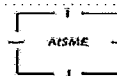**IGWT**
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18TH IGWT SYMPOSIUM

TECHNOLOGY AND INNOVATION FOR A SUSTAINABLE FUTURE: A COMMODITY SCIENCE PERSPECTIVE

Rome, September 24-28th, 2012

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IMPROVEMENT OF TOURISTIC SERVICES THROUGH AN INNOVATIVE MODEL BASED ON ENVIRONMENTAL SUSTAINABILITY INDICATORS

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Abstract

To implement a sustainable tourism strategy, which aims not only to promote the area and development of the local economy, but also to guarantee to everything its appropriate use, it is essential to carry out an inventory of available tourism resources, to check therefore what is the actual historical-cultural environment of a particular area, in order to assess its potentiality, the present degree of enhancement, the presence of initiatives and projects aimed at its improving. The aim of this paper is precisely to propose a model of sustainable tourism that can offer a full overview of the situation of the tourism sector in a given area, and to highlight what are the strengths and the points of weakness,of the facility, the behavior of tourists in relation to the choice of type of accommodation and length of staying, and thus identify areas requiring specific actions. A useful tool for studying the evolution of tourism in an area is the quantification of three classes of indicators, that can also be used to analyze the various environmental impacts generated by tourism: structural indicators, flow indicators and economic indicators. To implement the proposed innovative model based on these indicators, the city of Syracuse has been chosen for its enormous natural and historical heritage and tourism potential.

The indicators were first quantified for a period of five years in order to analyze the flow of tourists, to represent data relating to employees of the sector and to its revenue, but also to identify the single environmental impact categories. As a consequence, it was possible to identify some inadequacies in the available accommodation. The results obtained showed that by the implementation of this new model, any territorial entity could derive many benefits in the identification of sustainable tourism strategies and implement actions to improve the supply of tourist services, while ensuring a tourist sustainable use of environmental and socio-cultural resources.

Keywords: Tourism sector, Development, Indicators, Model, Socio-Cultural Resources

Introduction

The concept of sustainable development is an universal issue dealt within different fields, because the environment is of great importance for all the companies which, unlike the past, do not consider it only as a constraint or a cost, but also as a source of potential benefits. This is especially true for the touristic field, where tourism activity itself find its foundation in the natural resources. If the environment, landscape, natural and cultural resources in an area are defaced, the tourist is less attracted and then the visits to those sites decrea, thereby adversely affecting the local economy. On the contraty,

if the natural and cultural heritage of the place is protected and kept intact, the economic value is added to the intrinsic one.

On the other hand, however, it is important to underline that tourism, due to its increasing intensity, in some areas in particular, has an high-impact which, if not properly managed, can irreparably compromise the future generation's life and the availability of resources. Therefore, it can be said that a relationship exists between the environment, expressed in its widest sense (i.e. natural, social, economic and cultural environment) and tourism, affecting each other. Considering this, even in this field it is necessary to operate on the basis of sustainability, identifying the critical environmental issues and the measures needed for preventing them, ensuring (at the same time) the quality of the service and the tourist' satisfaction. To do this, there are many tools, from the one strictly related to the environmental certification to those which recognize a real commitment to the environment, tools for assessing a set of impact indicators for studying the touristic offer of a territory and the flows of people. In particular, these indicators are fundamental for realizing an inventory of the available touristic resources in such a way as to verify what the historical-cultural heritage of an area actually is: this, in order to assess its potentiality, its degree of exploitation, the presence of initiatives and projects aimed for improving this exploitation. Accordingly, the purpose of this paper is to identify, among the various indicators proposed in the literature, the ones which seem to be the most adequate not only for representing the phenomenon of "tourism" of a region but also, through their quantification and subsequent aggregation, for providing information useful for building an integrated tourism based on a model of sustainability. Moreover, these indicators, depending also on the tourist's choice on the kind of accommodation and on the duration of the staying, could afford the strengths and weaknesses of the accomodation, and consequently to identify the most critical areas object of suitable policies.

The innovative model proposed was applied to the city of Syracuse that, for its immense historical and natural heritage as well as the mild climate throughout all the year which allows a constant flow of tourists, could gain a great deal by the implementation of strategies of sustainable tourism and create an integrated tourism offer, not only limited to the municipality but also extended to the whole area, diversifying seasons flows.

