Presenting the raw data

Land use maps

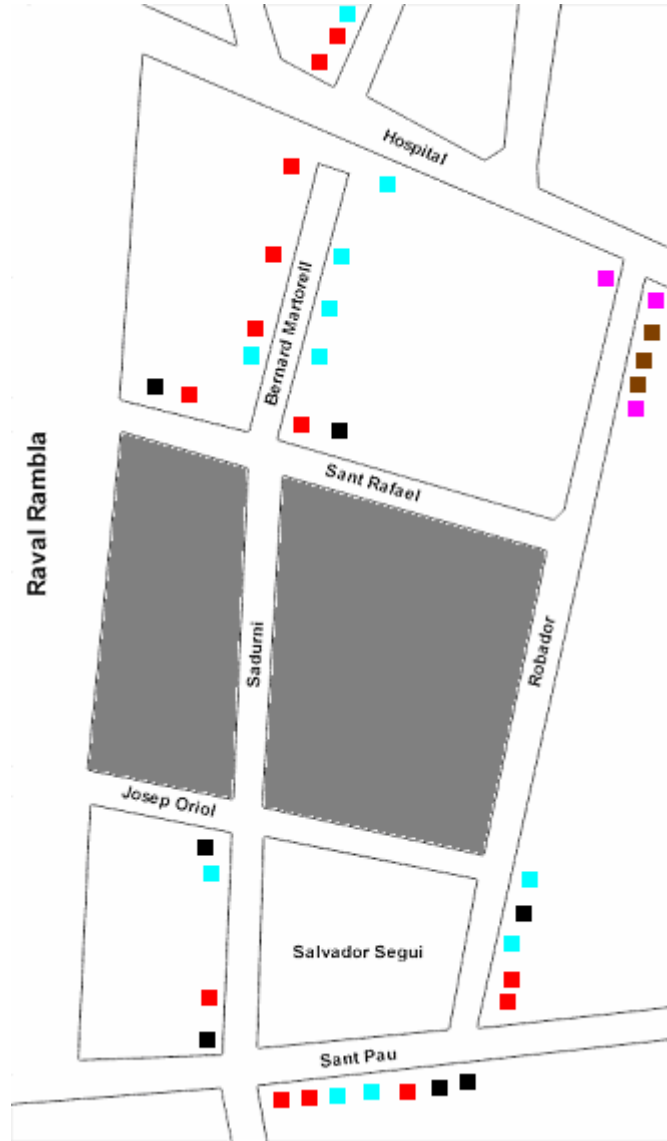| key:	
■	gentrified
■	training centres
■	workshops
■	immigrant services
■	local services
■	professional services
■	services of poverty
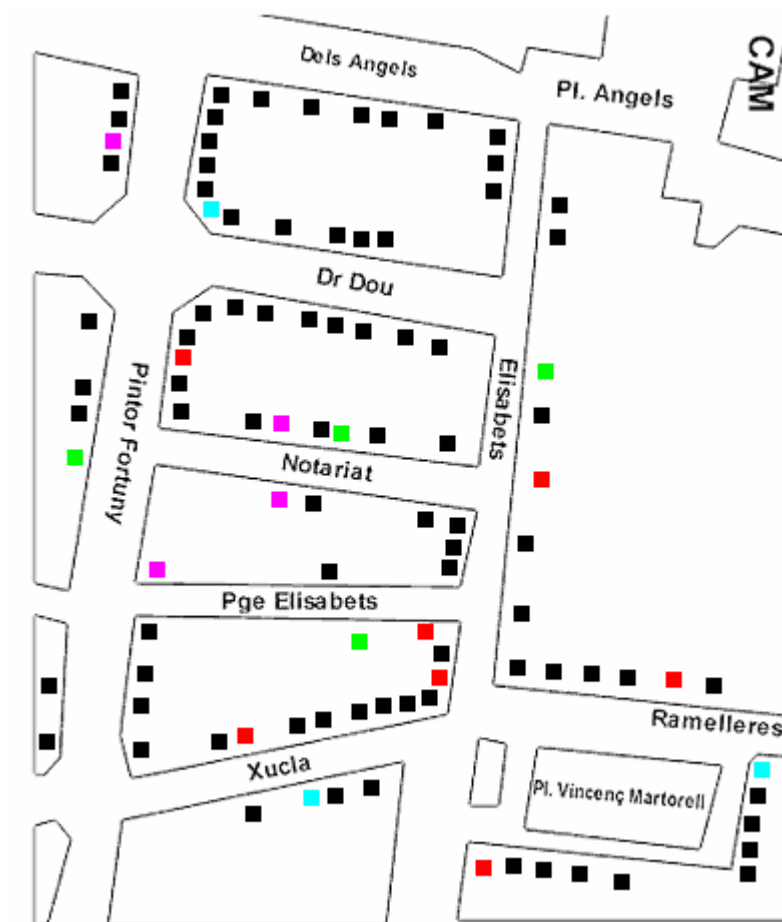
Zone 1
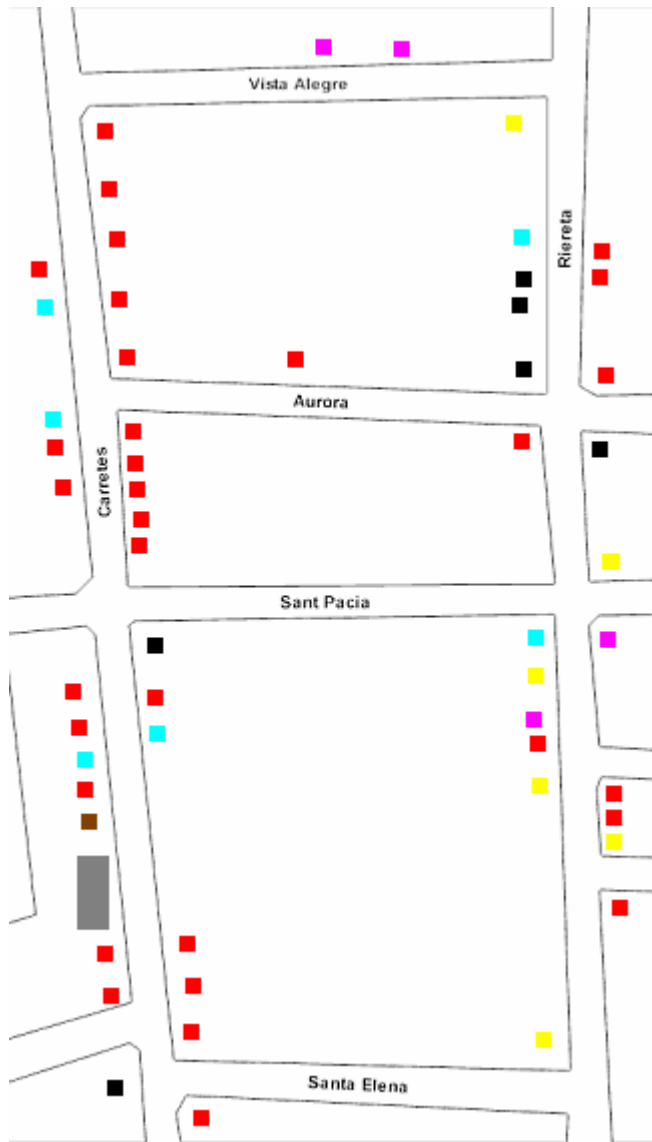
Zone 2

