

The Battle of the Neighborhoods

Report

1. Introduction & business problem.

Problem Background:

The City of Barcelona is one of the most populous city in Spain. Located on the coast of the Mediterranean Sea, its urban area extends to numerous neighbouring municipalities within the Province of Barcelona and is home to around 4.8 million people.

Barcelona is one of the world's leading tourist, economic, trade fair and cultural centres, and its influence in commerce, education, entertainment, media, fashion, science, and the arts all contribute to its status as one of the world's major global cities. This also means that the market is highly competitive. As it is a highly developed city so cost of doing business is also one of the highest.

Thus, any new business venture or expansion needs to be analysed carefully. The insights derived from analysis will give good understanding of the business environment which help in strategically targeting the market. This will help in reduction of risk. And the Return on Investment will be reasonable

Problem Description

Grupo Upper is a powerful supermarket cooperative, based in the Region of Murcia. Since its creation more than 30 years ago, it has been expanding in the southern Spain, now because of its intentions for becoming one of the most important supermarket groups in Spain, has decided to create its first supermarket in the city of Barcelona.

Before opening, The Company believe it is very important to develop a startegically plan. Various factors need to be studied in order to decide on the right location such as :

1. Segmentation of the Borough.
2. Barcelona Population.
3. Barcelona Demographics.
4. Level of Life and unplunemployment by neighbourhood.
5. Price of Comercials Properties.
6. Who are the competitors in that location?

Target Audience:

To recommend the correct location, Grupo Upper has appointed me to lead the Data Science team. The objective is to locate which neighborhood of Barcelona will be the best choice to start a supermarket. The Management also expects to understand the rationale of the recommendations made.

Success Criteria:

The success criteria of the project will be a good recommendation of neighborhood choice to Grupo Upper.

2. Data.

We will be using the below datasets for analysing Barcelona.

Data 1:

Neighborhood has a total of 10 districts and 73 neighborhoods. In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the districts and the neighborhoods.

Link to the dataset:

https://vangdata.carto.com/tables/shapefiles_barcelona_distrito/public

Data 2:

For the below analysis we will get data from Barcelona's City Hall Open Data Services as given below:

1. Barcelona Population
<https://opendata-ajuntament.barcelona.cat/data/en/dataset/est-ine-edat-any-a-any>
2. Unemployment by neighbourhood in the city of Barcelona
<https://opendata-ajuntament.barcelona.cat/data/en/dataset/est-atur-sexe>
3. List prices of commercial properties in the city of Barcelona
<https://opendata-ajuntament.barcelona.cat/data/en/dataset/loclo-a>