1. Type of touristic indicators

Economic development and environment are strictly related and tourism is a clear expression of this deep connection. The touristic phenomenon involves the environment as a whole and it creates different categories of impacts: environmental impacts, economic impacts and socio-cultural impacts; these impacts can be direct or indirect, short or long - term, reversible or irreversible, positive or negative (Friel et al., 2010). In recent decades, there has been a significant increase in tourism, especially along the coasts, mountains and cities of art; it is, therefore, essential to plan the development of the territory; to fight illegal building by setting strict rules for new construction; to handle the traffic to the resorts; to diversify the tourist offer; to implement and monitor environmental standards; to avoid over - crowding; to raise awareness, educate and train local people, tourists and operators about the respect of the environment and the community in general (AA.VV., 2002).

On the basis of the above, to analyze the development of tourism in an area comprehensively, it is possible to use three different kind of indicators which allow to analyze the various impacts generated by tourists on it: structural indicators, flow indicators and economic indicators. (AA.VV., Eleventh Report on Italian tourism, Mercury, 2002). The analysis of these three types of indicators, but also their accurate and comprehensive integration and interpretation, could lead to the promotion of sustainable tourism by

which it is possible to attract tourist flows over time, while respecting the needs of the local population, and preserving nature and culture (Innocenti, 1998).

In this paper the quantification of the structural and flow indicators is realized on one of the most suited to tourism italian city, Syracuse that since prehistoric times has been characterized by a succession, over the centuries, of many civilizations and cultures, with a fundamental impact on tourism heritage: since the Neolithic Age to the Greeks, Romans, Arabs, Byzantines, Normans, Bourbons, etc. until the unification of Italy and the Second World War.

From a methodological point of view, at first the evolution of tourism in this area has been studied through the quantification of five-year structural indicators (since 2005): this has been necessary for "taking a picture" of the hotel and "other hospitality" activities offer (in terms of their total number, number of bedrooms, number of beds available, and their pressure on the land) and their evolutionary trend in the same period. These indicators has allowed to highlight changes over time, that is if the number is increased and / or decreased, and to know their percentage composition.

The flow indicators, always for the same period of time, have permitted to quantify the flow of tourists that have affected the study area, in terms of arrivals, departures and average length of staying, intensity and density of tourism, and territorial exploitation. By combining and integrating the different categories of indicators it has been possible to identify any inadequaciy in the accomodation offer.

2.   Quantification of the structural touristic indicators for the province of Syracuse

The structural indicators allow to represent the structure of tourism in the territory analyzed, in terms of accomodation capacity (the so-called *Tourist Potential Indicators*).

In particular, for this study different kinds of index have been taken into considerations:
1. *Tourist Density Index* (TDI): the number of hospitality and "other hospitality" activities, the number of rooms and number of beds (distinguishing between hospitality and "other hospitality" activities);
2. *Tourist Function Index* (IFT): the number of activities, rooms and beds, absolute or with respect to residents (UNWTO, World Tourism Organization. Yearbook of tourism statistics, Madrid, 2000.);
3. *Spatial Density Index*: the number of activities, rooms and beds, in relation to the land area (Region of Sicily – Dept. of tourism, transport and comm.., 2006.).

2.1.   *Quantification of the Tourist Density Index (TDI) for the province of Syracuse*

With regard to the *Tourist Density Index* the following sub-indices were quantified:
-   Hospitality Accommodation Consistency: activities. It identifies the number of hospitality and "other hospitality" activities (Table 1) in the considered period in the area of Syracuse; from the reported data we can see that the number of accommodation establishments has grown steadly. It could also be noted that, compared to a more moderate increase in the number of hotels, there is a much more significant increase in the number of the "other hospitality" activities attributable, mainly, to the establishment of new B & B.

To better analyze the phenomenon of the "other hospitality" activities, due to its significance, we have quantified the different types of structures (Table 2), in terms of "other hospitality" activities, in the Province of Syracuse; data concerning the period 2008-2009 is not reported because not avaiable.

