Choosing the best location for a hotel in Barcelona
by Ingrid Artiola
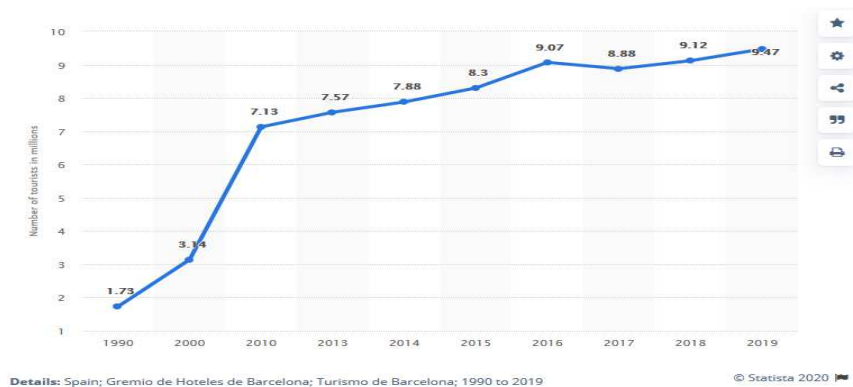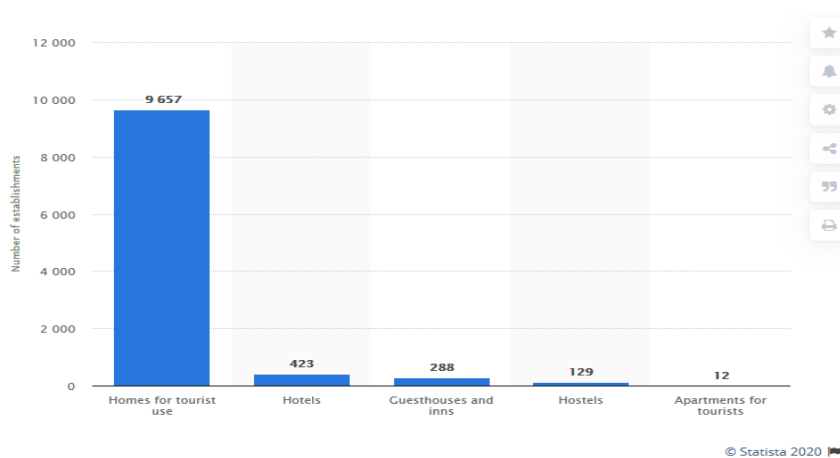April 14, 2020

1. Introduction

Barcelona (Spain) is one of the world's leading tourist destinations and has lots of accommodation options. The aim of this project is to identify the areas less crowded with hotels, specially those with tourist landmarks nearby, which could most likely attract potential customers.

The number of overnight tourists in Barcelona reached nearly 9,5 million in 2019, not including those staying in non-hotel accommodation. This is also reflected in the relatively high occupancy rates of the city's hotels, around the 72%.

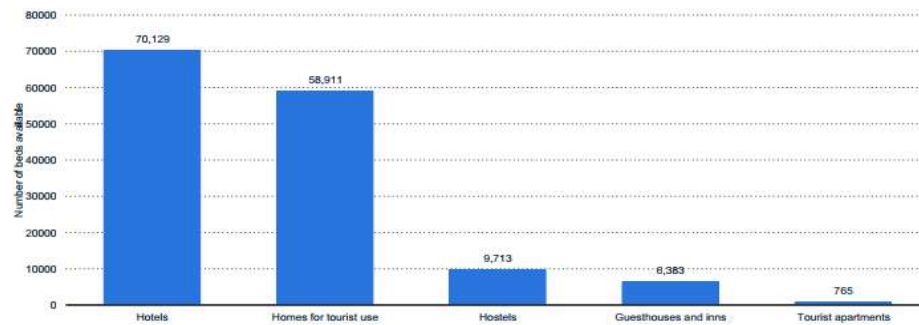*Evolution of the number of tourists (years 1990-2019)*

Hotels and Hostels represent the 5% of the accommodation establishments.