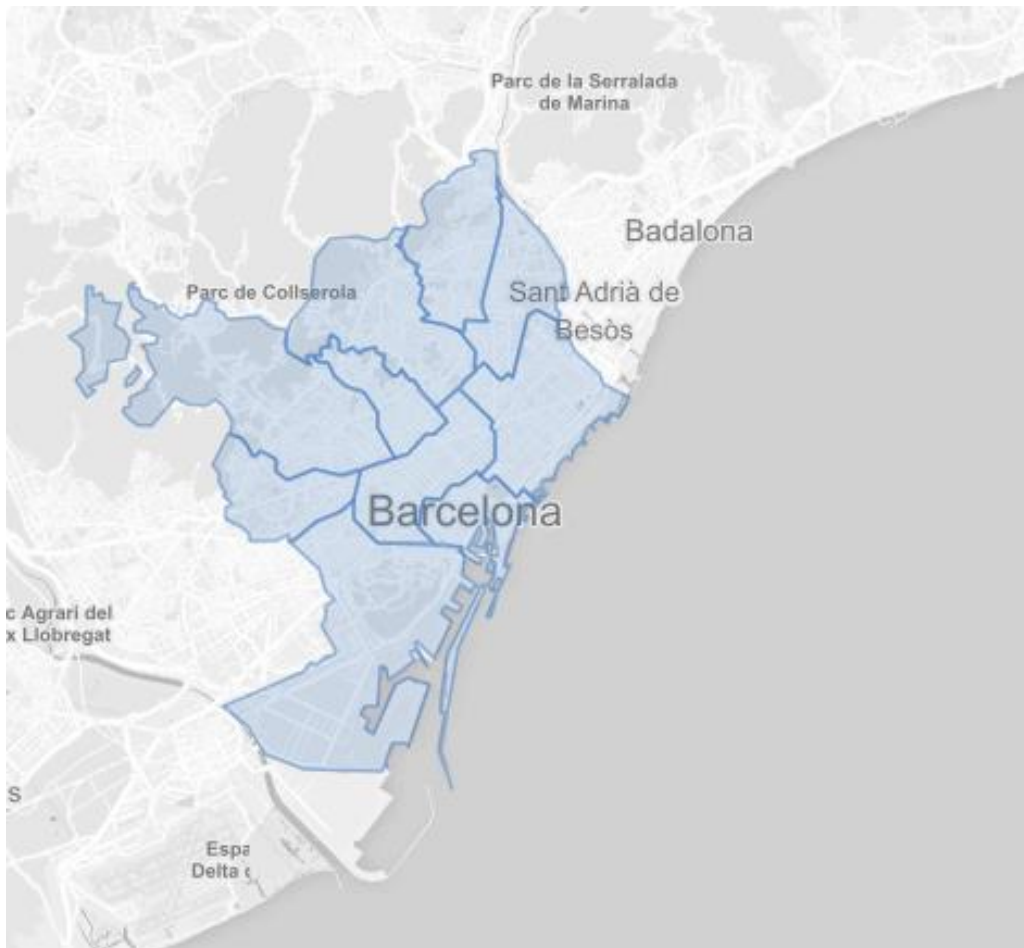
Data 3:

Barcelona geographical coordinates data has been utilized as input for the Foursquare API, that will be leveraged to provision venues information for each neighborhood. I have used the Foursquare API to explore neighborhoods in Barcelona, in special the supermarkets.

3. Methodology.

Analytic Approach:

Barcelona has a total of 10 boroughs and 76 neighborhoods. In this project first part is clustering of Barcelona Center . And second part is clustering of Barcelona Suburb. This is done because of the following Exploratory data analysis.



Exploratory Data Analysis:

Data 1- Barcelona Geographical Coordinates Data.

1. It is loaded the data and explore data from barcelona_data.json file.
2. Transform the data of nested python dictionaries into a pandas dataframe.
3. This dataframe contains the geographical coordinates of Barcelona neighborhoods.
4. This data will used to get Venues data from Foursquare.
5. We used geopy and folium libraries to create a map of Barcelona with neighborhoods superimposed on top.

Data 2: Population, Demographics, Unemployment and Prices.