Table 1 – Accomodation consistency in the province of Syracuse: activities (TDIa$_{=\text{ activities}}$)

Accomodation consistency	2005	2006	2007	2008	2009	2010
Hospitality activities	103	103	109	111	113	125
"Other hospitality" activities	231	260	306	317	336	367
TDIa	**334**	**363**	**415**	**428**	**449**	**492**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

Table 2 – "Other hospitality" accommodation consistency: activities

Activities	2005	2006	2007	2010
Rent rooms	32	31	33	37
Farm holidays	52	56	61	57
B & B	133	157	193	219
Vacation rentals	2	13	16	3
Holidays homes	12	2	2	25
Rural tourism	N/Av	N/Av	N/Av	11
Hostels	0	1	1	2
Campsites	N/Av	N/Av	N/Av	13
Total	**231**	**260**	**306**	**367**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

- Hospitality Accommodation Consistency: rooms. This indicator identifies the number of rooms in the area of the Province of Syracuse, distinguishing between hospitality and "other hospitality" activities (Table 3).

Table 3 - Accomodation consistency in the province of Syracuse: rooms (TDIr$_{=\text{room}}$)

Accomodation consistency	2005	2006	2007	2010
Hospitality activities	3844	3791	4104	4547
"Other hospitality" activities	891	980	1099	2532
TDIr	**4,735**	**4,771**	**5,203**	**7,079**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

The reported data reveals that, in the considered period, the number of rooms has grown steadily. It should also be noted that, compared to a more moderate increase of the number of the hotels, there is a much more significant increase of the number of the "other hospitality" activities, mainly due to the establishment of new B & B. Also in this case, due to the relevance of the "other hospitality" activities sector, the indicator of the "other hospitality" activities consistency (in terms of rooms and with respet to the various activities) has been quantified (Table 4).

- Hotel Accommodation Consistency: beds. This indicator identifies the number of beds in the Province of Syracuse, distinguishing between hospitality and "other hospitality" activities (Table 5). By the reported data, in the considered period, it is possible to note that, also in this case, the number of the available beds has grown steadily. It should also be noted that, compared to a more moderate increase of the number of hotels, there is a much more significant increase of the number of the "other hospitality" activities, mainly due to the establishment of new B & B.

Table 4 – "Other hospitality" accommodation consistency: rooms

Types of activities	2005	2006	2007	2010
Rent rooms	140	137	147	167
Farm holidays	314	342	345	420
B & B	339	391	491	601
Vacation rentals	25	79	85	49
Holidays homes	73	25	25	170
Rural tourism	N/Av	N/Av	N/Av	128
Hostels	0	6	6	14
Campsites	N/Av	N/Av	N/Av	983
Total	**891**	**980**	**1099**	**2532**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

Table 5 - Accomodation consistency in the province of Syracuse: beds (TDIb$_{= beds}$)

Accomodation consistency	2005	2006	2007	2008	2009	2010
Hospitality activities	8486	8559	9325	9637	7797	10208
"Other hospitality" activities	2340	2603	2877	N/Av	N/Av	6910
TDIb	**10,826**	**11,162**	**12,202**	**N/Av**	**N/Av**	**17,118**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

2.2. Quantification of the Tourist Function Index(TFI) for the province of Syracuse

It relates the TDI, above analized, with the number of residents in the considered territory; in particular, table 6 shows hospitality and "other hospitality" activities for the province of Syracuse for every 1,000 residents (No activities / 1000 residents) while Table 7 shows the number of rooms in the same province for every 1000 residents, always considering the distinction between hospitality and "other hospitality" activities (No of rooms / 1000 residents). Also in this case, data concerning years 2008-2009 are not reported becouse they are not available.

Table 6 - Tourist Function Index :activities/ 1000 residents (TFIa$_{= activities}$)

	2005	2006	2007
Residents	398330	398948	400764
TFIa Hospitality activities	0.3	0.3	0.3
TFIa "Other hospitality" activities	0.6	0.7	0.8
TOTAL TFIa	**0.9**	**1.0**	**1.1**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

Table 7 - Tourist Function Index: rooms/ 1000 residents (TFIr$_{=room}$)

	2005	2006	2007
Residents	398330	398948	400764
TFIa Hospitality activities	9.7	9.5	10.2
TFIa "Other hospitality" activities	2.2	2.5	2.7
TOTAL TFIr	**11.9**	**12.0**	**12.9**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

To complete the quantification of the structural tourism indicators it has been also necessary to consider the number of beds available within the province for every 1000 residents, always making the distinction between hospitality and "other hospitality" activities (No. beds / 1000 residents) (Table 8) and

then compare the obtained results with the classification adopted by the World Tourism Organization (UNWTO) (table 9). With reference to this classification, it is evident that the province of Syracuse, as a whole, has few tourist activities and functions, so tourism in this area doesn't play an important, or dominant, role on the local economy.

