

# Applied Data Science Capstone

Final Project by Almu

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# Applied Data Science Capstone

- Introduction

## INVESTMENT IN MADRID OR BARCELONA

RICS' Global Commercial Property Monitor is a quarterly guide to the trends in the commercial property investment and occupier markets.

Last September, the Iberian Commercial Property Monitor index was published by RICS, and it shows Madrid and Barcelona are the best places in Europe to invest, next to Amsterdam and Budapest.

The objective of this analysis is to help investors, who want to invest in Spain, decide which city, Madrid or Barcelona, has the best opportunities.

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- Data

In this analysis, we use the Foursquare API to obtain location data of hotels, both in Madrid, and Barcelona, and we compare the results, so that we can find any gap in the hotels distribution which turns into an investment opportunity.

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- Madrid data

	Area	name	Latitude	Longitude
0	28014	Hotel Agumar	40.406.855	-3.683.119
1	28045	AC Hotel by Marriott Atocha	40.403.773	-3.689.994
2	28045	AC Hotel by Marriott Carlton Madrid	40.405.123	-3.693.702
3	28012	Hotel TRYP Madrid Atocha	40.411.691	-3.697.533
4	28012	Hotel Catalonia Atocha ****	40.411.843	-3.697.838
5	28014	Radisson Blu Hotel, Madrid Prado	40.412.517	-3.694.167
6	28014	Vincci Soho Hotel	40.414.773	-3.698.160
7	28012	Hotel Catalonia Plaza Mayor	40.413.180	-3.700.828
8	28046	Hotel Villa Magna	40.429.984	-3.687.964
9	28001	AC Hotel by Marriott Recoletos	40.421.381	-3.689.498
10	28004	Hotel 7 Islas	40.421.292	-3.701.927
11	28013	Hotel Catalonia Gran Vía ****	40.419.551	-3.699.064
12	28001	Hotel Vincci Soma	40.424.943	-3.677.994
13	28001	Hotel Jardín de Recoletos	40.422.124	-3.689.200
14	28014	Hotel Catalonia Las Cortes	40.414.554	-3.699.495
15	28001	Hotel Hospes Madrid	40.420.445	-3.689.146

	Area	name	Latitude	Longitude
16	28012	Medium Cortezo Hotel	40.413.721	-3.703.601
17	28013	Hotel Praktik Metropol	40.419.691	-3.701.709
18	28014	Hotel Urban Madrid	40.416.372	-3.698.679
19	28001	Hotel Único Madrid	40.428.560	-3.686.494
20	28004	Only YOU Hotel&Lounge	40.422.200	-3.695.799
21	28013	Hotel Emperador Madrid	40.421.427	-3.707.880
22	28005	Hotel Ganivet ***	40.408.105	-3.710.902
23	28013	Hotel Intur Palacio San Martín	40.418.571	-3.706.700
24	28004	Hotel Eurostars Central	40.426.954	-3.698.475
25	28012	Hotel chic&basic Atocha	40.410.325	-3.694.692
26	28013	Hotel Mayorazgo	40.422.105	-3.709.476
27	28013	Hotel Europa Madrid***	40.417.503	-3.703.612
28	28012	Hotel Catalonia Puerta del Sol	40.414.012	-3.702.940
29	28014	Only You Hotel Atocha	40.407.161	-3.688.438
30	28010	Hotel Gran Versalles	40.428.374	-3.697.102
31	28013	Hotel Francisco I	40.417.510	-3.707.456

	Area	name	Latitude	Longitude
32	28012	Hotel Husa Paseo del Arte	40.409.883	-3.693.564
33	28014	Hotel Ritz	40.415.591	-3.692.439
34	28010	Hotel Santo Mauro	40.430.934	-3.693.156
35	28004	Room Mate Óscar Hotel	40.420.664	-3.699.170
36	28013	Hotel Opera Madrid	40.418.856	-3.710.226
37	28013	Hotel Atlántico	40.420.372	-3.704.764
38	28013	Senator Gran Vía 70 Spa Hotel 4*	40.422.621	-3.709.561
39	28013	Hotel Petit Palace Plaza del Carmen	40.418.806	-3.703.129
40	28013	Hotel Vincci Gran Vía	40.422.408	-3.708.890
41	28012	Hotel Victoria 4	40.416.237	-3.701.691
42	28013	Cafetería-Restaurante Hotel Europa	40.417.388	-3.703.623
43	28013	Hotel Preciados	40.419.705	-3.707.515
44	28010	Hotel Juan de Austria	40.431.893	-3.699.728
45	28012	Hotel Mediodía	40.408.348	-3.692.810
46	28014	Hotel Asturias	40.416.807	-3.700.278

