larger markets, seasonality, loss of high quality human resources, and other structural problems), must be transformed into specific political actions and clear legal provisions, fully integrated in the system of European decisions. They emphasised that the competitive integration of the insular regions is appropriate, in compliance with the framework foreseen by the Lisbon Process, based on the advantages of the areas in question.

There is, however, a number of characteristics of island areas, which can be considered as *advantages* over larger areas, such as that: a) they can be model cases for a zero-emission

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<sup>1</sup> Dictionary.com. <http://dictionary.reference.com/browse/Island>. Retrieved 2007-03-05.

society (Kakazu, 2007), b) they could be benefited from the developments on the sector of Information and Communication Technologies (ICTs) which have the potential to increase the accessibility of insular regions (Kitrinou, 2009), and c) the main advantage of the island areas seems to relate to the fact that, they have enormous potential to develop a *tourism industry*, which is a future-oriented industry and it is becoming the most important source of foreign exchange income for insular regions.

Referring to Greece, island space constitutes an economic, social, cultural and strategic resultant of its national substance and heritage. Roughly 15% of the Greek population lives in the islands, which cover the 19% of the country's land. All over Greece, but especially in the Aegean Archipelago, there are numerous small and medium-sized inhabited islands. For most of them, the basic economic activity for the past three decades has been tourism, which has influenced not only the economic life of the islands, but also their population structure and environmental conditions (Coccossis, 2001; Haralambopoulos and Pizam, 1996; Loukissas, 1982; Mantoglou et al., 1998). Tourism has helped to halt economic problems and population losses through the creation of new jobs, which to an extent balanced the loss of jobs in agriculture and manufacturing, and through increases in the domestic product and income (Coccossis, 2001; Lagos & Gkrimpa, 2000). The fact that many people are occupied in the tourism sector led to population growth and to a reduction of the out-migration rate that had been very high in the Aegean Islands over previous decades (Sophoulis & Assonitis, 1998).

In the aforementioned framework, this paper focuses on the advantage of tourism development, suggesting that tourism industry is becoming the most important source of income and employment for the local economy, especially for island regions. It emphasises that tourism constitutes important factor of regional development, especially in Greece, with positive contribution in the country's economic development and social cohesion, while the Greek islands have enormous potential to develop specific tourism policies, based on their characteristics and comparative advantages. The case of Lesbos Island is considered in detail, in order to investigate the extent to which the tourism stakeholders of the island are willing and able to take the initiative in implementing tourism development policies and investing in tourism projects, based on the EU general development policies for island regions. Also, through the survey results we are going to explore: a) potential statistically significant relationships between the characteristics of the enterprises or the characteristics of the entrepreneurs referring to their beliefs about the development of both sustainable and mass tourism models at the island and b) the factors that are a part of the entrepreneurs' *perceived satisfaction from both the basic and the tourist infrastructure in Lesbos Island*.

The remaining of the paper is organised as follows: In section 2 a theoretical framework is proposed, highlighting a number of significant features concerning the role and relationship of the public authorities and tourism entrepreneurs in the determination of tourism policy in insular regions. Section 3 presents the specific tourism characteristics of Lesbos Island. Section 4 presents the empirical survey design for the island in question and analyses the collected data. The final section 5 concludes the paper and proposes developmental policies for the island of Lesbos, concerning both the effective tourism policy framework and the appropriate tourism infrastructure and investments in the island.

## 2. Theoretical frame of tourism development

Tourism, according to the neoclassical theory of comparative cost, is considered to be integrated into the international labour division system among countries that are more or less developed, i.e. countries that produce industrial products of a high added value and countries the economies of which are based on the production of raw materials, where natural resources are more likely to support tourism development. Consequently, in a free trade environment and based on the principle of the comparative advantage which supports that each region specialises in the manufacture of products that utilise to the maximum those factors available in abundance in the particular region, those destination countries that are less advanced are driven, in terms of their roles as tourism flow destinations, to a specialisation of their tourism products (Lagos 1998:55-57, Lagos 2005:105).

According to the production factor theory developed by Heckscher (1949) and Ohlin (1933), in order for a country to commence a productive process, several necessary factors must be available, which are different for each country or region. The production and sale of tourism products and services is, to a particular extent, labour intensive, whereas the production of industrial products is capital intensive. Thus, industrialised countries or regions with a higher concentration of capital tend to specialise in the production of capital goods, whereas developing countries or regions tend to render services, such as tourism.

Contrary to the most orthodox theories of international trade, which presuppose a given offer and focus more on the offer side, the neoclassical theory focuses on the demand side. The theory of demand for a differentiated product between cooperating countries was first proposed by Linder (1961), who pointed out that the international specialisation of a country is to a great degree dependent on internal demand. According to Linder, the development of international tourism is the result of conditions that are created by internal tourism. The comparative advantage of a country stems from the quality of its superstructure and infrastructure, its tourism know-how, its technological level and its natural environment.