Zone 3

Zone 4

Residential decay survey

A table to show the scores I gave each individual zone

Features	Site			
	Zone1	Zone2	Zone3	Zone4
Deterioration of walls	3	1	0	1
Part peeling	2	1	0	1
Broken glass in windows	3	1	0	1
Structural damage e.g. settling cracks	6	3	3	3
Rotting timber	4	2	2	2
Broken gutters, etc	7	3	1	1
Total score	25	11	6	9

Environmental survey

A table to show the scores I gave each individual zone

Feature	Zone			
	Zone1	Zone2	Zone3	Zone4
Landscape quality	6	2	4	0
Derelict (waste) land	8	8	0	9
Litter/vandalism	6	4	2	3
Industrial work shop premises	7	6	6	6
Noise	3	2	2	2
Air pollution	4	5	8	7
Access to recreational amenities	4	2	2	0
Traffic flow	6	6	6	6
Total	44	35	30	33

Perception Survey

A table to show the scores I gave each individual zone

		Zone1	Zone2	Zone3	Zone4
Positive qualities	**Rich**	1	1	0	0
	Safe	1	0	0	0
	Friendly/relaxed	1	0	0	0
	Improving	3	2	3	3
	Community atmosphere	3	0	0	0
	Attractive area	2	1	0	0
Negative qualities	**Poor**	1	1	3	2
	Dangerous	1	1	3	2
	Declining	0	0	0	0
	Risk of crime	1	2	3	2
	Unattractive area	1	2	3	2
	vandalised	1	2	3	2
	Total positive score	11	4	3	3
	Total negative score	5	8	15	10
	Total score	6	-4	-12	-7

Price of a convenience item

A table to show the prices I collected from the 12 convenience stores

Sampling location	Price of convenience item (€)
1	0.50
2	0.65
3	0.69
4	0.60
5	0.70
6	0.65
7	0.75
8	0.80
9	0.80
10	0.75
11	0.65
12	0.80

Data Presentation

Residential decay survey

A score was given to each of the residential decay qualities depending on my perceptions of the zone. The score was then totalled for each individual zone, and the higher the score the better my perceptions were of that particular zone. Before carrying out the study I made a key, which suggested the description residential decay of the zones based on the score I gave it.

A table to show the ratings of the scores

	Much	Some	Little	None
Deterioration of walls	0	1	3	5
Part peeling	0	1	2	3
Broken glass in windows	0	1	3	7
Structural damage e.g. settling cracks	0	3	4	8
Rotting timber	0	2	4	8
Broken gutters, etc	0	1	3	7

A key to show a suggestion of the description of the zone based on my perceptions

| **Score**	**Physical condition of buildings**
33-41	Good/ excellent
23-32	Satisfactory
14-22	Generally unsatisfactory. May be bad in specific parts
5-13	Action needed in very near future to improve structure
Below 5	Need to demolish or rebuild

A table to show the scores I gave each individual zone

Features	**Site**			
	Zone1	**Zone2**	**Zone3**	**Zone4**
Deterioration of walls	3	1	0	1
Part peeling	2	1	0	1
Broken glass in windows	3	1	0	1
Structural damage e.g. settling cracks	6	3	3	3
Rotting timber	4	2	2	2
Broken gutters, etc	7	3	1	1
Total score	25	11	6	9

To present my data and to make it easier to visualise the results I drew two bar charts showing the score that I gave each individual zone, meaning that the results could be easily compared.