Table 8 - Tourist Function Index: beds/ 1000 residents (TFIb$_{= beds}$)

	2005	**2006**	**2007**
Residents	398330	398948	400764
TFIb Hospitality activities	21.3	21.5	23.3
TFIb "Other hospitality" activities	5.9	6.5	7.2
TOTAL TFIb	**27.2**	**28.0**	**30.5**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

Table 9 – UNWTO tourist centers classification

Centers with few tourist activities and functions	0< TFIb < 75.21
Centers with significant, but not dominant, tourism sector	75.21< TFIb < 100
Centers with significant tourism sector but together with other activities	100< TFIb < 500
Centers with dominant tourism sector with respect to other activities	500< TFIb < 1000
Large tourist resorts completely saturated by tourism sector	TFIb > 1000

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

2.3. *Quantification of the Spatial Density Index (SDI) for the province of Syracuse*

It is composed of three sub-indices concerning the quantification of the number of activities, rooms and beds, in relation to the land area.

The SDI related to the activities measures the number of hospitality and "other hospitality" activities per sq.km (No. Exercises / Area (sq km)); its values have been reported in table 10, where it clearly appears that in this province there is less than one accommodation facility for each sq. km.

Table 10 - Spatial Density Index: activities/sq.km (SDIa$_{= activities}$)

	2005	**2006**	**2007**	**2010**
Area (sq.km)	2108.80	2108.80	2108.80	2108.80
SDIa Hospitality activities	0.05	0.05	0.05	0.06
SDIa Not Hospitality activities	0.11	0.12	0.15	0.17
TOTAL SDIa	**0.16**	**0.17**	**0.20**	**0.23**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

Table 11 - Spatial Density Index: rooms/sq.km (SDIr=room)

	2005	2006	2007	2010
Area (sq.km)	2108.80	2108.80	2108.80	2108.80
SDIr Hospitality activities	1.8	1.8	1.9	2.2
SDr "Other Hospitality" activities	0.4	0.5	0.5	1.2
TOTAL SDIr	**2.2**	**2.3**	**2.4**	**3.4**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

This shows that, with reference to the province of Syracuse, the pressure exerted by the tourism infrastructures on the physical territory is negligible.

Another sub-indicator measures how many rooms, per sq. km , are in this area, with respect to hospitality and "other hospitality" activities (No of rooms / area (sq. km)) and its quantification for the examined area is shown in table 11; from it it is possible to enhance that that for every sq.km the increas in the number of rooms in the province causes a change from 2.2 rooms in 2005 to 3.4 rooms in 2010; also in this case, the data of years 2008-2009 are not shown because not available.

The last sub-index (table 12) shows how many beds are available in hotels and in "other hospitality" activities for each sq.km of the considered area, (No. beds / Area (sq.km). By comparing the obtained values with the classification adopted by the UNWTO (table 13), it appears that with respect to the rooms the increase on the number of beds in the province has caused an increase from 5.1 beds in 2005 to 8.1 beds in 2010 per sq km, remaining however always within the first level of the UNWTO classification and determining a negligible result on the land pressure.

Table 12- Spatial Density Index: beds/sq.km (SDIb$_{= beds}$)

	2005	2006	2007	2010
Area (sq.km)	2108,8	2108,8	2108,8	2108,8
SDIb Hospitality activities	4,0	4,1	4,4	4,8
SDb Not Hospitality activities	1,1	1,2	1,4	3,3
TOTAL SDIb	**5,1**	**5,3**	**5,8**	**8,1**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

Table 13 – UNWTO Pressure on Land Classification

Negligible territorial pressure	$0 < SDIb < 8.80$
Average - high territorial pressure	$8.80 < SDIb < 25$
High-density tourist centers	$25 < SDIb < 50$
Very high-density tourist centers	$50 < SDIb < 100$
Tourist area with territorial pressure o be monitored	$SDIb > 100$

Source: Personal Elaboration

3. Quantification of the Flow touristic indicators for the province of Syracuse

The flow indicators represent the movements of tourists within the considered territory. The two main ones are:

- the *number of Arrivals* (*A*), i.e. the number of times that a guest stays at a hotel;
- the *number of ATtendances* (*AT*), i.e. the number of nights spent by guests at the hotel structures.