The New Economic Geography (Krugman 2001, Rovolis 2002) proposes that in the liberalisation of trade some regions present a particular "threshold" of activity concentration; once they have gone beyond that threshold, however, concentration becomes self-feeding, since businesses in these regions gain important profits, due to the centripetal forces. As a result of this, some regions continue to attract activities and some others keep losing them. Therefore, tourism activity can be easily integrated in this new theoretical approach, due to its "tourism urbanisation" characteristic (Lagos 2001), which favours local or regional development.

As far as sustainable tourism is concerned, there is a theory supporting that it is possible for all forms of tourism to be transformed into sustainable ones, if they follow the principles of sustainable or viable development (WTO 1993). The term "viable" tourism development describes the type of a well-balanced tourism development adjusted to local social, economic, cultural and environmental structures of each tourist destination, whereas at the same time it also shapes the conditions (services, infrastructure, know-how) for its continuous progress (Kokkosis & Tsartas, 2001). However, practice has shown that mass tourism cannot coexist with sustainable tourism development. These are two diametrically opposed forms of tourism, since viable tourism development automatically means rejection of mass tourism.

Over the past few years, the model of mass tourism experienced a declining yield, both on an international level and in Greece, a fact indicating that the mass consumption of tourism products and services has reached its limit. Tourism industry intensification on numerous islands as well as in coastal areas has brought not only various benefits, but also a series of concerns and problems related especially to tourist destinations bearing a special ecological value.

Today, this model of tourism development experiences a recession. The life cycle theory (Butler 1980) can be useful as an interpretational tool of the crisis of the 4S (Sun, Sand, Sea, Sex) and the “sun lust” model. The life cycle of the product often seems to correspond to the development of tourism product and the democratisation of vacations, where tourism demand addresses lower and lower income classes and is depicted by the 4S model. Therefore the beginning of the crisis can be combined with the crisis of the “4S model”. The democratisation of tourism tends to address parts of the population whose income gradually decreases. This process can be made possible due to higher productivity profits attributed to tourism becoming more of a mass activity. Productivity profits have the characteristic of reducing inflexible costs by means of certain artificial factors, such as the use of charter flights and the low-cost accommodation.

Coastal vacation tourism as the traditional development model, no longer satisfies the new demands of tourists. A clear proof of the above is the slow increase in the number of tourists visiting the Mediterranean countries, as well as the low occupancy rates of hotel accommodations.

In the case of a crisis of the structural type, mainly a product of economic concurrence, it is proposed to seek for a long-term model for tourism development, which shall focus on the promotion of quality against quantity and differentiation against homogenisation. So, in juxtaposition to the 4S a new model called 4E is proposed, which stems directly from tourist demands and the tourism product of the region receiving the tourists. This focuses on the following four variables (Varvaresos, 2009):

- Environment and clean nature
- Educational tourism, culture and history
- Events and mega events
- Entertainment and fun.

The proposed tourism development model is now a main strategy for a large number of countries so that they can have access to the “new tourism”. The essential difference when compared to the earlier model lies in the general concept related to tourism in the receiving country. Tourism is characterised as an industry, often even as a heavy industry, and thus it requires a great degree of planning.

### **3. Factors facilitating tourism development of Iesvos island**

Greece attracts more than 16 million tourists each year, thus contributing 15% to the nation's Gross Domestic Product Economy. The number of jobs directly or indirectly related to the tourism industry represents the 16.5% of the country's total employment (copyright: <http://www.statistics.gr>). A detailed analysis about the basic variables that represent the development of tourism in Greece during the period 1999–2002 can be found at: Rontos and



Sfakianakis (2009). They mainly suggest that Greece is still a middle and low-class summer seaside tourist destination, attracting tourists rather from Europe than from Northern America or Asia, while Greek tourists are the ones who have reinforced high-class tourism, due to income increases and their preference for short but qualitative holidays. Furthermore, an analysis about the specific characteristics of the Greek islands and a classification of them with regards to the charter arrivals can be found at Spilanis et al (2006).

Lesvos Island is the third largest island in Greece (in both land and population size) belongs to the Region of Northern Aegean. The capital of the island is Mitilini that pinpoints the economic growth of the island from the 18th century. Its castle was one of the most powerful in the eastern Mediterranean. It is also noted that the central offices of the Ministry of Aegean, the Regional Authority of Northern Aegean and the Rectorate of University of the Aegean are located at Mytilni. Island's coastline forms two bays in the south - Geras and Kallonis - and a plethora of creeks and capes. The main plains are those of Kalloni, Ipeos, Perama and Eressos and the highest mountains are Lepetymnos, Olympos. Generally the flora and fauna of the island are extremely rich. Today, 1,400 taxa (species and sub-species) of plants have been recorded on the island making Lesvos a "botanic paradise": aromatic, pharmaceutical, ornamental and rare plants, bushes and trees. The island has innumerable beaches to satisfy all its visitors, like Vatera, Varia, Agios Isidoro, Skala Eresou, Molyvos, Thermi and Anaxo. The coastal settlements that are notable for their particular colour are Molyvos (Mithymna) and Plomari with their architecture and natural beauty. Equally notable and peaceful is Sigri with its petrified forest. A map of Lesvos is following presented:



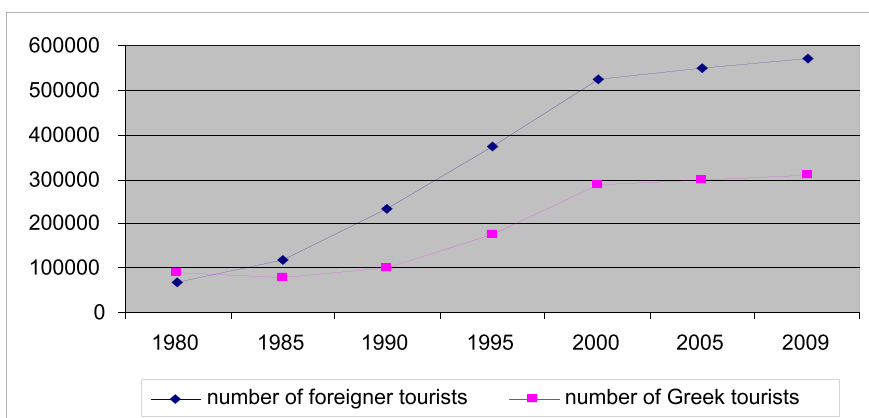
Map 1. Lesvos island (copyright:

[http://www.lesvosonline.gr/lesvos\\_gr/Map/maps/map\\_rd.htm](http://www.lesvosonline.gr/lesvos_gr/Map/maps/map_rd.htm))

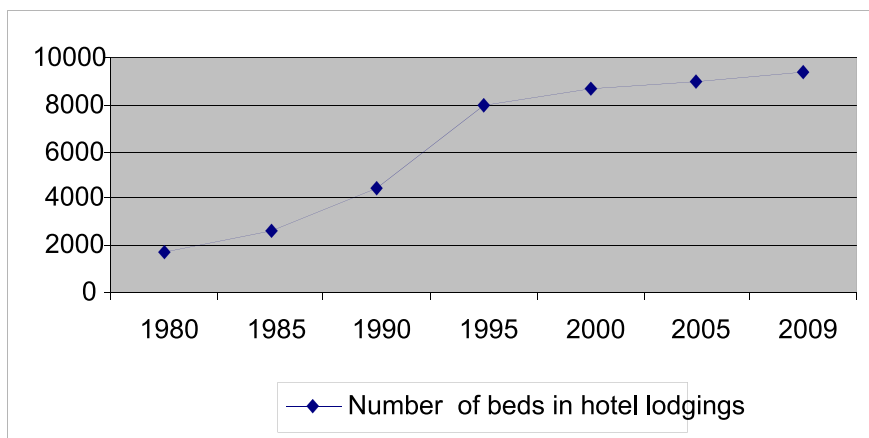
The climate of Lesvos is mild and healthy: the winter is warm and the sun shines throughout the year. Lesvos is one of the forested islands of the Aegean, apart from the olives groves found everywhere; pines, oaks, chestnuts etc cover a great proportion of its land. The local economy is based on the agricultural production with an emphasis on olive oil production (of exceptionally high quality), cattle-raising (mainly dairy products) and fishing. Additionally, distillery is developed and its main product is the world famous uzo. It is also noted that many of the island's inhabitants are professionally engaged in tourism.

The number of hotels and accommodation units has grown significantly in the last three decades. Molyvos is the main tourist place which maintains the market share in quality units, as each hotel is attaining a grade B from the Hellenic National Tourist Organization.

In other areas the quality of accommodation tends to be more diversified, while also more lower class accommodation can be found. The average utilization rate of accommodation is low for the island due to the short effective tourist season (June - September). The Graphs 1 and 2 following present the number of beds in hotel lodgings at Lesvos Island and the number of arrivals of foreigners and Greek tourists at the island respectively, during the period 1980-2009. We can note that the number of beds in hotel lodgings has been continuously increasing within the last three decades. The same increasing trend is noted at the arrivals of both foreigners and Greek tourists, while the number of foreigner tourists at the island is much greater than the number of Greeks, especially from year 1982 and on, which indicates the increasing demand for Lesvos, as a tourism destination, especially from the foreigners.



Graph 1. Number of beds in hotel lodgings at Lesvos Island, during the period 1980-2009



Graph 2. Number of arrivals of foreigners and Greek tourists at Lesvos Island, during the period 1980-2009

It is additionally noted that support services for tourism (such as tourism agencies, tour guides, vehicle rent shops and souvenir shops) are not yet very well developed on the

island. Other tourist facilities, like hospitals, banks, sports and transport (bus) facilities play a complementary role at tourist services.