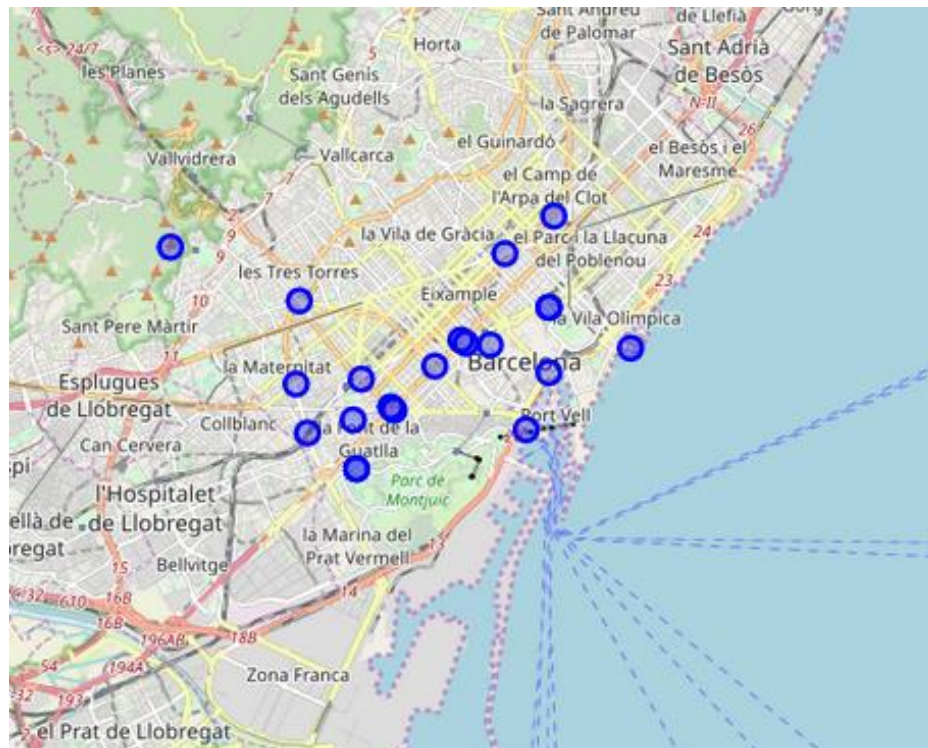
To analyze Barcelona Population, Demographics, Unemployment and Prices scrapped the data from we will get data from Barcelona's City Hall Open Data Services in csv format.

Data 3: Barcelona geographical coordinates.

This data has be utilized as input for the Foursquare API, that has been leveraged to provision venues information for each neighborhood. We used the Foursquare API data to explore neighborhoods in Barcelona. And find the supermarkets.

4. Results.

Boroughs & Neighborhoods in Barcelona City:



	Borough
Nou Barris	13
Horta-Guinardó	11
Sant Martí	10
Sants-Montjuïc	8
Sant Andreu	7
Eixample	6
Sarrià-Sant Gervasi	6
Gràcia	5
Ciutat Vella	4
Les Corts	3

Barcelona Center has 4 boroughs and 24 neighborhoods:

	Borough	Neighborhood	Latitude	Longitude
0	Eixample	el Fort Pienc	41.39142593401981	2.182389633367708
1	Eixample	la Sagrada Família	41.406032157337094	2.183361528532187
2	Eixample	la Dreta de l'Eixample	41.39998519624629	2.173315981922499
3	Eixample	l'Antiga Esquerra de l'Eixample	41.386303663440906	2.164126034567323
4	Eixample	la Nova Esquerra de l'Eixample	41.38212775566621	2.158570079959219
5	Eixample	Sant Antoni	41.3859161565667	2.164846888163389
6	Sants-Montjuïc	el Poble Sec	41.375294238214316	2.149816362663807
7	Sants-Montjuïc	la Marina del Prat Vermell	41.372297761678865	2.177634929704094
8	Sants-Montjuïc	la Marina de Port	41.36604062609688	2.14214209587741
9	Sants-Montjuïc	la Font de la Guatlila	41.36604062609688	2.14214209587741
10	Sants-Montjuïc	Hostafrancs	41.375678431629254	2.149066881557689
15	Sarrià-Sant Gervasi	Sarrià	41.41244509914005	2.119468523244587
16	Sarrià-Sant Gervasi	les Tres Torres	41.399333237187534	2.134157001051802
17	Sarrià-Sant Gervasi	Sant Gervasi - la Bonanova	41.41952910012302	2.129269039348241
18	Sarrià-Sant Gervasi	Sant Gervasi - Galvany	41.400533529434334	2.151169718470402
19	Sarrià-Sant Gervasi	el Putxet i el Farró	41.406831278098224	2.149065559437258
20	Gràcia	Vallcarca i els Penitents	41.421098063789245	2.140455493484387
21	Gràcia	el Coll	41.42067954785731	2.149520766165864
22	Gràcia	la Salut	41.41662265853957	2.152938835919317
23	Gràcia	la Vila de Gràcia	41.40097091029757	2.165241020041451
24	Gràcia	el Camp d'en Grassot i Gràcia Nova	41.406964630886314	2.168652007422523