Besides them, it is possible to calculate other indices such as:

- the *Average Stay* (*AS*), i.e. the average number of nights in which, spent by the guest at the hotel structures in a reference period of time (typically one year);

- the structures' *Gross Utilization Index* (*GUI*), i.e. the ratio of attendance in the strucrures and the availability of beds;
- the structures' *Net Utilization Index* (*NUI*), i.e. the ratio of attendances in the trucrures and the availability of beds;
- the *Touristic Intensity Index* (*TII*), i.e. the average number of presences per day for every 1,000 residents, which is obtained as the ratio between the presence in a given month (year) and the product of the number of residents and the number of days of the month, all multiplied by 1,000. If the surface of the considered territory is put at the denominator of the previous index , it is possible to obtain the *Touristic Density Index* (*TDI*), that represences the number of presences per sq.km:
- the *Touristicity Index* (*TI*), i.e. the average number of presences for every 100 residents;
- the *Territorial Exploitation Index* (TEI), i.e. the degree of the territory exploitation by both residents and tourists. In other words, this index measures the number of people per sq km of land area. The more is the index value, the greater the beared load charge by the considered area will be.

It is important to highlight, however, that these indicators can not provide totally comprehensive information on the streams of visitors. This is mainly due to the fact that they do not take into account all those who visit a territory and are not registered in any hotel structurese (e.g., hikers and those who decide to stay in private homes) (ROMITA, 2009,).

3.1. Arrivals Index (A)

Table 14 reports the number of arrivals registered in the province of Syracuse in the period 2005 - 2009, with respect to the type of accommodation. Data reveals that, compared to 2005, this number in the province of Syracuse has been characterized by a negative trend, above all for the "other hospitality" activities. Only the hotels, in the years 2006 and 2007, show a positive trend.

Table 14 - Arrivals by type of accommodation

Type	2005	2006	2007	2008	2009
Hospitality activities	300795	328144	331755	279359	244963
"Other Hospitality" activities	61576	58688	49276	39682	38080
Total arrivals	**362371**	**386832**	**381031**	**319041**	**283043**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

3.2. Attendance Index (AT)

Even for this indicator the period 2005 – 2009 has been taken into consideration (table 15).

Table 15 - Attendance by type of accommodation

Type	2005	2006	2007	2008	2009
Hospitality activities	973589	1085685	1044385	1033030	820069
"Other Hospitality"	207251	207037	157578	245382	141899
Total arrivals	**1180840**	**1292722**	**1201963**	**1278412**	**961968**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

The reported data reveals that during this period, despite a relative increasing in 2006 and 2008, the number of presences decreased: in particular, the increase occurred in 2006 is mainly recorded at the

hotels, while the one occurred in 2008 is mainly due to the lodging options. Splitting this total among the various types of accommodation, it is possible to note that over 80% of presences is at hotels. Moreover, while this value increases until 2006, then it decreases in 2007 – 2009; on the other hand, the valure related to lodging options decreases until 2007, increases in 2008, before declining again in 2009. Finally it appears that, compared to 2005, hotels recorded a positive trande since 2006 to 2008, albeit declining, but the lodging options, with the exception of 2008, register a more negative trande, especially in 2007 and 2009.

3.3. Average Stay (AS)

On the basis of the number of arrivals and of presences, it is possible to calculate, on average, how many nights the guest spend in the various structures in the examined period. In Table 16 the values of the avegarge stay and the average annual overall are reported (2005 – 2009), distinguishing between hospitality and "other hospitality" activities. The data reveals that the average stay of tourists in the Province of Syracuse was between 3.2 days in 2007 and 4.0 in 2008. Particularly remarkable is the lodging options value recorded in 2008 that, compared to a general decline in arrivals, shows an increase of the length of the stay, with an average value of 6.2 days.