The island is also rich in religious buildings. There are many monasteries, which exhibit various icons. Of special importance are the old picturesque villages, e.g. Molyvos, and the traditional industries, like olive oil production, ouzo production, leather, and wood carving and pottery industries. Archaeological sites, folk and art museums, Byzantine castles and cathedrals, ancient theatres, and Roman aqueducts can also be visited.

A case study concerning the sustainable tourism development at Lesvos Island has been developed by Nijkamp and Verdonkschot (1995). They focused on various sustainable tourism development options, developing a framework applicable to the island in question. This framework included and analysed the following options: exclusive tourism; agri-tourism; health tourism; adventure/sports-tourism; sea-tourism; cultural-tourism; winter tourism; educational tourism. Then, based on a system's impact analysis, they evaluated the impacts of these options to be: economic, human (or social) and natural (or environmental). A set of feasible impact indicators (economic, social and environmental) in the context of Lesvos Island was derived (an application of such impact indicators can be found in: Bithas and Nijkamp, 1995; Coccossis et al., 1991; Janssen et al., 1993).

In summary, it is noted that the attractions of the island seem to play an important role in its tourism development. The Mediterranean climate, the many beaches and bays, the beautiful landscape, and the size of the island offer the advantage of versified tourism with many options. Perhaps this is the reason that, until today, the tourism development of the islands is based on the 4S (sun; sand; sea; sex) and on the "sun lust" model. Nevertheless, the island has enormous potential to additionally develop its tourism product on the basis of a sustainable, 4E (Environment and clean nature; Educational tourism, culture and history; Event and mega event; Entertainment and fun) model for tourism. In this case, specific tourism developmental policies and plans, together with the appropriate investments will be required.

#### **4. Data and method**

The empirical study considers the case of Lesvos Island. The aim was to define the tourism entrepreneurs' perceptions about tourism development in the island and to investigate the extent to which the tourism entrepreneurs of the island are willing and able to take the initiative in implementing tourism development policies and investing in tourism projects. A structured questionnaire developed and addressed to entrepreneurs- owners of small sized businesses that are managed by the owners or by a responsible executive in the case of larger businesses (Hotels, Tourism Offices, Restaurants, Cafes, Bars, Tourist Shops, Tourist Boats, etc.). The questionnaire included four parts: the first part concerned about the characteristics of the sample enterprises; the second one about the demographic characteristics of the responded entrepreneurs; at the third part two perceptual scales were developed, referring to the degree of satisfaction of the respondents with regards to basic (port, airport, hospital, marines etc) and tourism infrastructure at the island in question; and the last part of the questionnaire included questions referring to attitudes and perceptions of the entrepreneurs about the application of the 4S and the 4E tourism models at Lesvos Island, and the appropriate policies for sustainable tourism development at the island.

The regional entrepreneurs register was used as a sampling frame and the systematic sampling method were implemented to collect data from 104 entrepreneurs activated in tourism sector. The survey took place during April and May of 2010. Well trained enumerators were employed for the data collection.

As concern as statistical analysis, a Crosstab-based Statistical Method (based on Chi-sq. tests) was firstly applied to identify statistically significant relationships between the characteristics of the enterprises or the characteristics of the entrepreneurs referring to their beliefs about the two models of tourism considered (4S and 4E tourism models). Following, a multiple step process is conducted (including reliability and factor analysis) to identify the factors that are a part of the *Perceived satisfaction from both the basic and the tourist infrastructure at Lesvos Island*.

The results are presented in the following paragraphs.

## **5. Results**

### **5.1 Sample characteristics**

#### **Characteristics of the sample enterprises**

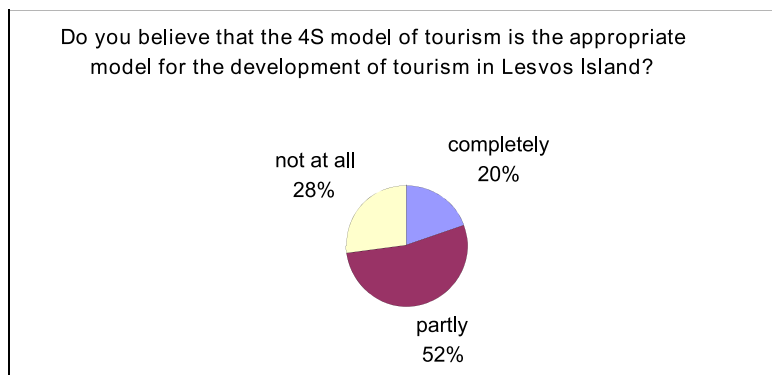
In the survey sample, the 31,7% of the enterprises are located at the municipality of Mytilene, the 34,6% at the municipality of Mithimna (Molyvos, which is the most touristic place of the Island, and the whole North Aegean region), another 10,6% are located at the municipality of Kalloni, the 9,6% at the municipality of Agiasos, the 7,7% at Thermi, while the remaining 5,8% at Plomari. With regards to the type of the sample enterprises, it is noted that 47,1% are restaurants/café/bar, 15,4% are hotels, 4,8% are rooms for renting, 7,7% are travel agencies, 8,7% are enterprises for renting cars or motos and the 16,3% are shops with traditional products. Referring to the legal type of the companies, the majority (67,3%) are personal enterprises. The 73,1% of the sample companies are family enterprises (the employees are members of the same family). It is also noted that the 59,6% of the companies are open continually (all the seasons of the year), and the 40,4% are open seasonally (specifically in summer time), while the average years that the sample companies are operating is 14,35 years (st. dev. 13,7years).