Hotel beds account for 48% of tourist accommodation in Barcelona.

Number of beds available in Barcelona in 2017, by type of accommodation

Bed numbers in Barcelona, Spain 2017, by type of accommodation

Source: Statista

The city of Barcelona is divided into the following 10 areas:

Source: wikipedia

2. Data

The factors that will be considered for choosing the hotel location are:
- Number of existing tourist attractions
- Number of existing hotels
- Existing public transport stations nearby
- Restaurant offer nearby

2.1 Data sources

- Tourist POIs and their location from the **OPEN DATA BCN** website
- Hotel businesses and their location from the **OPEN DATA BCN** website
- geojson file with the neighborhood boundaries

2.2 Data processing

The data with the tourist attractions of the city was available in a xml file, which needed to be parsed and cleaned.

Cleaning steps performed:
- Selection of the relevant features: Name, Latitude, Longitude, Neighborhood, Information
- Deletion of duplicate rows

Dataframe obtained:

	Name	Latitude	Longitude	Neighborhood	Information
0	The Auditori	41.398743	2.1851413	Eixample	Much more than a concert hall. Drop by the Aud...
1	Camp Nou	41.380775	2.1228578	Les Corts	Did you know that the Museu del Camp Nou is Sp...
2	Magic Fountain	41.371197	2.1517797	Sants-Montjuïc	Visit the Magic Fountain light and colour show...
3	Estació del Nord and Parc de l'Estació del Nord	41.394295	2.1823204	Eixample	The Estació del Nord bus station and the park ...
4	Museu Nacional d'Art de Catalunya	41.368855	2.1533628	Sants-Montjuïc	The Museu Nacional d'Art de Catalunya, a palac...
5	La Casa de la Caritat (CCCB)	41.383884	2.1667948	Ciutat Vella	Casa de la Caritat, contemporary culture in an...
6	Estació de França	41.384426	2.1853333	Ciutat Vella	Come and see #Estació de França, a station of ...
7	Piscines Bernat Picornell	41.3663	2.150775	Sants-Montjuïc	The Picornell pools, part of the Barcelona 92 ...
8	Palau Sant Jordi	41.36197	2.1523776	Sants-Montjuïc	A symbol of sport and big occasions. Discover ...
9	Mar Bella Beach	41.39855	2.2123103	Sant Martí	Cosmopolitan, urban and always buzzing. Come t...
10	Parc del Laberint d'Horta	41.437927	2.1475434	Horta-Guinardó	Enter Parc del Laberint d'Horta, you'll be ama...
11	El Park Güell	41.41348	2.1531093	Gràcia	Enter and discover the fantastic world of Park...
12	Parc de la Ciutadella	41.38584	2.1860828	Ciutat Vella	History, memory, the open air and nature. Parc...
13	El Parc de Montjuïc	41.361374	2.159711	Sants-Montjuïc	A park at the top of #Montjuïc is one of Barce...
14	Parc del Fòrum	41.411034	2.2216976	Sant Martí	Are you familiar with Parc del Fòrum? No? Then...
15	Museu de Ciències Naturals - Museu Blau	41.41078	2.220482	Sant Martí	What is there inside the building that housed ...
16	Parc Central de Nou Barris	41.436813	2.1712122	Nou Barris	Parc Central de #Noubarris, a large green area...
17	Jardí Botànic	41.362804	2.1569693	Sants-Montjuïc	The Jardí Botànic de Barcelona offers Mediterr...
18	El Castell de Montjuïc	41.364433	2.167106	Sants-Montjuïc	A testimony to history, Castell de Montjuïc is...