A bar chart to show the differences of scores in the residential decay qualities between the different zones
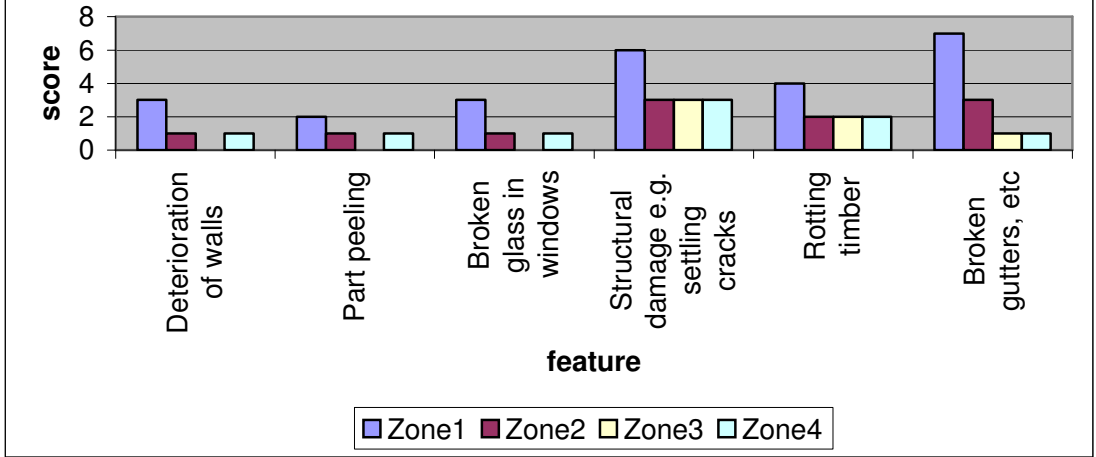
A bar chart to show of total scores in the residential decay qualities between the different zones
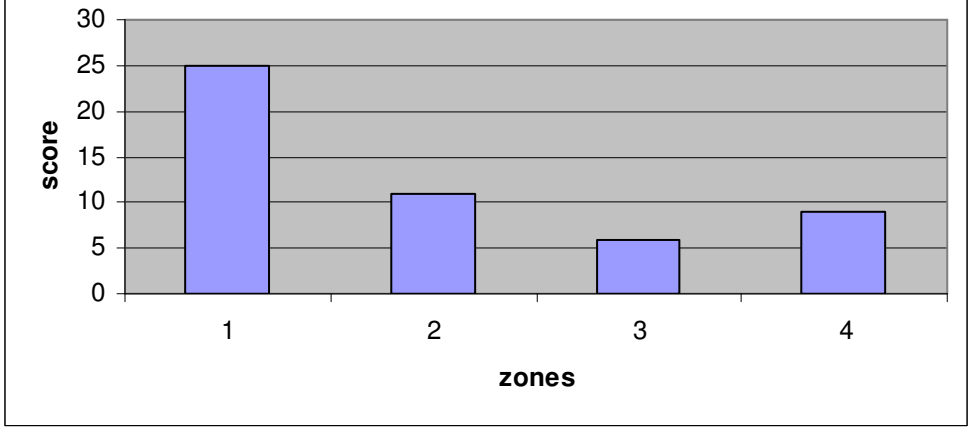
Environmental survey

A score in between the chosen ranges was given to each of the environmental qualities depending on my perceptions of the zone. The score was then totalled for each individual zone, and the higher the score the better my perceptions were of that particular zone.

A table to show the range of scores for each environmental feature

Feature	Range of possible scores
Landscape quality	0-8
Derelict (waste) land	0-10
Litter/vandalism	0-8
Industrial work shop premises	0-10
Noise	0-5
Air pollution	0-10
Access to recreational amenities	0-4
Traffic flow	0-6

A table to show the scores I gave each individual zone

Feature	Zone			
	Zone1	**Zone2**	**Zone3**	**Zone4**
Landscape quality	6	2	4	0
Derelict (waste) land	8	8	0	9
Litter/vandalism	6	4	2	3
Industrial work shop premises	7	6	6	6
Noise	3	2	2	2
Air pollution	4	5	8	7
Access to recreational amenities	4	2	2	0
Traffic flow	6	6	6	6
Total	44	35	30	33

To present my data and to make it easier to visualise the results I drew a radar graph showing the score that I gave each individual zone, meaning that the results could be easily compared. The advantage of a radar graph is that all the data can be shown in one graph.
To keep the open shapes of scores for each zone, I added one to each of the scores. This had no effect on the comparing of the scores as they were all treated in the same way. This made it easier to see the results clearly.