#### **Characteristics of the sample entrepreneurs**

The socioeconomic characteristics of the sample entrepreneurs are the following: 58,7% of the respondents are male, while the remaining 41,3% are female. The average age of the survey respondents is 44 years (st. dev. 11 years). Referring to the educational level, the majority of the respondents have a secondary education level (35,6%), following by those having a graduate degree (27,9%), (30%) and by those having a basic education level (27%), a professional diploma (8,7%) and postgraduate degree (1%). Additionally, from those having a graduate degree, the 42% their degree is relevant to tourism. Referring to the totality of the sample, a percentage of 48% have been educated in seminars relevant to tourism. The vast majority of the sample entrepreneurs (67%) believe that the role of the state constraints the development of their tourism company, mainly due to the role of the transport system at the specific island area, deficiencies in basic public services, and lack of advertisement/ promotion of the tourist product of the island in question.

## 5.2 Stakeholders' perceptions about the tourism models

The 4S (sun, sea, sand, sex) model of tourism (corresponding to mass tourism) together to the 4E ((Environment, Education, Event, Entertainment). model of tourism were presented to the respondents. It is found that the majority of the sample entrepreneurs (52%) believe that the tourism development of Lesvos Island could partially be based on mass tourism (the 4S model), the 20% believe that the tourism development of the island could completely be based on mass tourism, while a percentage of 28% of the entrepreneurs stated that the development of tourism has not at all to be based on the model of mass tourism. The results are presented in the following graph:



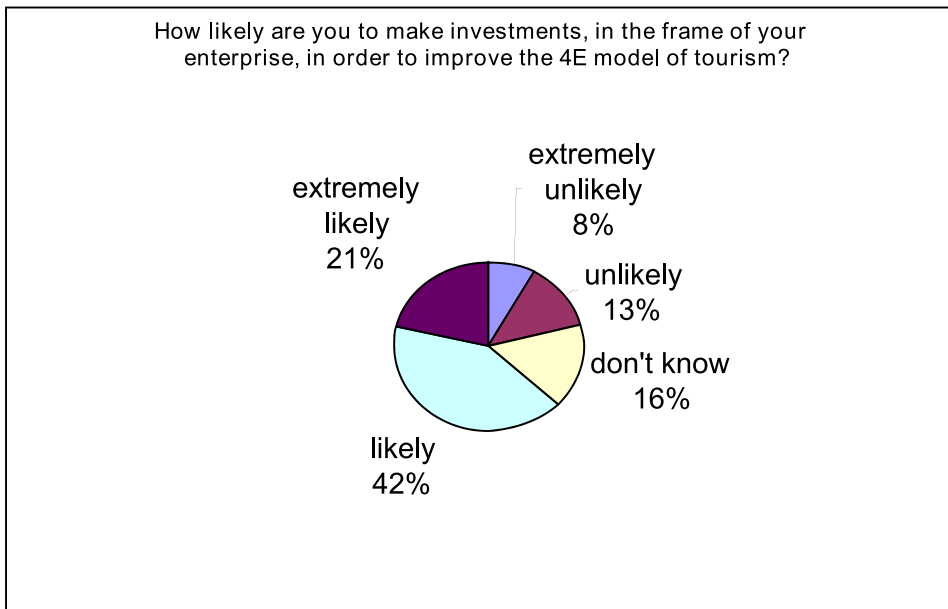
Graph 3. Stakeholders' perceptions about the tourism model of 4S in Lesvos Island

The entrepreneurs who believe that the tourism development of the island could completely be based on mass tourism (20% of the respondents), stated that this could be possible via mainly the improvement of the transport system of the wider Aegean Island area, together to improvements at the tourist services provided by the entrepreneurs, and the public (social) services (mainly health services, administration, telecommunications). They also emphasised the role of the State financing.