The data of the economic census of the city was obtained in a csv file. In order to create a dataframe with the existing hotel businesses the following cleaning steps had to be performed:
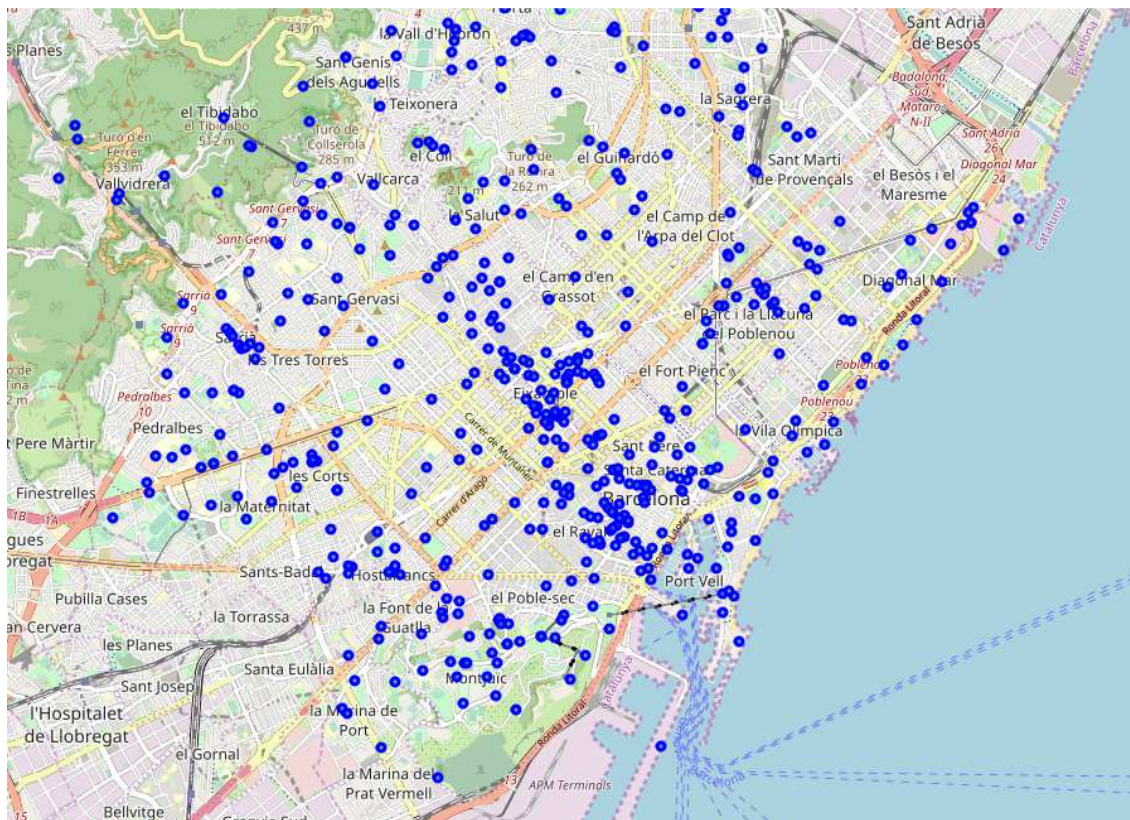
- Deletion of rows corresponding to closed business
- Selections of columns: business name, type of activity and geographical location
- Filtering of the dataset by the category "lodging establishments"

Dataframe obtained[1]:

	Name	Latitude	Longitude	Neighborhood
0	CASA MACA	41.397340	2.165709	2
1	GRAN HOTEL BARCINO	41.383098	2.177786	1
2	HOSTAL EUROPA	41.381504	2.174413	1
3	SUNOTEL CLUB CENTRAL	41.387976	2.156864	2
4	YELLOW NEST HOSTEL	41.377135	2.123807	4
5	GOLDEN TULIP	41.400258	2.190726	10
6	MAJESTIC RESIDENCE	41.393373	2.162895	2
7	HOTEL SB GLOW	41.402442	2.190840	10
8	CIUTAT BARCELONA HOTEL	41.385945	2.181089	1
9	HOSTAL PARIS	41.381497	2.173453	1
10	THE URBAN SUITS	41.377327	2.144460	3