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- Barcelona data

	Area	name	Latitude	Longitude
0	8002	Hotel Colon Barcelona	41.384.895	2.175.994
1	8003	Grand Hotel Central	41.384.969	2.177.663
2	8002	Hotel Petit Palace Boquería Garden	41.381.217	2.174.108
3	8003	Hotel Colonial	41.382.347	2.180.777
4	8001	Hotel Catalonia Ramblas	41.385.270	2.166.965
5	8010	Hotel Vincci Gala	41.389.560	2.174.757
6	8002	Hotel Catalonia Catedral	41.384.747	2.174.455
7	8039	Eurostars Grand Marina Hotel Barcelona	41.371.508	2.181.490
8	8002	Hotel Royal Ramblas	41.384.362	2.170.742
9	8002	Hotel Barcelona Catedral	41.384.972	2.175.132
10	8002	Hotel Catalonia Plaza Catalunya	41.386.406	2.168.230
11	8002	Hotel Catalonia Portal de l'Àngel	41.385.435	2.172.743
12	8002	Olivia Plaza Hotel	41.386.074	2.171.258
13	8010	El Palace Hotel Barcelona	41.391.485	2.171.460
14	8002	Hotel Catalonia Avinyó	41.381.260	2.176.382
15	8002	Hotel Duquesa de Cardona	41.379.801	2.180.637

	Area	name	Latitude	Longitude
16	8007	NH Gran Hotel Calderón	41.389.264	2.166.129
17	8007	Hotel Catalonia Passeig de Gràcia	41.390.191	2.169.558
18	8002	Hotel Regina	41.386.020	2.167.945
19	8003	K+K Hotel Picasso	41.386.667	2.184.064
20	8002	Hotel Catalonia Port	41.378.738	2.178.700
21	8002	Hotel Catalunya	41.385.429	2.171.697
22	8010	Hotel Indigo Barcelona	41.391.328	2.170.100
23	8001	Hotel España	41.379.899	2.172.996
24	8010	Hotel Acta Atrium Palace	41.390.954	2.170.494
25	8002	Hotel Serhs Rivoli Rambla	41.384.191	2.171.060
26	8004	Tryp Barcelona Apolo Hotel	41.374.664	2.170.726
27	8001	Hotel España	41.379.964	2.172.833
28	8013	Ayre Hotel Caspe	41.396.066	2.179.531
29	8010	Hotel NH Pódium	41.391.672	2.177.914
30	8003	Hotel Catalonia Born	41.389.819	2.180.023
31	8001	Hotel San Agustín	41.380.715	2.171.706

	Area	name	Latitude	Longitude
32	8002	Hotel 1898	41.383.404	2.170.680
33	8009	Hotel Praktik Garden	41.393.767	2.171.349
34	8001	Hotel Barceló Raval	41.379.025	2.169.729
35	8007	Hotel Petit Palace Museum	41.388.921	2.165.360
36	8008	Alexandra Barcelona Hotel, Curio Collection by...	41.393.137	2.161.503
37	8002	Hotel Flor Parks	41.380.726	2.173.853
38	8003	Musik Boutique Hotel	41.388.007	2.178.391
39	8001	Hotel Gaudí	41.378.903	2.174.046
40	8002	Nouvel Hotel	41.385.272	2.171.669
41	8001	Hotel Lleó	41.385.754	2.166.527
42	8001	Hotel Medium Monegal	41.385.337	2.169.708
43	8011	Hotel Gran Ronda	41.383.130	2.163.298
44	8002	Hotel Neri	41.383.295	2.175.287
45	8003	Banys Orientals Hotel Barcelona	41.383.738	2.180.013

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- ## Methodology

Our analytic approach has two phases, so we can decide easily which city, and where inside the city center, has the best investment opportunity.