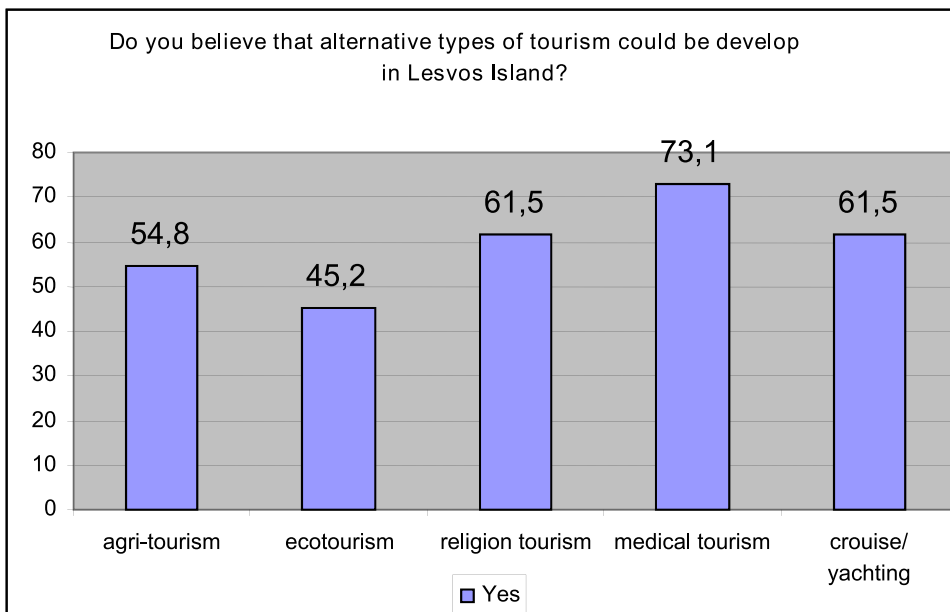
Additionally, the 96.2% of the totality of the sample believe that the 4E model of tourism has to be combined to the development of alternative types of tourism in Lesvos Island. To the question how likely are they (in the frame of their enterprises) to make investments in order to improve the 4E model of tourism at the island, the majority (42%) answered "likely". Graph 4 presents the frequencies of the relevant likelihood.

It is additionally noted that 32% of the entrepreneurs stated that they would extend their company, 27% that they would develop new tourist enterprises, another 29% stated that they would make investments with regards to the human capital of the company (education, additional staff), while the remaining focused at the improvement of the services they currently provide (including the investment in telecommunications infrastructure)

Graph 5 presents the percentages of the respondents who believe that Lesvos Island has enormous potential to develop the following alternative types of tourism (agri-tourism- 54,8%, ecotourism- 45,2%, religion tourism-61,5%, medical tourism- 3,1%, cruise/yachting- 61,5%).



Graph 4. Stakeholders' perceptions about investments in order to improve the 4E model in Lesvos Island



Graph 5. Stakeholders' perceptions on the potential to develop alternative types of tourism in Lesvos Island

Following, a Crosstab-based Statistical Method (based on Chi-sq. tests) is applied in order to identify statistically significant relationships between the characteristics of the enterprises or the characteristics of the entrepreneurs referring to their beliefs about the two models of tourism considered (4S and 4E tourism models). It is noted that no statistically significant relationships found between entrepreneurs with different gender, age group or educational level. This finding suggests that tourism is of significant importance between all the social groups of entrepreneurs in tourism, who are all strongly concerned about the future of the tourism industry at Lesvos Island. Some statistically significant differences found between the family and non-family tourism enterprises referring:

- a. To the perception if tourism development of Lesvos Island could be based on mass tourism -the 4S model (Chi-sq= 6,011,  $p=0,05$ ), while, as it is noted from the descriptive statistics presented in the following Table 1 the family enterprises in tourism are more likely to reject the 4S model of tourism for Lesvos Island.

Type of tourism enterprise	Do you believe that the 4S model of tourism is the appropriate model for the tourism development in Lesvos Island?			
	Completely	Partly	Not at all	Total
Family tourism enterprise	17(22,4%)	34(44,7%)	25(32,9%)	76(100%)
Non- Family tourism enterprise	4(14,3)	20(71,4%)	4(14,3%)	28(100%)
Total	21(20,2%)	54(51,9%)	29(27,9%)	104(100%)

Table 1. Stakeholders' perceptions on the appropriateness of 4S tourism model for Lesvos Island

- b. To the perception about agri-tourism development in Lesvos Island (Chi-sq= 5,639,  $p=0,018$ ). It is noted that the family enterprises are more likely than the non- family ones to perceive that agri-tourism is an appropriate alternative type of tourism that has to be developed in Lesvos Island. Cross-tab descriptive statistics are presented in the following Table:

Type of tourism enterprise	Agri-tourism has to be developed in Lesvos Island		
	Yes	No	Total
Family tourism enterprise	47(61,8%)	29(38,2%)	76(100%)
Non- Family tourism enterprise	10(35,7%)	18(64,3%)	28(100%)
Total	57(54,8%)	47(45,2%)	104(100%)

Table 2. Stakeholders' perceptions on Agri-tourism for Lesvos Island

In addition, it is found that the entrepreneurs who have completed educational seminars in tourism, are more likely to prefer ecotourism (Ch-sq= 4,51, p=0,033), while they additionally are more likely (than the entrepreneurs who have not completed such seminars) to make investments with regards to the improvement of the human capital of their company (e.g. training), in order to improve the alternative tourism (4E model) in Lesvos Island (Chi-sq= 5,039, p=0,025). The relevant descriptive statistics are presented in the Table following:

Entrepreneurs who have completed educational seminars in tourism	Ecotourism has to be developed in Lesvos Island			Investments in human capital		
	Yes	No	Total	Yes	No	Total
Yes	28(56%)	22(44%)	50(100%)	22(59,5%)	15(40,5%)	37(100%)
No	19(35,2%)	35(64,8%)	54(100%)	8(30,8%)	18(69,2%)	26(100%)
Total	47(45,2%)	57(54,8%)	104(100%)	30(47,6%)	33(52,4%)	63(100%)

Table 3. Stakeholders' perceptions on Ecotourism development and Investments in human capital for Lesvos Island

### 5.3 Factor analysis models for the perceived satisfaction of tourism entrepreneurs in Lesvos Island regarding both the basic and the tourist infrastructure at the island

Following, a multiple step process was conducted (including reliability and factor analysis) to identify the factors that are a part of the *Perceived satisfaction from both the basic and the tourist infrastructure at Lesvos Island*.

*Regarding the basic infrastructure at the island*, a 13-item scale of perceptual indicators was developed. A 5-point Likert scale of the level of satisfaction from the respondents regarding the tourist infrastructure in question was used taking the values: (1) extremely dissatisfied; ..., (5) extremely satisfied.

Reliability analysis of the 13-item scale was conducted. The scale had a Cronbach's alpha of 0.792. Following, exploratory Factor Analysis using principle component analysis with *varimax* rotation was performed on the 13-item scale to determine the latent structure of the set of variables. The Kaiser-Meyer-Okin (KMO) statistic was 0.590 indicating the validity of the Factor Analysis method applied. The solution considered 3 factors accounted for 49,8% of total cumulative variance. The resulted factors were labelled: (1) *Transport system, health and administration* (variance explained=23,6%); (2) *Financial and telecommunications infrastructure* (variance explained=13,7%) and (3) *Infrastructure for communication and quality of life* (variance explained=12,5%). Six items loaded on the *first* factor, with factor loadings ranging from .0352 to 0.828. Three items loaded on the *second* factor, with factor loading ranging from .0491 to 0.818. Finally, four items loaded on the *third* factor, with factor loadings ranging from -0,228 to 0,627. The perceptual indicators and their factor loadings are presented in the following Table:



Regarding the tourism infrastructure at the island, a 12-item scale of perceptual indicators was developed. A 5-point Likert scale of the level of satisfaction from the respondents regarding the tourist infrastructure in question was used taking the values: (1) extremely dissatisfied; ..., (5) extremely satisfied.

Reliability analysis of the 13-item scale was conducted. The scale had a Cronbach's alpha of 0.786. Following, exploratory Factor Analysis using principle component analysis with *varimax* rotation was performed on the 13-item scale to determine the latent structure of the set of variables. The Kaiser-Meyer-Olkin (KMO) statistic was 0.653 indicating the validity of the Factor Analysis method applied. The solution considered 3 factors accounted for 61,2% of total cumulative variance. The resulted factors were labelled: (1) *Accommodation* (variance explained=27,2%); (2) *Culture* (variance explained=19,5%) and (3) *Leisure* (variance explained=14,5%). Five items loaded on the *first* factor, with factor loadings ranging from .0581 to 0.783. Three items loaded on the *second* factor, with factor loadings ranging from .0534 to 0.864. Finally, four items loaded on the *third* factor, with factor loadings ranging from 0,444 to 0,790. The perceptual indicators and their factor loadings are presented in the following Table:

Basic Infrastructure	Factors		
	<i>Transport system, health and administration</i>	<i>Financial and telecommunications infrastructure</i>	<i>Infrastructure for communication and quality of life</i>
Airport	,828	-,076	,031
Port	,760	-,206	,364
Road network	,671	,126	-,326
Health infrastructure	,660	,214	-,139
Transport system	,571	,342	,152
Administration	,352	,305	,314
Banking	,104	,818	-,035
Telecommunications	-,058	,684	,079
Police	,394	,491	,464
Fire station	-,163	,212	,627
Post office	-,099	-,078	,546
Marines	,499	-,174	,533
Parking	-,070	-,054	-,228

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 6 iterations.

Table 4. Factor Analysis model of the entrepreneurs' satisfaction of basic infrastructure in Lesvos Island

Tourism infrastructure	Factors		
	<i>Accommodation</i>	<i>Culture</i>	<i>Leisure</i>
Restaurants	,783	,098	,258
Café/bars	,772	,269	-,103
Hotels	,720	-,164	,104
Rooms for renting	,689	-,178	,286
Places for events	,581	,149	,393
Cultural centers	,018	,864	,050
Museums	-,233	,794	,030
Places for accommodation in monasteries	,498	,608	,028
Travel agencies	,526	,534	-,259
Beaches	-,037	,022	,790
Conference centers	,326	-,147	,721
Sport places	,198	,351	,444

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

<sup>a</sup> Rotation converged in 6 iterations.