3. Analysis
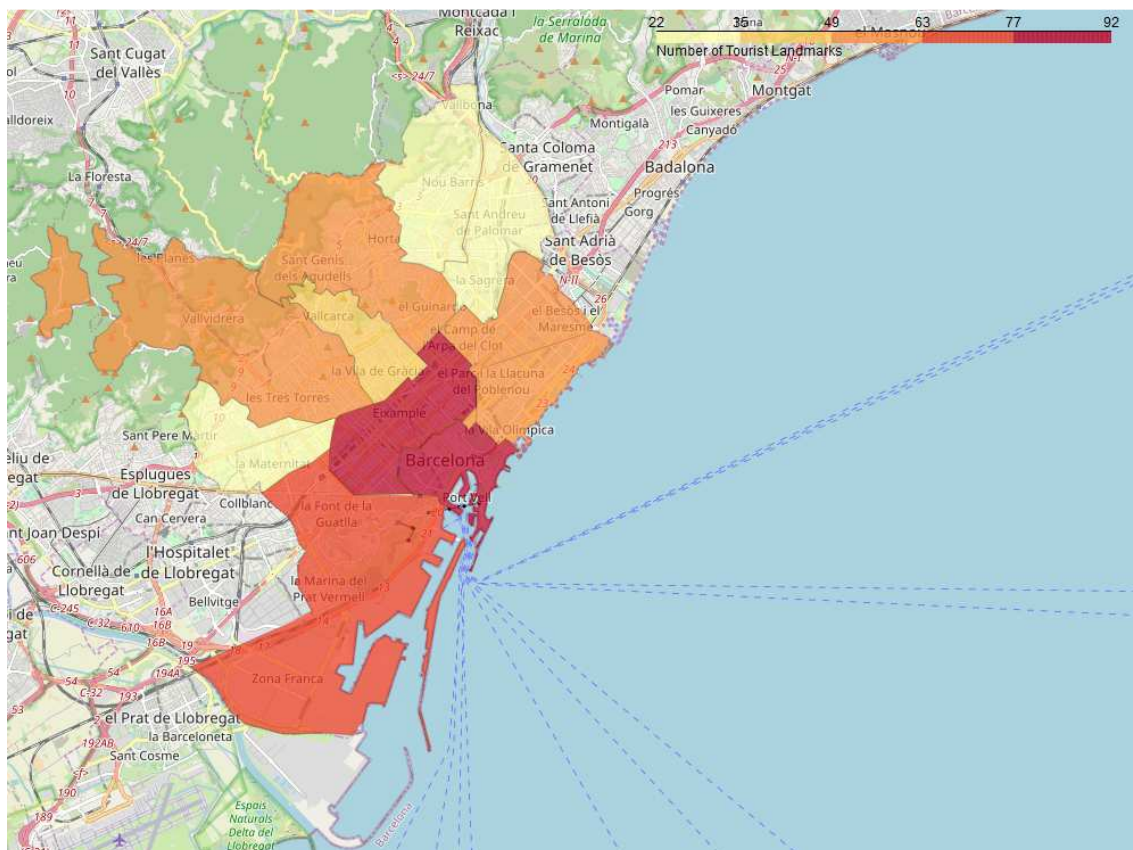
- Visualization of the tourist attractions:

Groupping the tourist attractions by area, we get following rank :

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[1] *Key: Old Town=1, Eixample=2, Sants-Montjuïc=3, Sant Martí=10, Sarrià-Sant Gervasi=5, Horta-Guinardó=7,Gràcia=6, Les Corts=4, Sant Andreu=9, Nou Barris=8.*

	Count
Neighborhood	
Ciutat Vella	91
Eixample	81
Sants-Montjuïc	64
Sant Martí	56
Sarrià-Sant Gervasi	54
Horta-Guinardó	49
Gràcia	38
Les Corts	33
Sant Andreu	33
Nou Barris	22