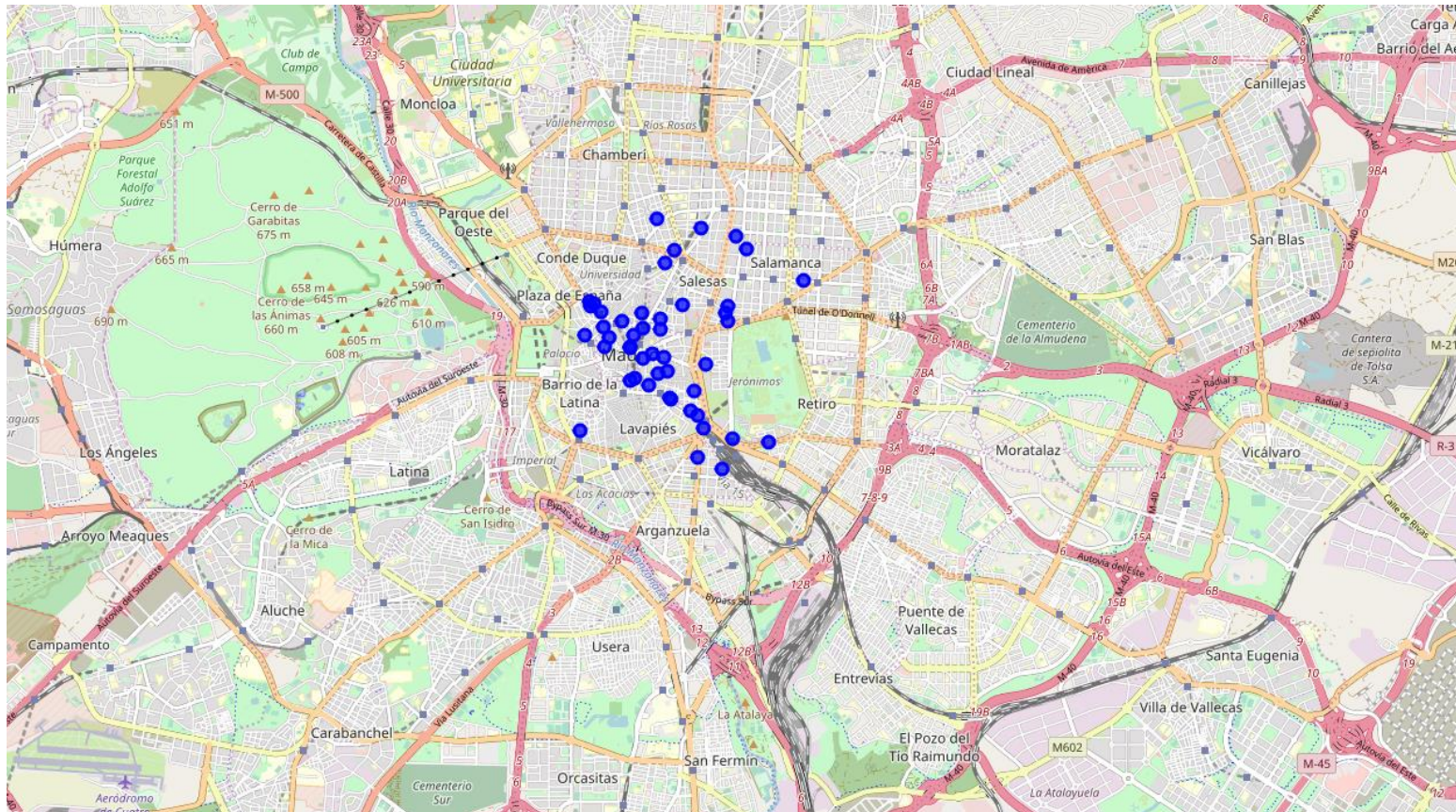
In the first phase, we see the current status of both cities, related to hotels distribution in each city center. We achieve this by plotting the maps of each city, with hotels superimposed on top.

Once we know which city has more free-of-hotel space in its central zone, in the second phase, we use the unsupervised learning technique named Clustering, so that we can choose the best zone inside city center to build a new hotel.