Table 16 Average length of stay

Type	2005	2006	2007	2008	2009
Hospitality activities	3,2	3,3	3,1	3,7	3,3
"Other Hospitality" activities	3,4	3,5	3,2	6,2	3,7
Average stay	3,3	3,3	3,2	4,0	3,4

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

3.4. Gross Utilization Index (GUI)

With regards to the touristic flows, a very useful indicator which allows to know how much is the the accomodation capacity used is the *Gross Utilization Index* (No. presences / N beds * days * 100). This index measures the percentage of occupied beds during the referred period (not considering the seasonal pauses). Table 17 shows the GUI values, always distinguishing between hospitality and "other hospitality" activities. The data reveals that, in 2005 - 2007, the facilities were used for a value comprised between 20% and 35% of their capacity. The peak reached a maximum in 2006 and was recorded by hotels. The lodging options showed, however, for the same period, a decreasing gross utilization rate. The data also clearly shows that some available beds remain unused during the year.

Table 17 - Gross Utilization Index (GUI)

Years	2005	2006	2007	2008	2009
Days	365	365	365	366	365
Attendance Hospitality activities	973589	1085685	1044385	1033030	820069
Beds Hospitality activities	8486	8559	9325	N/Av	N/Av
GUI Hospitality activities	31.43%	34.75%	30.68%	N/Av	N/Av
Attendance Not Hospitality activities	207251	207037	157578	245382	141899
beds Not Hospitality activities	2340	2603	2877	N/Av	N/Av
GUI Not Hospitality activities	24.27%	21.79%	15.01%	N/Av	N/Av
Total attendance	1180840	1292722	1201963	1278412	961968
Total beds	10826	11162	12202	N/Av	N/Av
GUI	29.88%	31.73%	26.99%	N/Av	N/Av
Potential annual beds	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

3.5. *Touristic Intensity Index (TII)*

This index measures, on average, how many the daily attendances are in the considered area for every 1,000 residents (presences in the year / * Residents * day of the year * 1000). From Table 18 it can be observed about 8 daily attendance for every 1,000 residents in the first four years, before decreasing to 6.5 in 2009.

Table 18 Tourist Intensity Index (TII)

	2005	2006	2007	2008	2009
Residents	398330	398948	400764	402840	403356
Attendance	1180840	1292722	1201963	1278412	961968
days	365	365	365	366	365
TII	**8.1**	**8.9**	**8.2**	**8.7**	**6.5**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

3.6. *DensityTourist Index (TDI)*

This indicator measures, on average, the annual presences on the considered territory for each sq.Km of surface area (attendance year / surface area in sq.km). From table 19 it is possible to observ how the number of presences registers an alternating pattern between growth phases and decline phases. In particular, there was a considerable reduction in 2009, mainly because of the decrease in arrivals recorded in the province, with only 456 presences per sq.km.

Table 19 Tourist Density Index (TDI)

	2005	2006	2007	2008	2009

Area (sq.km)	210 8.80	210 8.80	210 8.80	210 8.80	21 08.80
Attendances	118 0840	129 2722	120 1963	127 8412	96 1968
TDI	**560**	**613**	**570**	**606**	**45 6**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

3.7. Touristicity Index (TI)

To assess the impact of tourism on the considered area, it is possible to use the *touristicity index*, i.e. the number of attendances for every 100 residents (No. presences / Residents * 100). Table 20 shows that the highest peaks were in 2006 and 2008, with over 300 attendances / 100 residents. Generally speaking, however, it shows a negative trend with the lowest value registrered in 2009.

Table 20 Touristic density Index (TI)

	2005	**2006**	**2007**	**2008**	**2009**
Attendance	1180840	1292722	1201963	1278412	961968
Residents	398330	398948	400764	402840	403356
TI	**296.45**	**324.03**	**299.92**	**317.35**	**238.49**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

3.8. Territorial Exploitation Index (TEI)

To assess the degree of the territorial exploitation by both residents and tourists, the Territorial Exploitation Index has been calculated (Arrivals + residents / area). Table 21 shows that in the considered period (2005-2009) 2006 and 2007 have been characterized by the greatest value of TEI which decreased in the subsequent years significantly, due to a declinein the arrivals recorded from 2008.