A radar graph to show the differences in the scores for the qualities of the environmental survey in the different zones
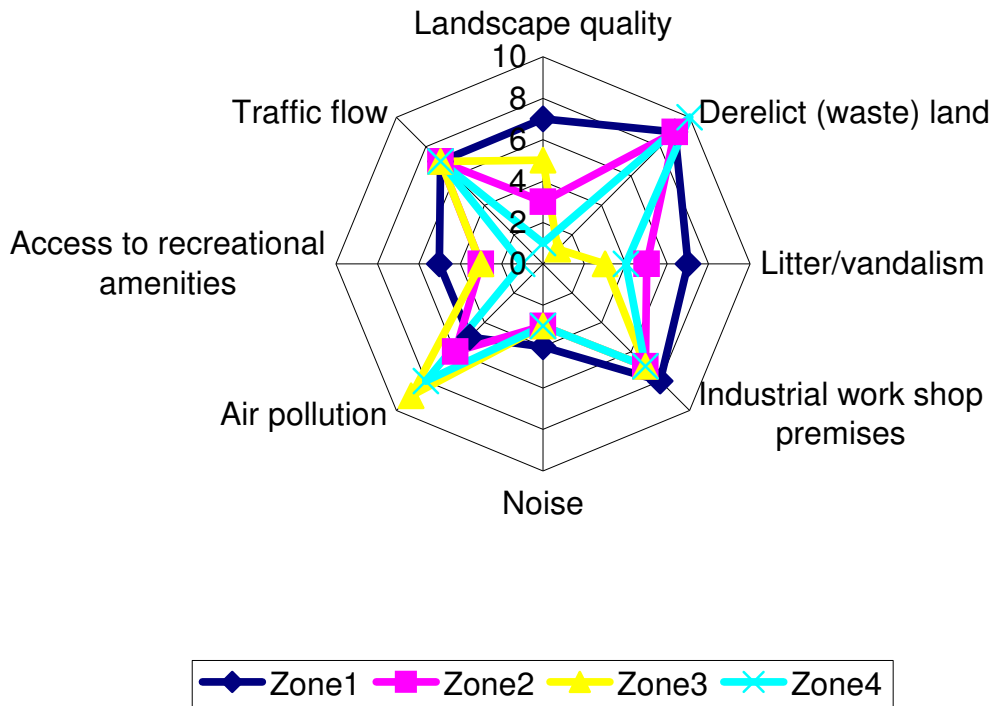
Perception Survey

A score was given to each of the perception qualities depending on my opinions of the zone. The score was then totalled for each individual zone, and the higher the score the better my perceptions were of that particular zone.

A table to show the ratings of the scores

	Very strongly felt	Strongly felt	Felt	Not felt
Score	3	2	1	0

A table to show the scores I gave each individual zone

		Zone1	**Zone2**	**Zone3**	**Zone4**
Positive qualities	**Rich**	1	1	0	0
	Safe	1	0	0	0
	Friendly/relaxed	1	0	0	0
	Improving	3	2	3	3
	Community atmosphere	3	0	0	0
	Attractive area	2	1	0	0
Negative qualities	**Poor**	1	1	3	2
	Dangerous	1	1	3	2
	Declining	0	0	0	0
	Risk of crime	1	2	3	2
	Unattractive area	1	2	3	2
	vandalised	1	2	3	2
	Total positive score	11	4	3	3
	Total negative score	5	8	15	10
	Total score	6	-4	-12	-7

To present my data and to make it easier to visualise the results I drew a bi-polar chart showing the score that I gave each individual zone, meaning that the results could be easily compared. The advantage of a bi-polar graph is that you can easily identify both the positive and the negative values on the same graph.

A bi-polar chart to show the overall scores of the perception survey of the different zones
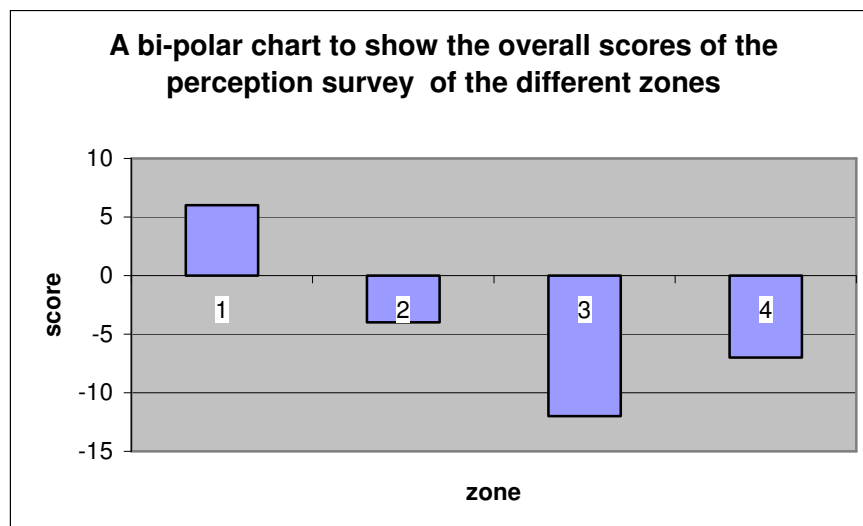
Land use maps

After formalising my colour coded land use maps, I counted the number of accounted for services in each zone. However, to compare the data I needed to find the percentages of each of the services over the total number of services.

