TOURISM IN NORTH SARDINIA

Insights for future development

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Introduction

Background

Sardinia is an Italian island placed between the Italian peninsula and Spain. It is the second-largest island in the Mediterranean Sea, after Sicily, with an area of 24,100 square kilometres. Well known for its rich environment and in particular coasts, it has one of the pillars of its economy in the tourism industry. In the past years, one of the main issues regarding this sector has been the important difference of tourist attraction capability within different areas in the region and this has been mainly due to various business development strategy put in place by operators and public policies. Nowadays tourism industry is allover suffering for Covid-19 consequences and even more in Sardinia because of transport limitations and costs. Therefore, it is urgent to define new strategies and business models to cope with this tragic crisis.

Problem

Why some areas, like *Costa Smeralda* in the North East of the island, can attract a lot of tourists and some others are almost unknown even with beautiful landscape and environmental attractions? Of course, we are not at the starting point so lots of investments spread the differences among the different areas, but can we still find some common characteristics to suggest development paths? In this era of social distancing, could there be the opportunity to link famous and unknown areas for a mutual benefit? To discover it the base is to identify key features in different zones and group them in clusters.

Interest

Tour operators are the stakeholder more directly interested, but the national, regional and local authorities are involved too to promote the economy of the island. At the same time all related activities, such as building firms and farmers. Due to the importance of the tourism sector in the regional economy, we can say that Sardinia, as a whole, is interest in everything can bring advantage to this subject.

Due to the Foursquare API free account limits, the analysis has been focused on the North Sardinia that corresponds to the Province of Sassari.

Data acquisition and preparation

Data sources

Data regarding incoming tourists are provided by the regional administration in the Opendata Sardegna portal .

Main datasets, in .csv format, are:

- Tourist movements in Sardinia 2019 by municipality that reports the incoming tourists by nationality and the values of arrivals and presences (days of staying)
- Sardinia 2019 accommodation capacity, where data regard accommodation facilities classified by typologies according to regional standards.

```
capacità_ricettiva_2019 = pd.read_csv('http://opendata.sardegnaturismocloud.it/IT/turismo/offerta/ricettivita/capacita-strutture-ricettive/20
```

```
[ ]  capacità_ricettiva_2019
```

	anno	Provincia	comune	mese	Tipologia	Stelle	numero_strutture	letti	camere
0	2019	CittàmetropolitanaCagliari	ASSEMINI	1	Affittacamere	IICategoria	1	9.0	4.0
1	2019	CittàmetropolitanaCagliari	CAGLIARI	1	Affittacamere	NaN	8	57.0	29.0
2	2019	CittàmetropolitanaCagliari	CAGLIARI	1	Affittacamere	ICategoria	3	28.0	13.0
3	2019	CittàmetropolitanaCagliari	CAGLIARI	1	Affittacamere	IICategoria	67	545.0	274.0
4	2019	CittàmetropolitanaCagliari	CAPOTERRA	1	Affittacamere	IICategoria	2	16.0	8.0
...	...	...	...	...	...	...	...	...	...
16536	2019	ProvinciadiSassari	TELTI	12	TurismoRurale	NaN	1	6.0	3.0
16537	2019	ProvinciadiSassari	TEMPIOPAUSANIA	12	TurismoRurale	NaN	2	23.0	37.0
16538	2019	ProvinciadiSassari	TERGU	12	TurismoRurale	NaN	1	18.0	12.0
16539	2019	ProvinciadiSassari	TULA	12	TurismoRurale	NaN	1	20.0	12.0
16540	2019	ProvinciadiSassari	OLBIA	12	Villaggioalbergo	2Stelle	1	130.0	0.0

16541 rows × 9 columns

Population by municipality is available in a Wikipedia website while geographic coordinates can be found here.

Comuni della Sardegna

Da Wikipedia, l'enciclopedia libera.

I **comuni** della **Sardegna** sono 377, così ricompresi (al 1º gennaio 2019):

- 17 alla città metropolitana di Cagliari.
- 74 alla provincia di Nuoro.
- 87 alla provincia di Oristano.
- 92 alla provincia di Sassari.
- 107 alla provincia del Sud Sardegna.

. La popolazione indicata risulta dai dati Istat aggiornati al 30 giugno 2019.[1]

Lista [modifica | modifica wikitesto]

Comune ⬥	Toponimo in lingua locale ⬥	Provincia ⬥	Popolazione ⬥	Altitudine ⬥
Abbasanta	(sc) Abbasànta	Oristano	2665	315
Aggius	(SDN) Àggju	Sassari	1436	514
Aglientu	(SDN) Santu Francìscu di l'Aglièntu	Sassari	1221	420
Aidomaggiore	(sc) Aidumajòre/Bidumajòre	Oristano	427	250
Alà dei Sardi	(sc) Alà	Sassari	1846	663

Data preparation and modelling

Mapping cities has been necessary to add "Sardinia" to the name to find by geolocator to avoid mismatching with others in other part of the world. Similarly, "Sassari" has been renamed as "Sassari,SS" to avoid to be confused the administrative "Province of Sassari".