Table 21 – Territorial Exploitation Index (TEI)

	2005	2006	2007	2008	2009
Arrivals	362371	386832	381031	319041	283043
Residents	398330	398948	400764	402840	403356
Area (sq.km)	2108.80	2108.80	2108.80	2108.80	2108.80
TEI	**360.73**	**372.62**	**370.73**	**342.2**	**325.49**

Source: Personal Elaboration from data of the Tourism Observatory Autonomous Region of Sicily

4. Results and Discussions

Through the surveys carried out for quantyfing the main touristic indicators for the province of Syracuse, it has been possible to "take a picture" of what the tourism industry represents for the considered area. From an analysis of tourism in terms of receptivity, it appears that the various accommodations in the whole province exert a very low pressure, less than one accommodation per sq.km, although this value has grown in recent years. In particular, the highest increase is due to the establishment of new B & B, probably because many persons, giving great importance to the development of the tourism industry, decide to exploit their homes for generating new forms of revenue: infact, the number of rooms of B & B, guesthouses and campsites represents about the half of the whole value (concentrated in the "3 stars" and "4 stars" accomodations). The same situation appears with respect to the number of beds that, in relation to the residents and the considered area, shows that the province of Syracuse, despite its immense archaeological and historical heritage and, thus, its potential attractions, has few touristic activities: so Syracuse can be considered as a center where tourism does not play a significant or dominant role on the local economy. Presently, even if all beds were occupied, the pressure on the territory is expected to remain low.

Observing, on the contrary, the departures and arrivals it is possible to note that from 2006 onwards, due above all to the international economic crisis, arrivals register an annual decline, although an increasing number of tourists "hit and run" who decide not to take shelter and, then, spends only one day on site. Similar situation is observed with respect to the attendances. It is important to highlight that about 80%, both arrivals and attendences, is recorded at the hotels. Comparing these two values, a visitor spents, on average, among Syracuse and its province about three days.

In line with what was seen for the accommodations, the territorial and social pressure exerted by tourists is kept at low levels. Moreover, considering the overall pressure registered on the territory, both among tourists and residents, it is decreasing from 2007, in line with the reduction in arrivals. From the foregoing, it is clear that the calculation and the use of experimental indicators has proved to be a useful tool for obtaining a full overview of the situation of the tourism sector in a given territory. As said in the introduction, the analysis was conducted on the province of Syracuse, but the same procedure is applicable to any territorial entity, of any size, from an entire country to a region, from a city to a district. It is, also, possible to evaluate whether tourism represents for the considered territory an important secotr form an economic point of view and if the pressure exerted on it is excessive (and therefore dangerous for sustainability) or not.

With reference to the province of Syracuse, because of its touristic potential and considering that most of the beds remain unused during the year, it would be important to develop policies aimed at encouraging not only the arrivals but also the permanence of the visitors: this could be possible, for example, organizing events of national and international appeal, itineraries for discovering the different provinces, in a perspective of integrated network and, in the end, realizing an integration between the various subjects responsible of tourism policy. Furthermore, to give a greater impetus to the local

economy, it would be desirable to support policies aimed at encouraging local small business initiatives because, probably, the income from these activities represents would remain within the local economy, while stimulating all other economic activities.

Conclusions

As seen, the touristic activity involves the territory in which it takes place, within which a multitude of relationships are settled, making it a very complex system. In such a framework, in order to achieve sustainability goals shared by both operators and residents, it is essential an adequate planning and local programming, strategy achieved through the integrated use of the indicators identified in this study; through their smart use, territory is considered as a whole, with reference both to the material components (e.g. cultural heritage, urban, infrastructural and environmental) that to those assets (e.g. skills, values, identity, traditions, relationships). A model of tourism development of a territory through the quantification of these indicators enables us to appreciate the interdependencies that exist in a specific area, according to a process of cause and effect, or the presence of a resource that stimulates the development of all system. From this system, properly integrated, comes the touristic offer of a territory, where sustainability derives from the combination of three elements: competitiveness: the considered territory satisfies the expectations of the visitors better than other areas; positive impact on the socio-environmental balance: tourists, enjoying the considered area, produce positive externalities and benefits for the environment and the local community; generation of new resources: the ability of stimulating in the visitors the production of resourcesof which the local population can enjoy.

The results obtained show that from the implementation of this new model, whatever territory could obtain many benefits creating sustainable tourism strategies by engaging actions useful for improving the supply of touristic services and ensuring, at the same time, the sustainable enjoyment of the environmental and socio-cultural resources.

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