*A table to show the number of registered services in each zone*

Services	Zone1	Zone2	Zone3	Zone4
Gentrified	79	15	7	5
Training centre	0	0	0	6
Workshops	4	7	3	4
Immigrant services	3	8	11	6
Local services	7	42	11	6
Professional services	4	6	0	0
Services of poverty	0	8	3	0
Total	**97**	**86**	**35**	**27**

A table to show the percentage of registered services in each zone (to the nearest whole number)

Services	Zone1	Zone2	Zone3	Zone4
Gentrified	81	17	20	19
Training centre	0	0	0	22
Workshops	4	8	9	15
Immigrant services	3	9	31	22
Local services	7	49	31	22
Professional services	4	7	0	0
Services of poverty	0	9	9	0
Total	100	100	100	100

To present my data and to make it easier to visualise the results I drew a series of pie charts showing the percentage of registered services that I gave each individual zone, meaning that the results could be easily compared. The advantage of a pie chart is that it displays the relative proportions of multiple classes of data, it also simply summarizes a large data set in visual form. However they do not easily or clearly reveal the exact values.
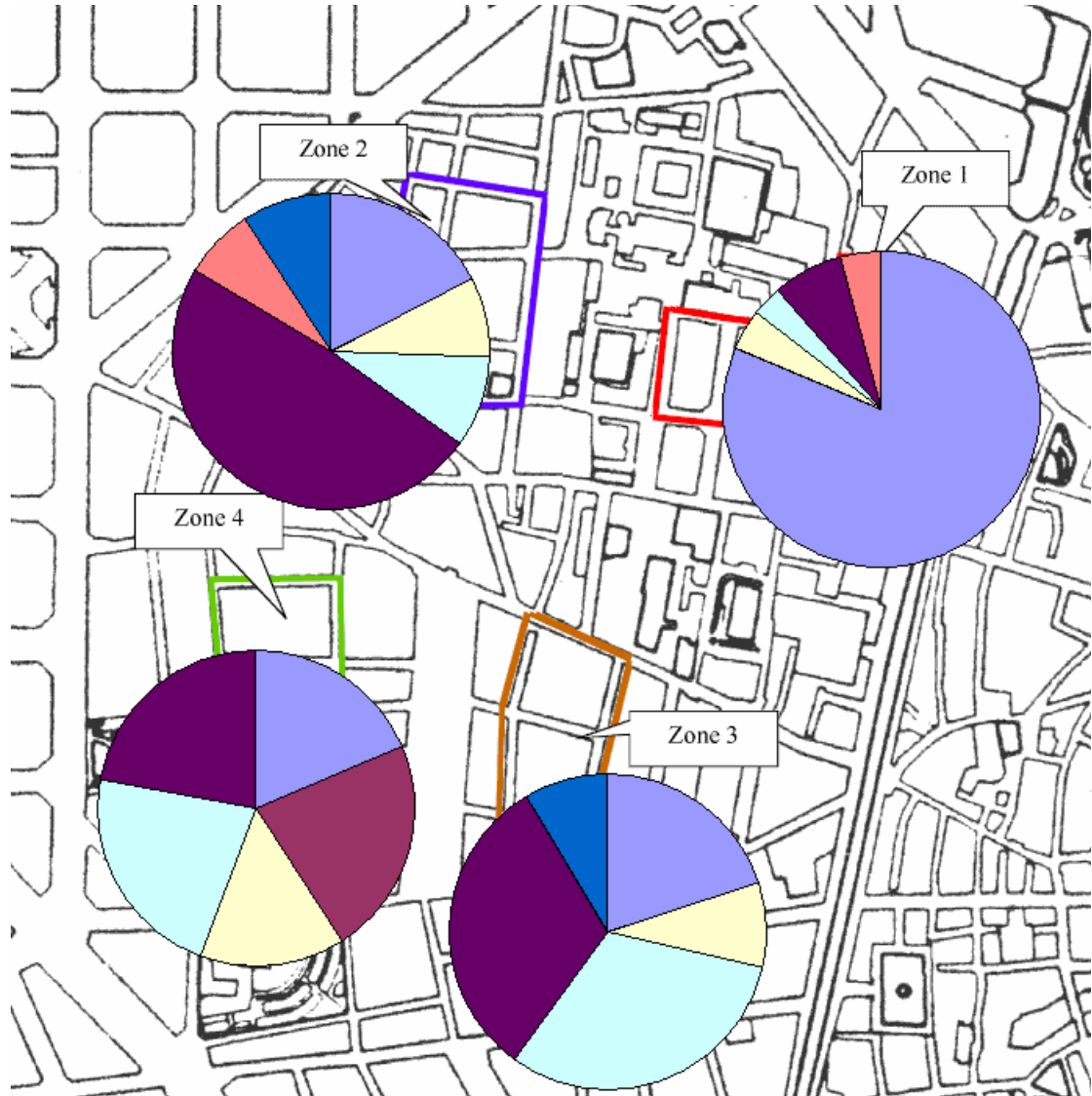
I categorised each of the services of each zone into three sections, depending on what I thought that the services indicated about the quality of the area, and calculated the percentages over the total number of services.