Barcelona Center has 6 boroughs and 47 neighborhoods:

	Borough	Neighborhood	Latitude	Longitude					
0	Ciutat Vella	el Raval	41.38546968235703	2.170043729484323	21	Nou Barris	Can Peguera	41.434861235523535	2.169596255351586
1	Ciutat Vella	el Barri Gòtic	41.38127041329914	2.182463146983109	22	Nou Barris	la Guineueta	41.43900573153187	2.175107864500738
2	Ciutat Vella	la Barceloneta	41.384934944079056	2.199722962413001	23	Nou Barris	Canyelles	41.44982105409815	2.16408037571296
3	Ciutat Vella	Sant Pere, Santa Caterina i la Ribera	41.39142593401981	2.182389633367708	24	Nou Barris	les Roquetes	41.454492803208666	2.184364893824311
4	Les Corts	les Corts	41.3925389469222	2.1299436208967	25	Nou Barris	Verdun	41.43900573153187	2.175107864500738
5	Les Corts	la Maternitat i Sant Ramon	41.379433561582665	2.12913926505408	26	Nou Barris	la Prosperitat	41.43970545330367	2.185440675953275
6	Les Corts	Pedralbes	41.40109422432195	2.102913725441463	27	Nou Barris	la Trinitat Nova	41.45493112520515	2.188420850158434
7	Horta-Guinardó	el Baix Guinardó	41.41120501510022	2.174287667140717	28	Nou Barris	Torre Baró	41.456635040375545	2.187584210130602
8	Horta-Guinardó	Can Baró	41.41545162913898	2.167294636826141	29	Nou Barris	Ciutat Meridiana	41.46434800255743	2.179266936830972
9	Horta-Guinardó	el Guinardó	41.42543850962799	2.17616061750463	30	Nou Barris	Vallbona	41.462126460922036	2.187454466491353
10	Horta-Guinardó	la Font d'en Fargues	41.42651857963422	2.172352976514009	31	Sant Andreu	la Trinitat Vella	41.44900606599639	2.201319052726174
11	Horta-Guinardó	el Carmel	41.425592288262806	2.158336071295066	32	Sant Andreu	Baró de Viver	41.446996736262285	2.203316627644958
12	Horta-Guinardó	la Teixonera	41.42067954785731	2.149520766165864	33	Sant Andreu	el Bon Pastor	41.42756050967902	2.207193739305272
13	Horta-Guinardó	Sant Genís dels Agudells	41.424783833229114	2.142328528102691	34	Sant Andreu	Sant Andreu	41.447611945332056	2.197202816219813
14	Horta-Guinardó	Montbau	41.436122692736944	2.14857121954406	35	Sant Andreu	la Sagrera	41.426931037166426	2.195934085009976
15	Horta-Guinardó	la Vall d'Hebron	41.43166197175465	2.153785687911287	36	Sant Andreu	el Congrés i els Indians	41.427627339626895	2.184294863622275
16	Horta-Guinardó	la Clota	41.42899526394588	2.15697845477888	37	Sant Andreu	Navas	41.41538276639932	2.191187455170464
17	Horta-Guinardó	Horta	41.43992734310348	2.161525032157495	38	Sant Martí	el Camp de l'Arpa del Clot	41.41526736366928	2.186884067754626
18	Nou Barris	Vilapicina i la Torre Llobeta	41.43030844236767	2.174683173768802	39	Sant Martí	el Clot	41.41456626469455	2.192361632101159
19	Nou Barris	Porta	41.43019102377437	2.183012709204312	40	Sant Martí	el Parc i la Llacuna del Poblenou	41.405012099215966	2.193781220494194
20	Nou Barris	el Turó de la Peira	41.43030844236767	2.174683173768802					