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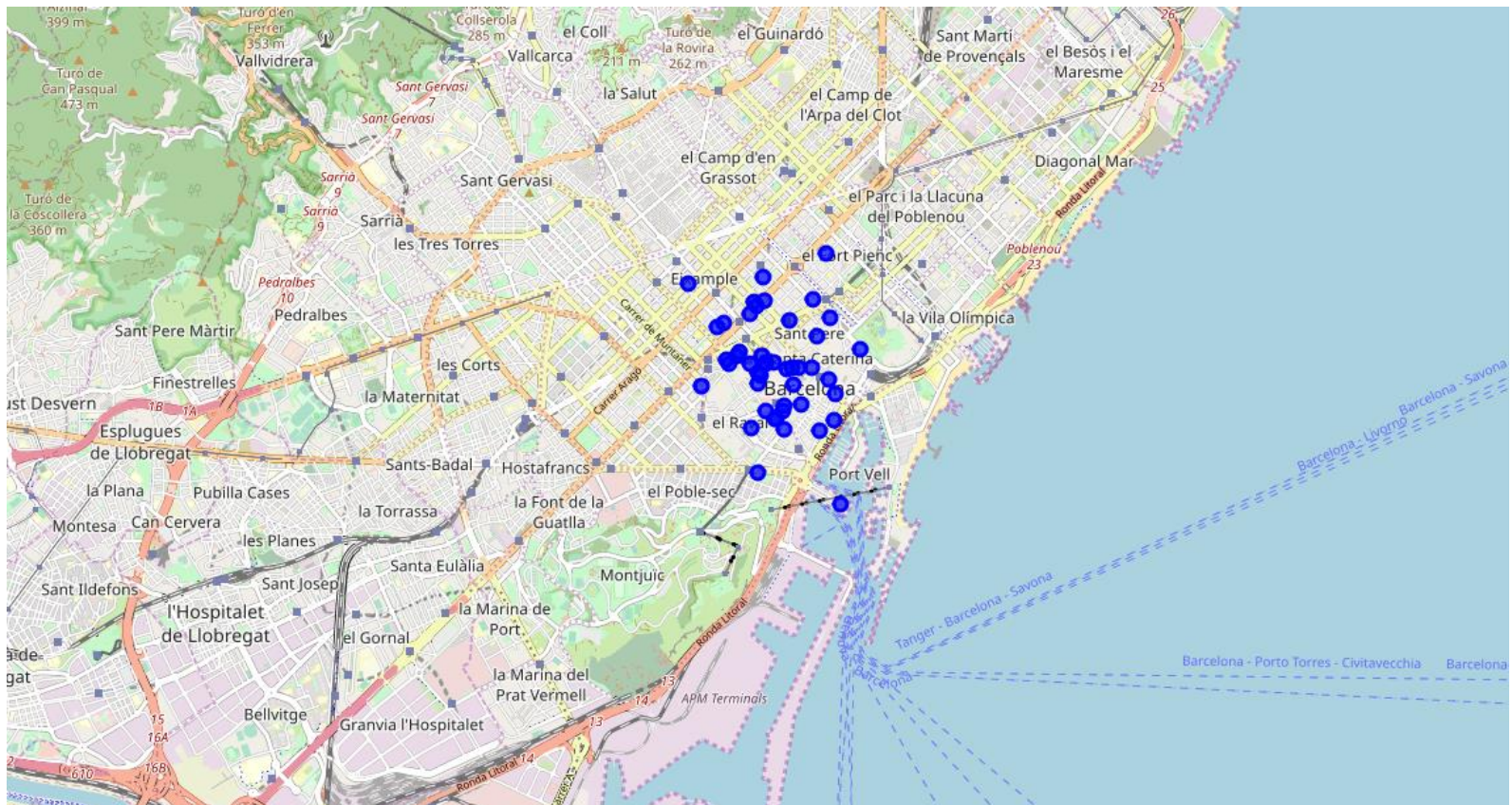
- Results First Phase. Madrid map with hotels





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- Results First Phase. Barcelona map with hotels