- 'rich' indications
    - gentrified
    - professional services
- 'poor' indications
    - training centres
    - workshops
    - immigrant services
    - services of poverty
- 'non-touristic' indications
    - local services

A table to show the number of categorised services in each zone

Categories	Zone1	Zone2	Zone3	Zone4
'rich'	83	21	7	5
'poor'	7	42	11	6
'non-touristic'	7	23	17	16
total	97	86	35	27

A table to show the percentage of categorised services in each zone

Categories	zone1	zone2	zone3	zone4
'rich'	86	24	20	19
'poor'	7	49	31	22
'non-touristic'	7	27	49	59

Then, I plotted a triangular graph using these results, as well as the results from a similar census from 2002. The triangular graph is convenient to show this particular data as it clearly gives quick visual comparison of contrasting component dominance for different areas, also it is particularly useful in identifying changes over time, since a position on the graph will change as the relative dominance of the components change.

A table to show the number of categorised services in each zone using information from a census from 2002

Categories	Zone1	Zone2	Zone3	Zone4
'rich'	52	25	1	1
'poor'	3	27	24	36
'non-touristic'	33	73	33	17
total	88	125	58	54

A table to show the percentage of categorised services in each zone using information from a census from 2002

Categories	zone1	zone2	zone3	zone4
'rich'	59	20	2	2
'poor'	3	22	41	67
'non-touristic'	38	58	57	31

A triangular graph to show the differences of land use over lime in the four chosen zones
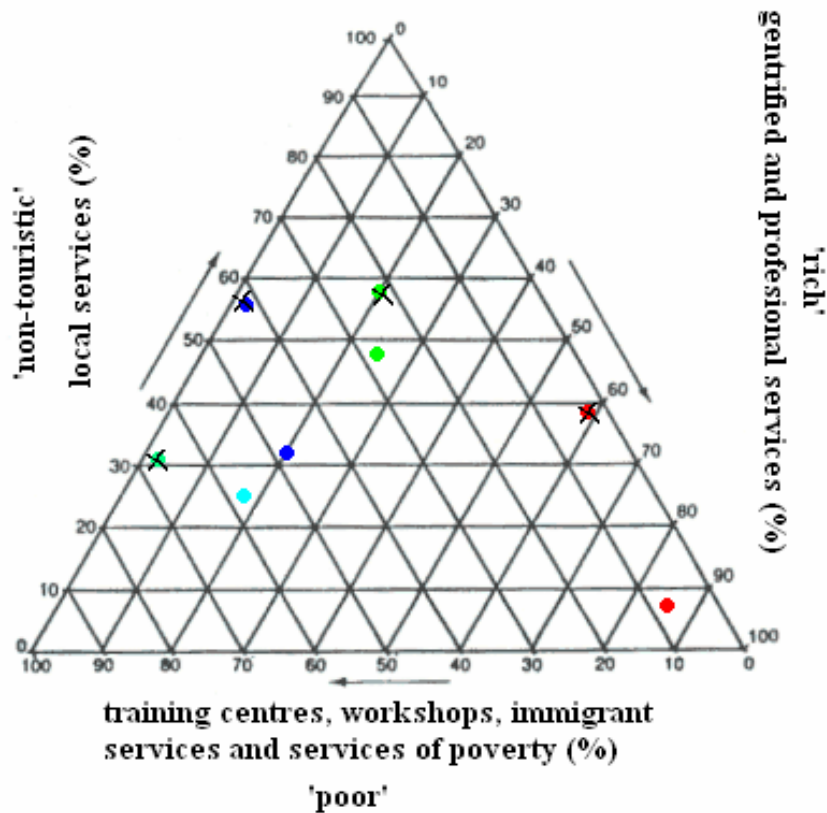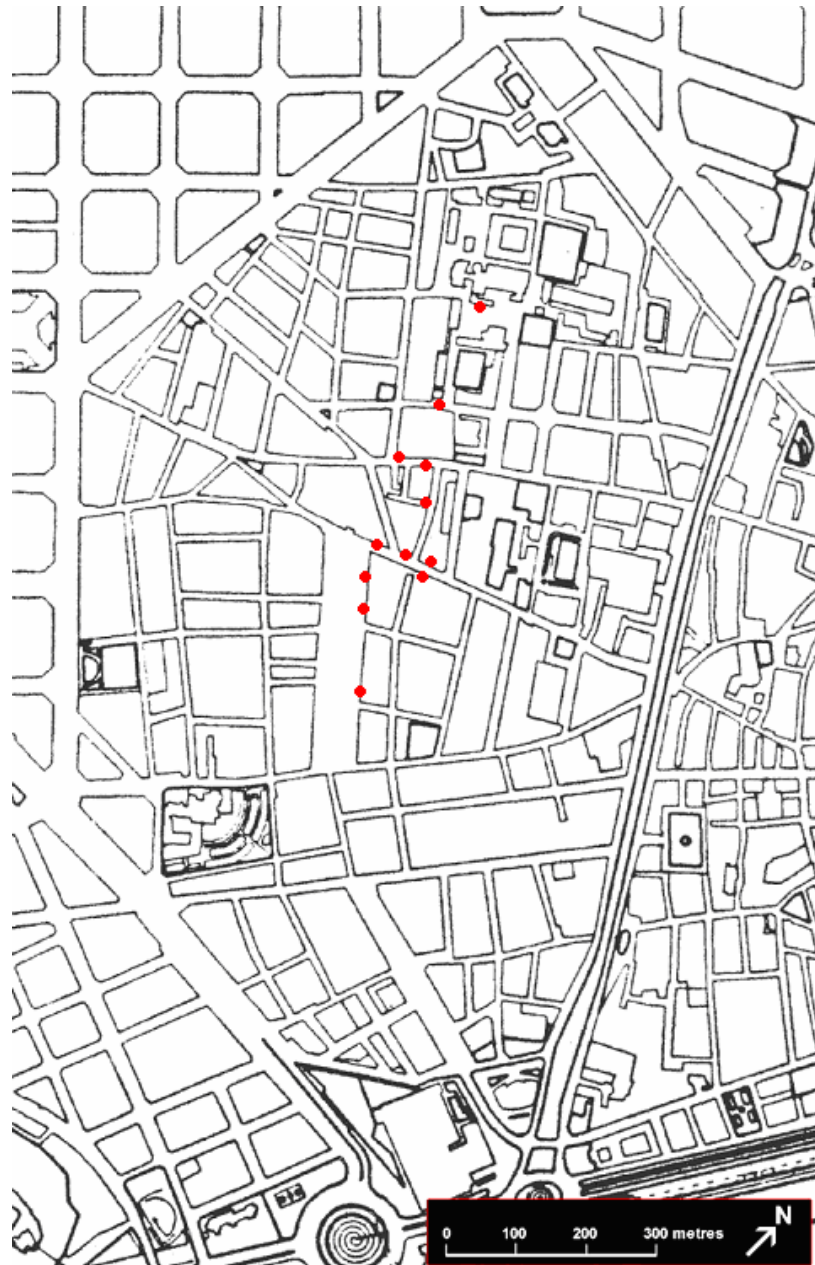

