

Choice and Synthesis of Indicators to Identify Tourist Municipalities

Scelta e Sintesi di Indicatori per l'Identificazione dei Comuni Turistici

Roberto Gismondi

Istat, viale Liegi 13, 00198 Roma, Italy, gismondi@istat.it

Massimo Russo

Università di Foggia, via IV Novembre 1, 71100 Foggia, Italy, m.russo@unifg.it

Riassunto: L'attrattività turistica potenziale ed effettiva deve essere valutata ad un livello territoriale molto dettagliato. Per questo motivo, in questo lavoro si propone la selezione di una serie di variabili a livello comunale, utili per il calcolo di un *indice di turisticità* sulla base di due possibili tecniche di sintesi a confronto. La verifica empirica è stata condotta sui comuni della provincia di Foggia, con riferimento al 2002.

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1. The concept of tourist municipality

Even though tourism is becoming more and more relevant for local development, actually the definition of “tourist municipality” is not uniformly accepted, as well as the list of variables and the same methodology to be used for assessing the effectiveness of local tourist attractiveness. Recent proposals are given by the Italian Foreign Exchanges Office (1998) - but with a regional level of details only - and Greco (1999) for what concerns relevant variables to be collected, while an analysis at the provincial level is available in Gismondi (2001). However, no in depth analyses exist concerning both data collection at the municipality level and the definition of a methodology to achieve to an overall local *tourist index*. Given these premises, on the basis of a statistical database built up for the 64 municipalities belonging to the province of Foggia, the main goal consists in defining a statistical model measuring a *tourist index* for a given territory. Variables taken into account concern potential *tourist attractiveness* (structural, environmental, historical, etc.), availability of *tourist bed places* and the effective *tourist impact* due to tourist demand. The main steps are:

1. to identify and pick up all main variables useful to define an overview tourist profile of the municipality. Items are available from current official and not official statistical sources, or could be estimated according to some reasonable hypotheses.
2. To define the concept of *tourist index* (TI) and to assess in which way it should be calculated. In particular, we can calculate separately a theoretical *tourist attractiveness index* (TAI), a *tourist bed-places index* (TBI) and the effective *tourist impact index* (TII). Their conjoint use will lead to TI.
3. To define more detailed indexes necessary for calculations. In particular, TAI will be based on 4 attractiveness sub-indexes and TII on 2 tourist impact sub-indexes.

4. To calculate these indexes, to synthesise them according to 2 alternative methodologies, to analyse and to compare results (paragraph 2).

Concerning point 1, 30 potentially main variables have been identified, on the basis of their theoretical informative content. Even though their choice has been inspired by a late research (Landi, 2003), new variables have been added, as well as a more detailed analysis on their meaning and statistical use. In practice, 8 variables couldn't be measured (those on a grey shade in table 1), while 3 variables (in *Italic*) can't be associated with a high or low attractiveness objectively, and therefore they play a *descriptive* role. So, all the remaining 19 variables were effectively used for further analyses. According to table 1, they cover these aspects: territory and environment; infrastructures; natural and historical attractors; other attractors; notoriety; tourist infrastructures; tourist economic profile; tourist demand; tourist investments.

Table 1: List of variables related to the province of Foggia (data referred to 2002)

TOURIST ATTRACTIVENESS INDEXES (TAI)	
1) Territory and environment (TAI1) - Surface - Average yearly rain level - Average yearly temperature - Kilometres of accessible cost - <i>Type of locality and altitude</i>	2) Infrastructures (TAI2) - Kilometres of road - Railway station (yes/no) - Airport (yes/no) - Port (yes/no) - Bed places in hospitals and first aid points
3) Natural and historical attractors (TAI3) - Number of historical churches, archaeological sites, museums, religious sites, castles and historical buildings, libraries, sanctuaries, cultural events - Surface of protected area (% on whole surface)	4) Other attractors (TAI4) - Religious events, fairs, markets, exhibitions, etc. 5) Notoriety - Number of quotations in national and foreign tour operators tourist magazines and tourist guides
TOURIST BED-PLACES INDEX (TBI)	
1) Tourist infrastructures (by 1.000 residents) - Bed places in 4 and 5 stars hotels - Bed places in other collective accommodations - <i>Average daily price of hotels</i>	- Bed places in 1, 2 and 3 stars hotels - Bed places in private houses - <i>Average number of hotels stars</i>
TOURIST IMPACT INDEXES (TII)	
1) Tourist economic profile (TII1) - % of persons employed on active population - % of persons employed in hotels, other collective accommodations, bar, restaurants, entertainment activities, travel agencies and tour operators on the whole number of persons employed	2) Tourist demand (by 1.000 residents) (TII2) - Nights spent in tourist accommodations - Nights spent in private houses - Number of incoming excursionists - Visitors of museums and archaeological sites - Tourist expenses - Excursionist expenses - <i>Seasonality and reason of travel</i>
3) Tourist investments - Amount of tourist investments in the last 3 years	

Variables in *Italic* are descriptive, while those in a grey box are not available. The other 19 are active.

Concerning points 2 and 3, we must consider that one thing is the calculation of a *potential* tourist index as TAI - based on 4 groups of variables, which synthesis leads to the calculation of the corresponding tourist attractiveness indexes TAI1, TAI2, TAI3 and TAI4 - while another is the calculation of a TII, based on the effective tourist impact in terms of employment in tourist enterprises (index TII1) and the final tourist demand (index TII2), so that TII measures the *effective* activation induced by a tourist site.