The boroughs of Ciutat Vella (Old Town), Eixample and Sants-Montjuïc are the areas with more tourist attractions.
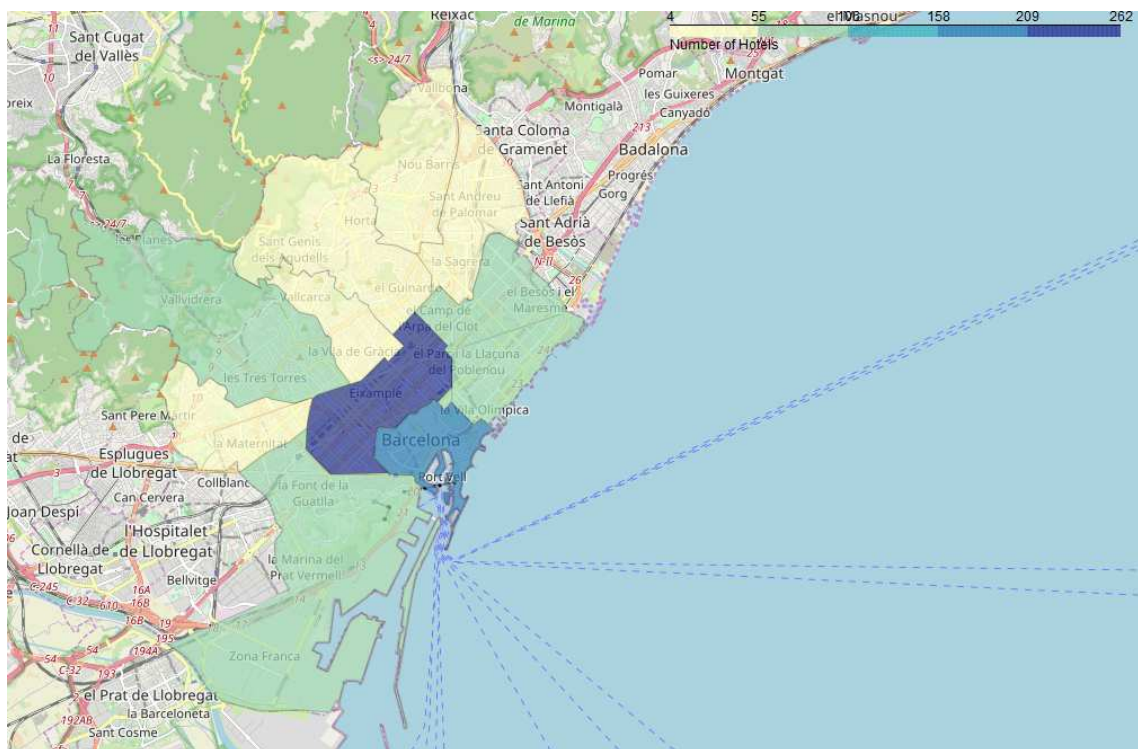

Visualization with a Choropleth map:

Red: Old Town and Eixample
Dark orange: Sants-Montjuïc

Groupping the number of hotel businesses by area, we get the following rank[2]:

Neighborhood	Count
2	261
1	192
3	72
10	61
5	57
6	41
4	30
7	17
9	5
8	4

The boroughs with more hotel businesses are: 02 (Eixample), 01 (Ciutat Vella /Old Town).
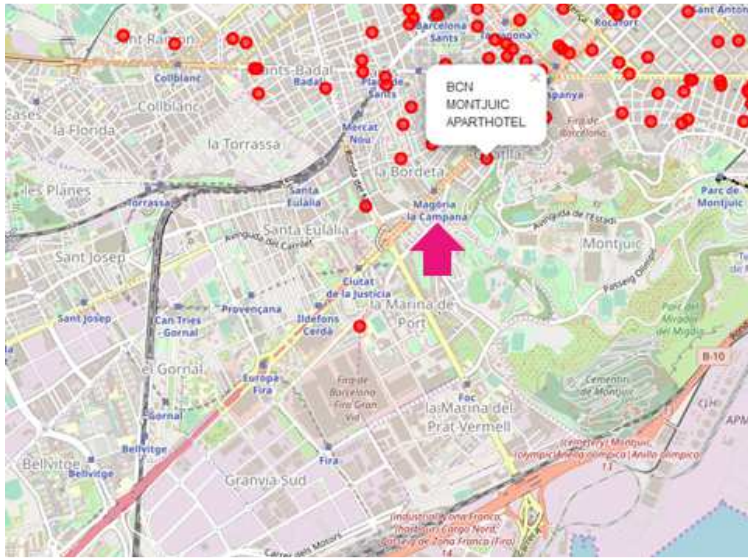
Visualization with a Choropleth map:

We had seen that the borough of Sants-Montjuïc has a fair good amount of Tourist Attractions (64). However, it has a moderate amount of hotels (72, less than a half of the second most hotel-populated area). This borough (specially the zones neighboring the Old Town and Eixample) is a good candidate for opening a new hotel.
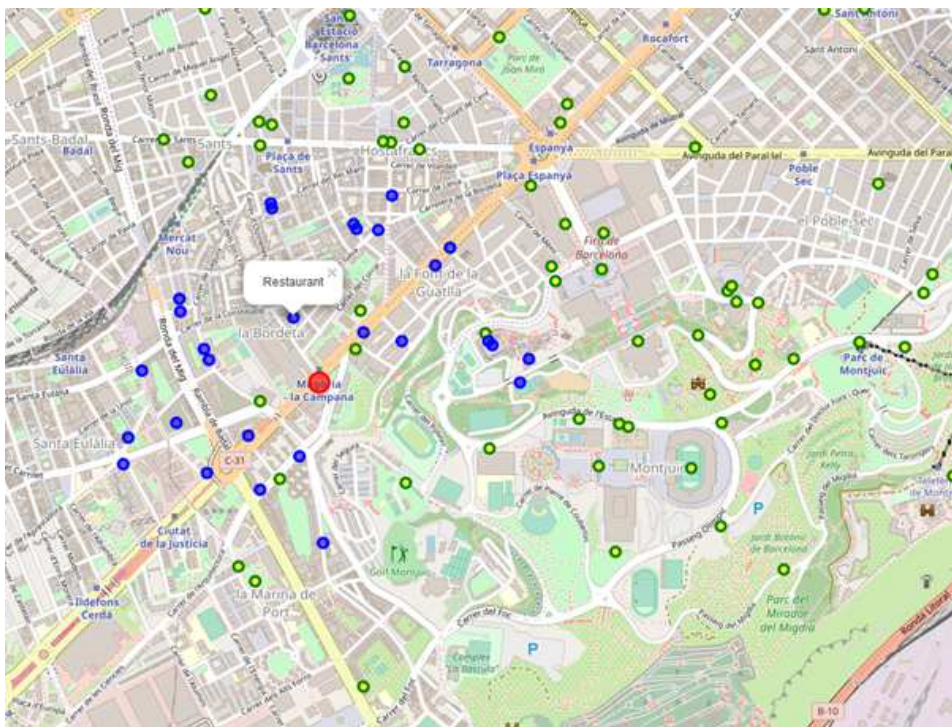
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4. Selection of the candidate location

Further exploration confirms that the area of Sants-Montjuïc is less crowded with hotels compared to the neighboring ones. The labels in blue on the map are metro and train stations. Ideally a hotel business should be near those convenient locations, since tourists usually get around the city by foot. A good option would around the 'Magoria - La Campana' station, in the center of the map.

For our candidate location, we want to make sure that besides public means of transport and tourist attractions, there is enough restaurant offer nearby. For this purpose we use the Foursquare API.

5. Results and Conclusion

There is a great number of Tourist attractions in Barcelona (more than 500 according to the Open Data BCN). The more dense areas are Ciutat Vella (Old Town) and Eixample, are also very densely crowded with accommodation options, hence opening a hotel business in those areas could be high risk.

Alternatively our attention was focused on a moderately low hotel density area but still offering lots of Tourist attractions and with access to the public transport. The candidate area is the borough of Sants-Montjuïc, which is located in the southeast of Barcelona. This Olympic-inspired district is full of attractions: the Montjuïc Park, museums, a castle, and fantastic city views. We selected an hotel-empty area around the Magòria-La Campana station. A fair amount of restaurants was detected near the candidate location, which adds attractiveness to the eventual hotel.