Key:
- ● = Zone 1 (2004)
- ● = Zone 2 (2004)
- ● = Zone 3 (2004)
- ● = Zone 4 (2002)
- ✖ = Zone 1 (2002)
- ✖ = Zone 2 (2002)
- ✖ = Zone 3 (2002)
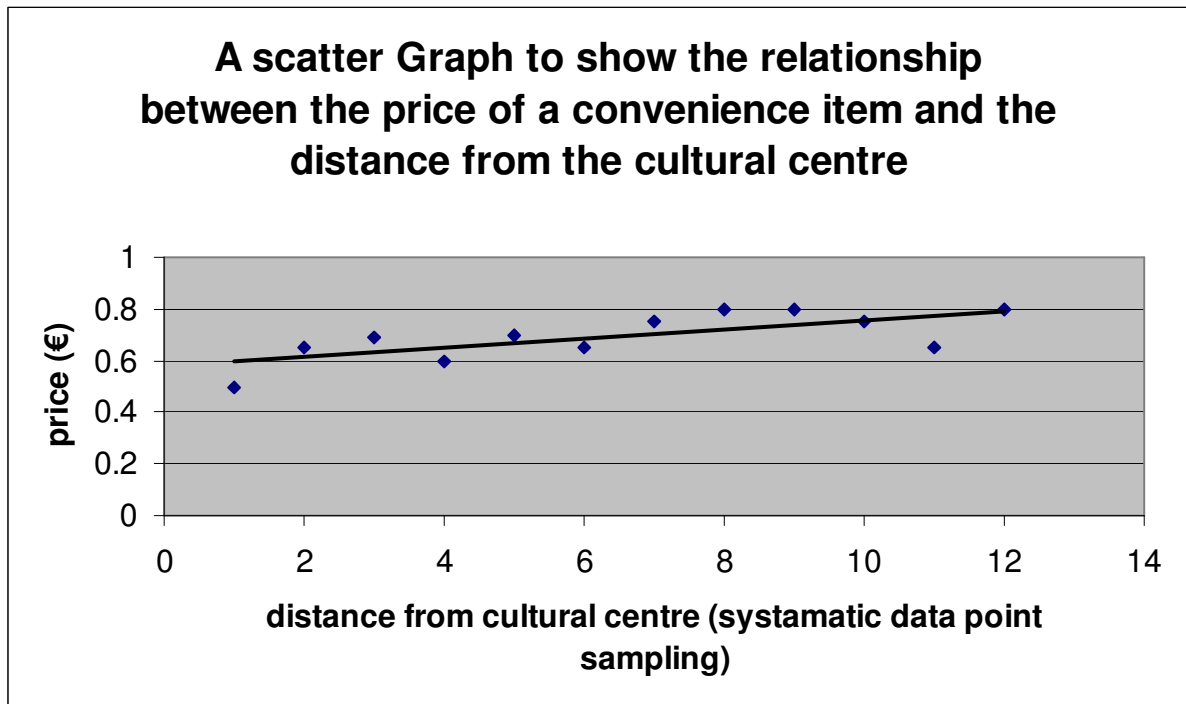- ✖ = Zone 4 (200)

Price of a convenience item

To collect the data to see how the price of a convenience item changed along the transect line, I found out the price of a 50cl bottle of coca-cola in 12 convenience stores along the transect line. Using my results I then plotted a scatter graph with a line of best fit to visualise any apparent trends or correlations between the two variables.