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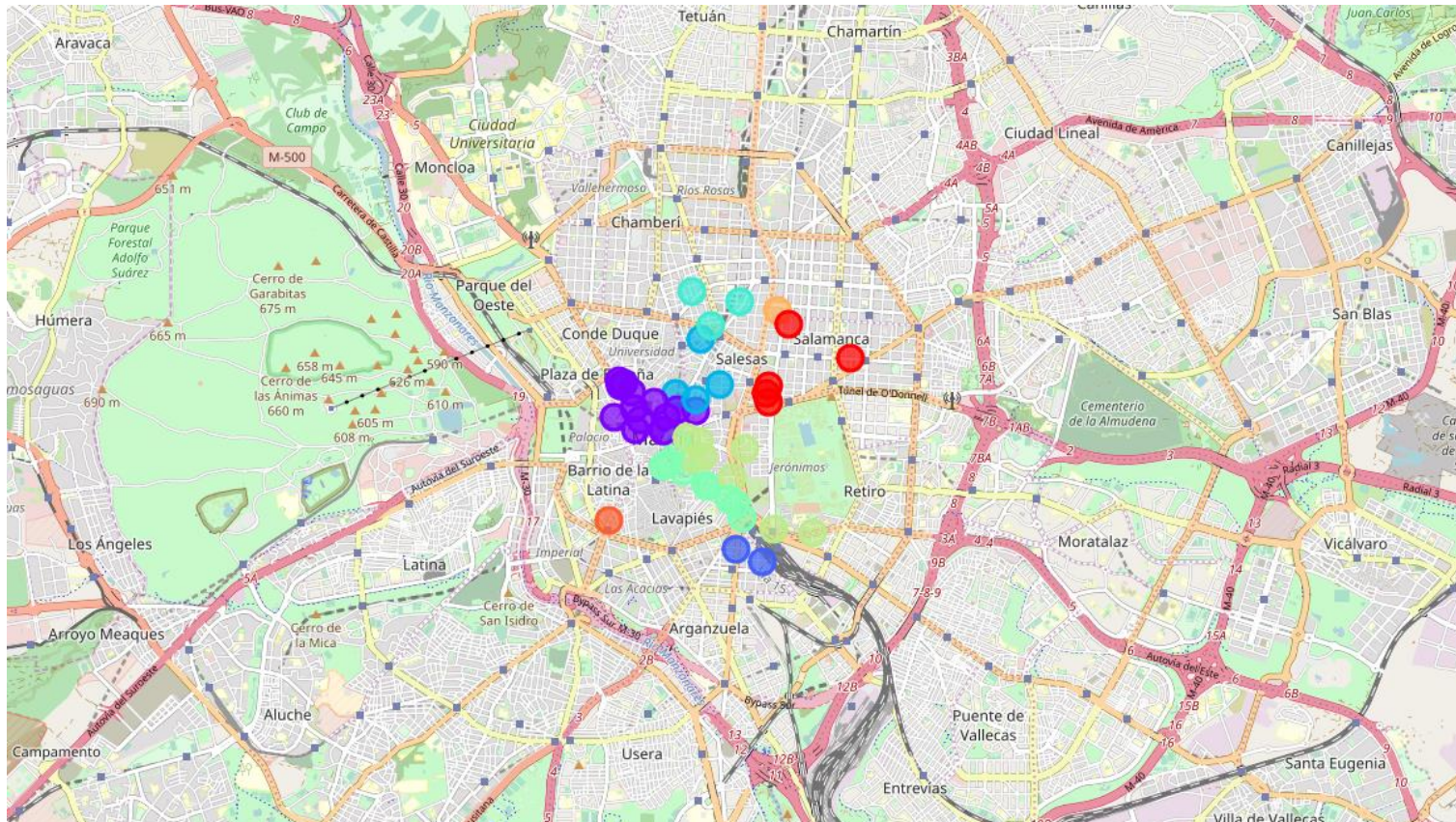
- Results First Phase

Thanks to the maps with hotels superimposed on top, we realize Madrid is the best city to invest, since the central zone has more free-of-hotel space than Barcelona's, that is to say, the current amount of Hotels cover all city center in Barcelona, while there is much free space in Madrid.



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- Results 2nd Phase. Madrid areas



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- Results Second Phase

Looking at the clustering image, we can say the best zone to build a new hotel in Madrid center is the dark orange zone, that is, near "Barrio de la Latina" and "Lavapiés", as it is the area with less hotels.

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- Discussion

Before doing this analysis, I was not able to say whether Barcelona or Madrid had opportunities of investment, but now, having the results in front of me, I can say both cities are great, though Madrid seems to have more free room for hotels, in the southern area of city center.

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- Conclusion

I recommend investors to build a new hotel in Madrid, near "Barrio de la Latina" and "Lavapiés".