The cities were differently reported in the original databases (spaces or underscore, upper or lower cases), to make them comparable some tests and subsequent actions have been made.

Not all the cities have venues listed in Foursquare, basically for their very small size.

In the table regarding tourism accommodation capacity the first action has been translating columns name in English and change NaN to 0, second to limit data to Province of Sassari and then to set some values from "float" to "int". To prepare data for clustering has been needed to use a lamba formula (apply(lambda x: x / x.sum())).

Same actions have been made even in "Tourist movements in Sardinia 2019 by municipality" where the main problem was that data were not appropriately recorded: in many rows the occurring month was "Other".

Nationality columns in this dataset have been aggregate in wide geographical areas, except for national and regional provenance, to make results more readable. The adopted classification was:

The aim is to obtain clusters to make clear the "touristic capacity " of the various municipality in Sardinia.

Methodology

The used methodology is to apply clustering analysis to three different dataset containing different information about cities in North Sardinia such as:

- city venues, that should model the attractiveness of the place;
- tourist accommodation facilities, that represents the hosting capacity;
- tourists' presences by nation of provenience, that segment customers.

Venues have been searched in a round of 1.5km from the city center, the analysis considered the most frequent ten categories for each municipality. The same limit has been used in the other investigations too.

With these results the analysis has followed by k-means method to compose the clusters. In every case the number of clusters has been 5.

Results

Here we will show results using maps and key findings.
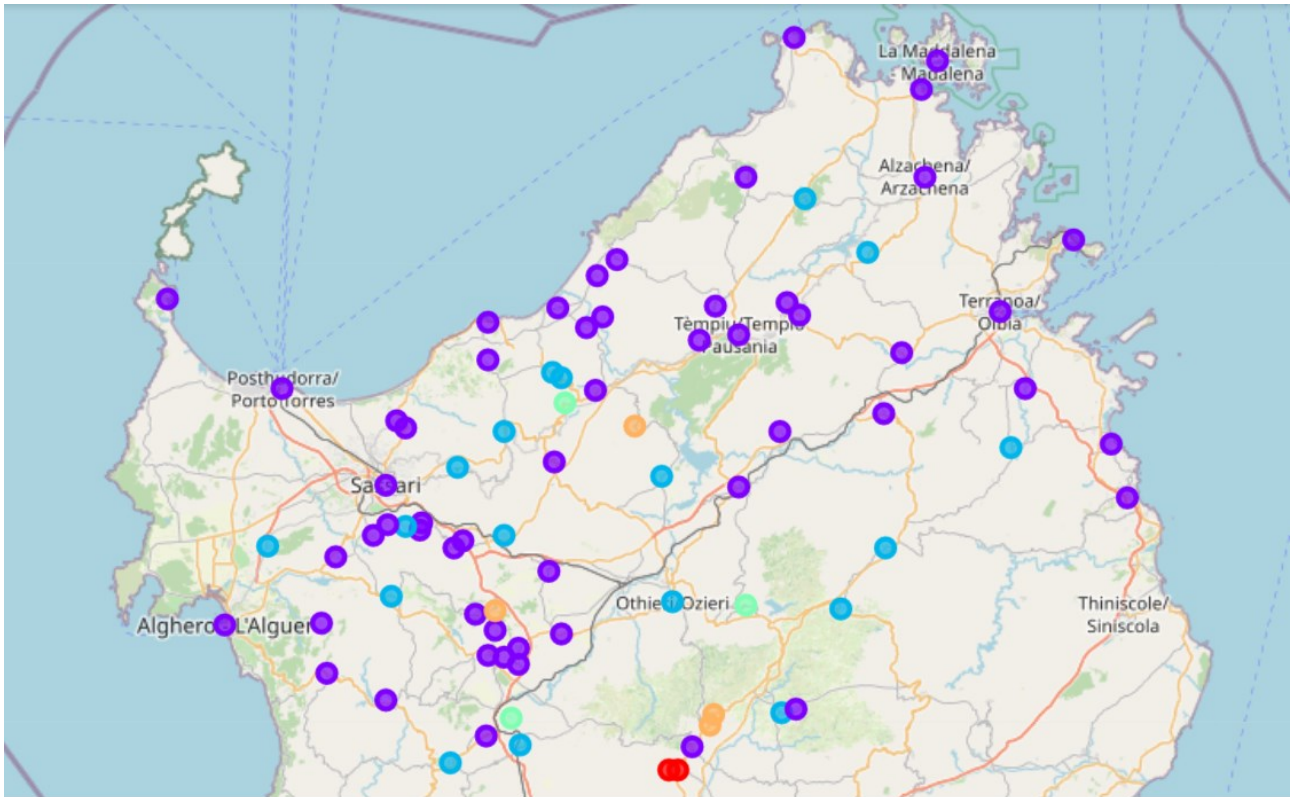
The five clusters obtained by the city venues analysis are:

- Cluster 1, red label, composed by very small towns where venues are mainly dedicated to daily food provisioning;
- Cluster 2, violet label, composed by the most part of the cities with a wide offer of leisure services and gourmet food;
- Cluster 3, light blue label, where main activities regard small and medium enterprises and related services;
- Cluster 4, orange label, characterized by agricultural economy and genuine country food;
- Cluster 5, light green label, where activities are linked to everyday life and the most common venues are bar and café as social meeting point for the few citizens.
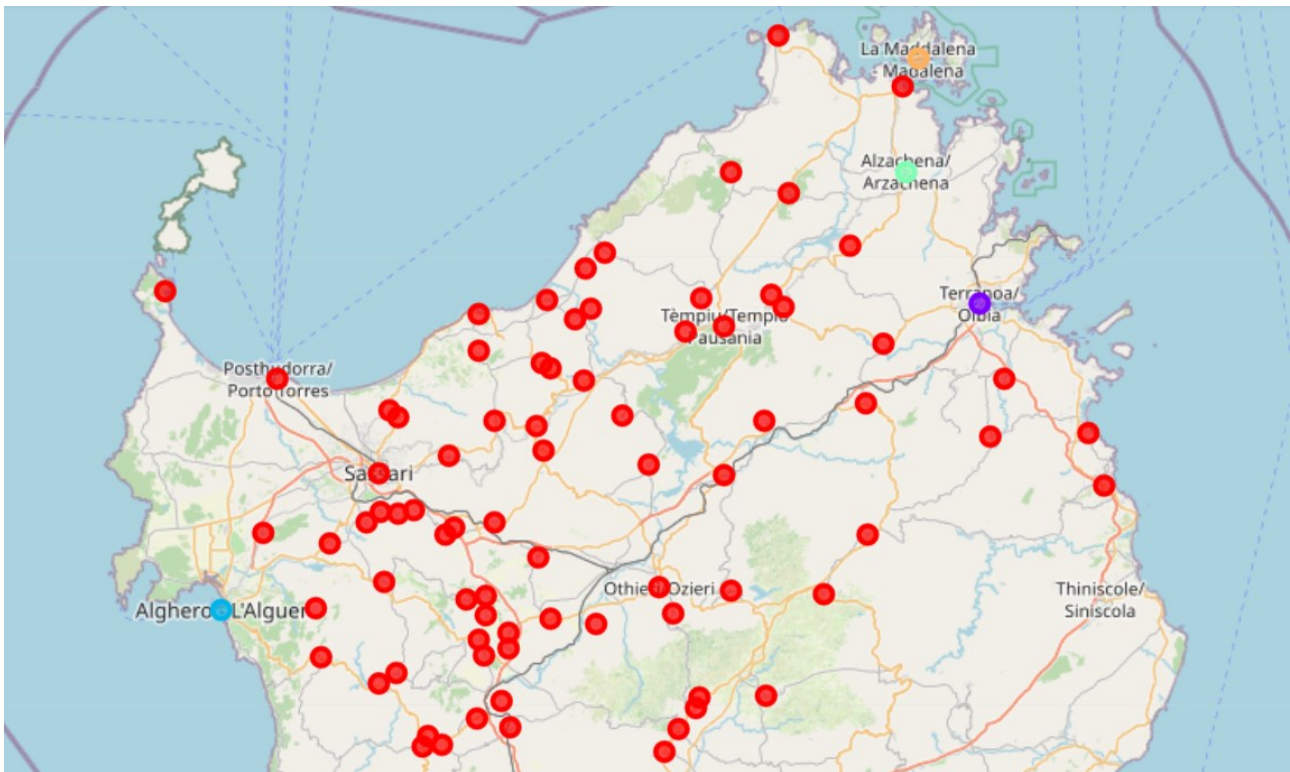
The five clusters obtained by the analysis of the tourist accommodation capacity are:

- Cluster 1, red label, this is the cluster more populated and cities inside show common characteristics all over the area.
- Other Clusters, they are composed by just one city each with Olbia (2, violet label) , Alghero (3, light blue label), Arzachena (4, light green label) e La Maddalena (5, orange label) are unique places that built up their touristic offer over decades. Most common facilities in Olbia are resorts, in Alghero are B&B and private holiday houses, in Arzachena are high level hotels and resorts and in La Maddalena medium level resorts.
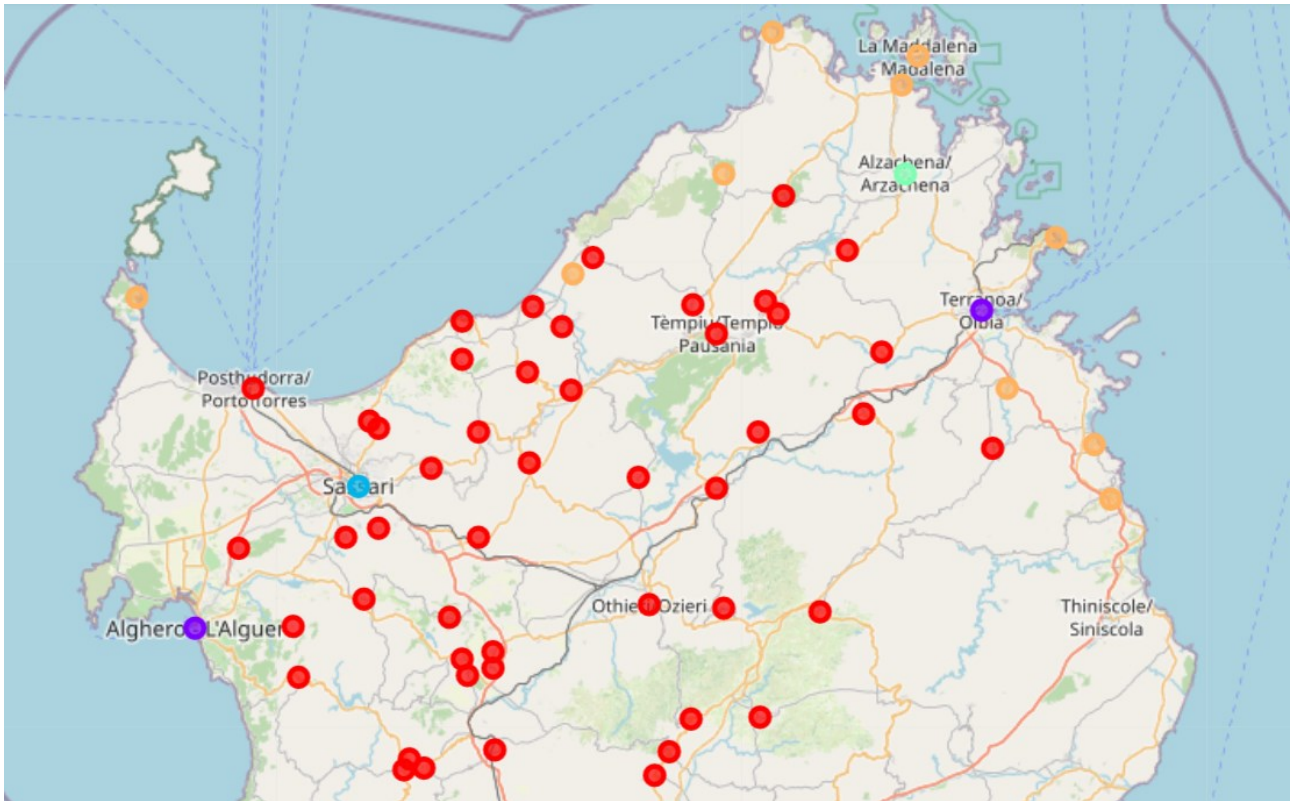
The five cluster by tourist's nationality are:

Cluster 1, red label, we can find here inside cities with tourists coming from other part of the region, from Italy or from Europe.
Cluster 2, violet label, contains Alghero and Olbia that have very various tourists.
Cluster 3, light blue label, is Sassari where tourism is for business or immigration.
Cluster 4, light green label, with Arzachena and its Costa Smeralda, a very international attraction.
Cluster 5, orange label, the most interesting. There are only coastal cities, but not all, and their tourists' nationalities are mainly Italian and European.

Comparing the three analyses can suggest possible strategies for development.

Discussion

The main possible consideration derived by reading together the three maps is that, as well known, tourism in Sardinia is inseparably linked to its coasts but there is still room for development in the North coast where some cities with attractive venues and accommodation can aspire to reach the same, and more remunerative, tourist segment as the other coastal cities.

This can be a favorable finding to use now in the phasing out from the Covid crisis. Social distancing push to spread presence and these cities can be a good alternative to more crowded seaside.

Conclusion

The goal of this work can be considered obtained even if many further analyses can be promoted to obtain further information regarding distributions within the clusters and possible specific correlations. This could lead to specific and more satisfactory actions for development strategies and the many Sardinian stakeholders in the tourism sector.