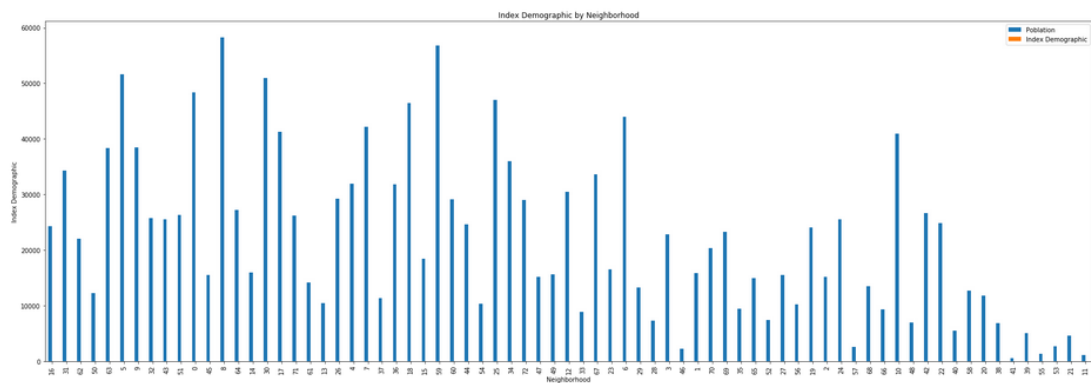
High Index Demographics

	Borough	Neighborhood	Poblation	Index Demographic
16	Sants-Montjuïc	Sants - Badal	24344	0.0592947
31	Gràcia	el Camp d'en Grassot i Gràcia Nova	34356	0.0528934
62	Sant Andreu	Navas	22059	0.0521061
50	Nou Barris	Verdun	12294	0.0517782
63	Sant Martí	el Camp de l'Arpa del Clot	38361	0.0517181
5	Eixample	la Sagrada Família	51623	0.0491184
9	Eixample	Sant Antoni	38512	0.0480808
32	Horta-Guinardó	el Baix Guinardó	25766	0.0460242
43	Nou Barris	Vilapicina i la Torre Llobeta	25581	0.0451073
51	Nou Barris	la Prosperitat	26295	0.0442077
0	Ciutat Vella	el Raval	48403	0.0440671
45	Nou Barris	el Turó de la Peira	15554	0.0439245
8	Eixample	la Nova Esquerra de l'Eixample	58224	0.0435269
64	Sant Martí	el Clot	27170	0.039904
14	Sants-Montjuïc	Hostafrancs	15954	0.0388927
30	Gràcia	la Vila de Gràcia	50928	0.0384066
17	Sants-Montjuïc	Sants	41313	0.0376339
71	Sant Martí	Sant Martí de Provençals	26196	0.0351432
61	Sant Andreu	el Congrés i els Indians	14161	0.0347915
13	Sants-Montjuïc	la Font de la Guatlla	10481	0.0346982

Low Index Demographics

	Borough	Neighborhood	Poblation	Index Demographic
40	Horta-Guinardó	la Vall d'Hebron	5469	0.00742923
58	Sant Andreu	el Bon Pastor	12766	0.00678402
20	Les Corts	Pedralbes	11800	0.00436652
38	Horta-Guinardó	Sant Genís dels Agudells	6891	0.00401567
41	Horta-Guinardó	la Clota	537	0.00301224
39	Horta-Guinardó	Montbau	5110	0.00249671
55	Nou Barris	Vallbona	1348	0.00225497
53	Nou Barris	Torre Baró	2719	0.00153754
21	Sarrià-Sant Gervasi	Vallvidrera, el Tibidabo i les Planes	4666	0.00040495
11	Sants-Montjuïc	la Marina del Prat Vermell	1138	7.96688e-05

Graphics of all Neighborhoods (Population & Index Demographics)



High Population

	Borough	Neighborhood	Poblation	Index Demographic
8	Eixample	la Nova Esquerra de l'Eixample	58224	0.0435269
59	Sant Andreu	Sant Andreu	56818	0.0308594
5	Eixample	la Sagrada Família	51623	0.0491184
30	Gràcia	la Vila de Gràcia	50928	0.0384066
0	Ciutat Vella	el Raval	48403	0.0440671
25	Sarrià-Sant Gervasi	Sant Gervasi - Galvany	47043	0.0283577
18	Les Corts	les Corts	46412	0.0328564
6	Eixample	la Dreta de l'Eixample	43994	0.0207186
7	Eixample	l'Antiga Esquerra de l'Eixample	42161	0.0341536
17	Sants-Montjuïc	Sants	41313	0.0376339