Table 5. Factor Analysis model of the entrepreneurs' satisfaction of tourist infrastructure in Lesvos Island

## 6. Conclusions – Policy proposals

Tourism constitutes important factor of regional development, especially in Greece (where tourism constitutes its heavy industry), with positive contribution in the country's economic development and social cohesion, while the Greek islands have enormous potential to develop specific tourism policies, based on their characteristics and comparative advantages. It is also common place that, on the basis of trade liberalization, there is a critical threshold in which the majority of economic and social activities are concentrated within some specific regions (which take the initiative to implement developmental policies and make investments) and they stay there, due to centripetal forces. Based on this approach, tourism activities could positively affect local or regional development (Lagos, 2001)

When discussing about sustainable tourism development in a region, this relates to the: local, social, economic, cultural and environmental structures of the region- by simultaneously shaping the appropriate services, infrastructure, know- how, for continuing

feedback (Kokkosis and Tsartas, 2001). This approach does not relate to mass tourism development, which is based on a 4S (sun, sand, sea, sex) model, or a “sun lust” model of tourism (it is noted that on such models is also based the tourism development in Greece and specifically in Lesvos Island). Based on this suggestion, sustainable tourism development seems to be related to the application of new tourism models, like the so called 4E model of tourism (Environment and clean nature, Educational tourism, culture and history, Event and mega event, Entertainment and fun). It is noted that, in order to move from a 4S to a 4E model of tourism, strategic planning and developmental policies for tourism, together to the appropriate investments are required, by taking into account the specific characteristics and the attractions of each region.

This paper considers the case of Lesvos Island in Greece. The attractions of the island that play an important role in its tourism development relate to the island’s History and culture; the Mediterranean climate; the many beaches and bays; the beautiful landscape; and offer the advantage of diversified tourism with many options.

A field survey was conducted aiming to define the tourism entrepreneurs’ perceptions about tourism development at the island and to investigate the extent to which the tourism entrepreneurs of the island are willing and able to take the initiative in implementing tourism development policies and investing in tourism projects. Data were collected from 104 tourism entrepreneurs at Lesvos island, during spring 2010. The data were firstly descriptively analysed, providing the sample characteristics of both enterprises and entrepreneurs. The descriptive findings suggest that the strategic plans for tourism in Lesvos Island: have to potentially combine mass and alternative tourism (4S and 4E models of tourism) in order to develop integrated tourism projects, based on the characteristics of the island, taking into account the principles of sustainability. It is also found that the development and application of new forms of tourism at the island has to focus mainly on medical (therapeutic tourism), cuisine/yachting, religion tourism, agri-tourism and ecotourism. Additionally, it was found that the entrepreneurs who have completed educational seminars in tourism are more “open” to sustainable tourism development in Lesvos Island and they are more likely to make investments to improve the 4E model of tourism, finding suggesting the necessity for the development of seminar courses in tourism for the entrepreneurs at the island.

Then, a Crosstab-based Statistical Method (based on Chi-sq. tests) was employed to identify statistically significant relationships between the characteristics of the enterprises or the characteristics of the entrepreneurs referring to their beliefs about the two models of tourism considered (4S and 4E tourism models). The analysis’ results suggested that tourism is of significant importance between all the social groups of entrepreneurs in tourism at Lesvos Island, who are all strongly concerned about the future of the tourism industry at Lesvos Island.

Following, a multiple step process was conducted (including reliability and Factor Analysis methods) to identify the factors that are a part of the Island’s tourism entrepreneurs’ perceived satisfaction from both **the basic and the tourist infrastructure at Lesvos Island**. The analysis suggested that, regarding the **basic infrastructure** at the island in question, tourism developmental policy at the island has to be based in improvement of the following systems:

- the transport system of the wider Aegean Island area (including improvements in infrastructure at ports, airports and marines, increase in travel frequency (by both sea and air), reduce travel cost to/from the island.), together to improvements of the health and the administration systems of the island
- the financial and telecommunications infrastructure system
- the communication system (mainly promotion / advertisement )

Regarding the **tourist infrastructure at Lesvos Island**, Factor Analysis indicated that tourism developmental policy has to be based in the emphasis of the following axes:

- Accommodation infrastructure
- Promotion of the Island's Culture
- Leisure activities

By concluding, it is common stated that tourism industry is the most important source of foreign exchange income for the island economies. Especially for the Greek islands, their main advantage is the tourism product, which includes the culture, the history, the environment and the geographical location of the islands. Especially Lesvos, the third largest in size Greek island, has enormous potential to develop integrated tourism projects, potentially based on the combination of mass and alternative tourism products. The proposed framework of tourism policy for Lesvos Island is able to contribute to the enrichment and differentiation of the characteristics of the offer of the tourism products, resulting in the improvement of the tourism market of the island and the increase of the role of tourism in the Aegean region's economic development. It is also noted that the cooperation between private and public organisations to promote the common drawing and implementing of tourism policies is necessary.

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