Moreover, the number of bed places available for tourist use, leading to TBI, is a particular structural variable bridging tourist potentiality with the effective tourist impact and should be considered *separately* from the other attractiveness variables, because in some way it reflects tourist demand raised along the last years. Even though, of course, a simple *ex-post* tourist index could be based on TII2 only - that in practice measures the *ex-post* effectiveness of all *ex-ante* tourist resources of the municipality - the need to consider separately the various components which determine TI derives by the fact that the only TII2 doesn't supply information on the reasons of the high or low tourist attractiveness, nor a qualitative profile of the site. For instance, a known maritime municipality could have a high TII2, but without particular attractors TAI3 and TAI4. An opposite situation can occur for municipalities characterised by high levels of TAI3 and/or TAI4, but less known or less accessible.

2. Statistical analysis and main results

We can define x_{vm} as the value x that the variable v ($v=1,2,\dots,19$) takes for municipality m ($m=1,2,\dots,64$). The methodology used for calculating for each municipality the tourist index TI is based on the following steps.

- 1) All x -variables are standardized in order to deal with characters homogeneous in average level and variability. So, new standardised z -variables will be available.
- 2) If each of the previous 7 tourist indexes is based on V of the 19 statistical active variables (for instance, TAI1 is based on $V=4$ variables, according to table 1), a *score* for municipality m can be calculated in 2 ways: a) simple mean (SM method) of the V standardised z -variables; b) weighted arithmetic mean of the contributions that the V variables supply to the first 2 principal components (PC method) extracted from the 19 available variables, where weights are the correspondent "explained" variances. If a_{Iv} and a_{IIv} are the v -th coordinate ($v=1,2,\dots,19$) of the first and second factor axes, while λ_{Iv} and λ_{IIv} are the variances of the first 2 principal components, the scores obtained using the 2 methods will be given, respectively, by formulas:

$$\text{a) } s_m = \sum_{v=1}^V z_{vm}/V \quad \text{b) } s_m = \left(\lambda_I \sum_{v=1}^V z_{vm} a_{Iv} + \lambda_{II} \sum_{v=1}^V z_{vm} a_{IIv} \right) / (\lambda_I + \lambda_{II}). \quad (1)$$

If in formula 1b) we put $V=19$, the 2 sums in brackets simply are the values that municipality m takes in correspondence of the first and second principal component.

- 3) To deal with scores ranging from zero to one – that could make easier interpretation of results and comparisons among different places and times – we can calculate the final score S for each municipality m , equal to the correspondent tourist index:

$$S_m = (s_m - s_{MIN}) / (s_{MAX} - s_{MIN}) \quad (2)$$

- 4) For each municipality, TAI is the simple arithmetic mean of the 4 indexes TAI1, TAI2, TAI3, TAI4; TII is the simple arithmetic mean of the 2 indexes TII1 and TII2; TI is the simple arithmetic mean of the 3 indexes TAI, TBI and TII.

The PC method – that could be based on more than the first 2 principal components if their explained variance is low and the interpretation of *all* factor axes is not problematic – should avoid the over-estimations of some tourist aspects due to statistical correlation among the 19 original variables and give the possibility to better identify which are those effectively fundamental to assess the level of tourist attractiveness.

Main results of the empirical attempt showed that: 1) the first 2 principal components explain the 50,1% of variance. 2) The first component is mainly correlated with territorial variables as kilometres of coast and presence of ports and with the whole TBI and TII indexes, so that it represents the *real effectiveness of tourist attractiveness*. 3) The second component is mainly correlated with TAI indexes as surface, presence of airport, kilometres of road and bed places in hospitals and with the whole TAI3 index, so that it expresses the *true relevant potential attractiveness factors*. 4) As a consequence, the other structural variables included in the TAI indexes and the number of bed-places in private houses are not particularly relevant. Since the third component explains only the 9,9% of variance (it is correlated with climate aspects), the first 2 components were considered as in formula 1b). As we can see from table 2 the PC and the SM methods lead to almost the same ranking: that happens because there is not a variable, among 19, *much more* correlated with the first two factor axes respect to the others; so, in method b) z_{vm} has approximately the same weight for each v . In the first 10 positions we find some well known tourist resorts, where in 2002 was spent the 94,1% of nights. TAI, TBI and TII indexes are quite similar, with some light exception for TBI.

Table 2: *The first 10 municipalities according to the principal components ranking*

Municipality	Nights spent %	Principal components (PC)					Simple mean (SM)				
		TAI	TBI	TII	TI	Rank	TAI	TBI	TII	TI	Rank
Peschici	19,8	0,53	1,00	0,79	0,77	1	0,56	1,00	0,79	0,78	1
Isole Tremiti	1,7	0,18	0,78	1,00	0,66	2	0,19	0,93	1,00	0,71	2
Vieste	43,4	0,52	0,71	0,64	0,63	3	0,53	0,69	0,64	0,62	3
Rodi Garganico	6,8	0,35	0,26	0,47	0,36	4	0,39	0,28	0,47	0,38	4
Foggia	1,6	0,87	0,01	0,12	0,34	5	0,86	0,01	0,13	0,33	6
Mattinata	4,5	0,36	0,32	0,24	0,31	6	0,38	0,32	0,24	0,31	7
San Giovanni Rotondo	12,7	0,51	0,10	0,27	0,29	7	0,51	0,15	0,27	0,31	8
Manfredonia	2,4	0,58	0,02	0,12	0,24	8	0,60	0,01	0,12	0,24	9
Monte Sant'Angelo	0,5	0,55	0,03	0,07	0,22	9	0,54	0,03	0,07	0,21	11
Ischitella	0,5	0,29	0,22	0,14	0,22	10	0,31	0,21	0,14	0,22	10
First 10	94,0	0,47	0,35	0,39	0,40		0,49	0,36	0,39	0,41	
All 64	100,0	0,27	0,06	0,11	0,15		0,28	0,08	0,11	0,16	

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