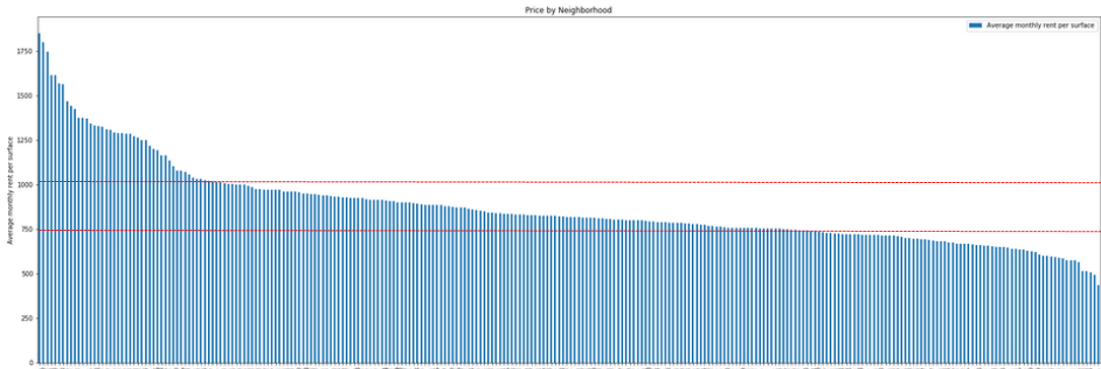
Unemployment by Borough

Nou Barris	312	← High Unemployment
Horta-Guinardó	264	
Sant Martí	240	
Sants-Montjuïc	192	← Medium Unemployment
Sant Andreu	168	
Eixample	144	
Sarrià-Sant Gervasi	144	← Low Unemployment
Gràcia	120	
Ciutat Vella	96	
Les Corts	72	

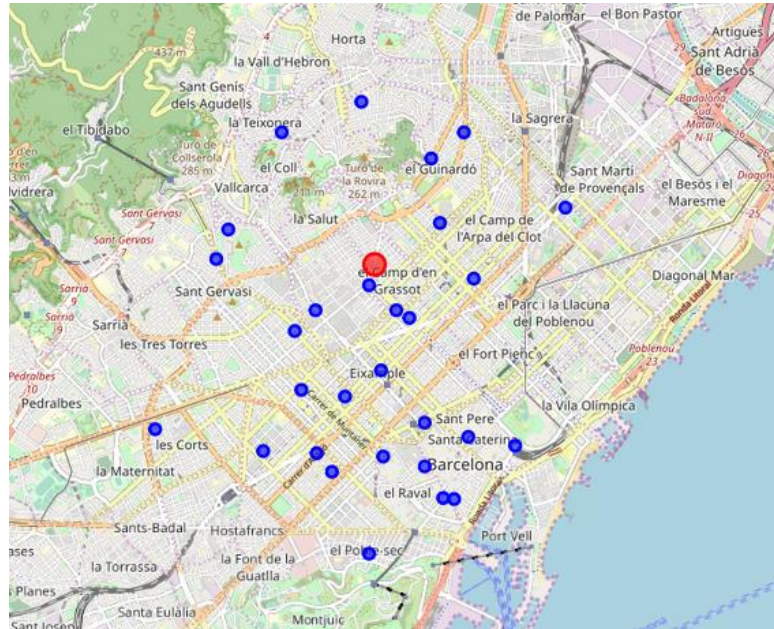
Prices of Comercial Properties

Borough	Neighborhood	Average monthly rent per surface
Les Corts	Pedralbes	1849.52
Les Corts	Pedralbes	1799.91
Sarrià-Sant Gervasi	les Tres Torres	1746.01
Les Corts	Pedralbes	1615.31
Sarrià-Sant Gervasi	les Tres Torres	1613.41
Sarrià-Sant Gervasi	les Tres Torres	1567.91
Les Corts	Pedralbes	1563.31
Sarrià-Sant Gervasi	les Tres Torres	1467.07
Sarrià-Sant Gervasi	Sarrià	1443.71
Sarrià-Sant Gervasi	Sarrià	1422.80
Sarrià-Sant Gervasi	Sant Gervasi - Galvany	1374.82
Sarrià-Sant Gervasi	Sant Gervasi - Galvany	1374.32
Sant Martí	Diagonal Mar i el Front Marítim del Poblenou	1371.14
Eixample	la Dreta de l'Eixample	1340.38
Sarrià-Sant Gervasi	Sarrià	1332.33
Sarrià-Sant Gervasi	Sant Gervasi - Galvany	1328.14
Sarrià-Sant Gervasi	Sant Gervasi - la Bonanova	1322.61
Sarrià-Sant Gervasi	Sant Gervasi - Galvany	1310.42

Nou Barris	la Prosperitat	634.30
Nou Barris	Verdun	628.80
Nou Barris	Verdun	624.71
Nou Barris	Verdun	618.91
Nou Barris	les Roquetes	605.41
Sant Andreu	la Trinitat Vella	598.29
Sant Andreu	la Trinitat Vella	597.93
Nou Barris	les Roquetes	595.81
Nou Barris	la Trinitat Nova	592.73
Sant Andreu	la Trinitat Vella	589.02
Nou Barris	la Trinitat Nova	584.73
Nou Barris	les Roquetes	575.71
Nou Barris	la Trinitat Nova	575.38
Nou Barris	la Trinitat Nova	574.15
Sant Andreu	la Trinitat Vella	564.56
Nou Barris	Ciutat Meridiana	514.52
Nou Barris	Ciutat Meridiana	514.34
Nou Barris	Ciutat Meridiana	507.16
Nou Barris	Ciutat Meridiana	491.84
Nou Barris	Torre Baró	434.52



Supermarkets in Interest Areas



0	Supermercado El Corte Inglés
1	Supermercado El Corte Inglés
2	Supermercado Fresnillo
3	Supermercado
4	Supermercado Dia
5	Supermercado SUMA
6	Supermercado Dia
7	Supermercado Dia
8	Supermercado DIA
9	Supermercado Hollyday
10	Supermercado JPC
11	Supermercado SUMA
12	Supermercado suma
13	Supermercado Fom de Pan
14	Supermercado
15	Supermercado El Corte Inglés
16	Supermercado Dia
17	Caprabo
18	Supermercado Suma
19	Diva Supermercado
20	Supermercado DIA
21	Supermercado Caprabo
22	Supermercado Esclat
23	Supermercado Montaña Nepal
24	Supermercado Guipúzcoa
25	Supermercado Aurora
26	Supermercado Dia
27	Supermercado Maxi DIA
28	Supermercado Al Madni
29	Supermercado GAUDI

5. Discussion.

For the perfect location of the supermarket we look for High density of population, low unemployment, and low prices. However, it is seen that high unemployment rates are highly correlated with low prices and vice versa, therefore you can rule out so many areas with high unemployment as very low. We are left with the average area that corresponds to areas with more moderate prices that we have delimited between 1000 - 750 euros.

The areas with the highest density of Sants Monjuic, Gracia and Sant Andreu. High population is spatially interesting Eixample. The largest concentration of supermarkets is found in Cuitat Bella and Eixample.

6. Conclusion.

After study the population, unemployment and local rent prices, and taking into account the supermarkets in the interest areas, it is recommended to locate the supermarket in the Sants Monjuic (Sant Badal & Hostafranc) or Sant Andreu (Navas) area, also a suitable area can be Eixample (the Nova Esquerra & La Sagrada Familia).