A map to show the location of the 12 convenience stores which I took samples from

A table to show the prices I collected from the 12 convenience stores

Sampling location	Price of convenience item (€)
1	0.50
2	0.65
3	0.69
4	0.60
5	0.70
6	0.65
7	0.75
8	0.80
9	0.80
10	0.75
11	0.65
12	0.80

A scatter Graph to show the relationship between the price of a convenience item and the distance from the cultural centre

distance from cultural centre (systamatic data point sampling)

Mann Whitney U Test

This method of statistical analysis tests the significance of the differences between sets of data, or whether they simply occurred by chance. It tests the reliability of the results, meaning how many times out of a hundred that you would get the same results if the study were repeated. I predict that the further away from the cultural centre the result is taken the lower the price of the convenience item, due to the decreasing land value which is clearly apparent.

First I need to divide my data into two groups to see if there is a difference between them. I decided to group my data into the first 6 results and the second 6 results, sample 1 and sample 2 accordingly. Then I will calculate the mean, median and mode averages, to see if there are any obvious differences. If there is a difference between the two groups, then I will carry out a further statistical test to test the significance of the difference. To do this, I will first need to rank the data from highest to lowest, and if there are two samples of the same value the sample from group A is to be placed first. Then I need to calculate the value of U by inspecting each B value and counting how many A values precede it, this process then needs to be repeated in the reverse for the A values. By taking the smaller of the two values and using the table below I will be able to look up the percentage probability that the difference between the two sets of data could have occurred by chance.

Sample 1: €0.50, €0.65, €0.69, €0.60, €0.70, €0.65
Sample 2: €0.75, €0.80, €0.80, €0.75, €0.65, €0.80

A table to show the averages of the two samples (2d.p. –units = €)

	Mean	Median	Mode
Sample1	0.63	0.65	0.65
Sample2	0.76	0.78	0.80

A table to show the values in order of rank from highest to lowest

B	B	B	B	B	A	A	A	A	B	A	A
€0.80	€0.80	€0.80	€0.75	€0.75	€0.70	€0.69	€0.65	€0.65	€0.65	€0.60	€0.50

Value of U for sample A = 5+5+5+5+6+6=32
Value of U for sample B = 0+0+0+0+0+4 = 4

Lowest value of U = 4 (sample B)

A table to give the percentage probability that the difference between the two sets of data could have occurred by chance

n¹ ∕ u	1	2	3	4	5	6	7	**8**
0	11.1	2.2	0.6	0.2	0.1	0.0	0.0	0.0
1	22.2	4.4	1.2	0.4	0.2	0.1	0.0	0.0
2	33.3	8.9	2.4	0.8	0.3	0.1	0.1	0.0
3	44.4	13.3	4.2	1.4	0.5	0.2	0.1	0.1
4	55.6	20.0	6.7	2.4	0.9	0.4	0.2	0.1
5		26.7	9.7	3.6	1.5	0.6	0.3	0.1
6		35.6	13.9	5.5	2.3	1.0	0.5	0.2
7		44.4	18.8	7.7	3.3	1.5	0.7	0.3
8		55.6	24.8	10.7	4.7	2.1	1.0	0.5
9			31.5	14.1	6.4	3.0	1.4	0.7
10			38.7	18.4	8.5	4.1	2.0	1.0
11			46.1	23.0	11.1	5.4	2.7	1.4
12			53.9	28.5	14.2	7.1	3.6	1.9
13				34.1	17.7	9.1	4.7	2.5
14				40.4	21.7	11.4	6.0	3.2
15				46.7	26.2	14.1	7.6	4.1
16				53.3	31.1	17.2	9.5	5.2
17					36.2	20.7	11.6	**6.5**
18					41.6	24.5	14.0	8.0
19					47.2	28.6	16.8	9.7

From this test, the percentage probability that the difference between the two sets of data could have occurred by chance is 0.4%, meaning that my results were 99.6% reliable, and that if the study was repeated by 1000 researchers 996 would be expected to obtain the same sort of results. This is extremely reliable, considering the study.

Spearman's rank correlation coefficient

This method of statistical analysis tests the strength of the link between the two sets of data. It tests the reliability of the results, meaning how many times out of a hundred that you would get the same results if the study were repeated. I predict that the further away from the cultural centre the result is taken the lower the price of the convenience item, due to the decreasing land value which is clearly apparent.

First I need to divide my data into two groups to see if there is a difference between them, I will use the same two groups as in the last analytical test. Then I will need to rank the two sets of data from furthest to nearest to the cultural centre. After doing this I will need to rank the data in order of price from highest to lowest. However if there are equal values I will calculate the mean average of their ranks. Then I will calculate the difference between the two ranks (d) and square this value (d²). Using the sum of d² I will be able to calculate to coefficient of r² using the formula below.

$$(R^2) = 1 - \frac{6\sum d^2}{n^3 - n}$$

Where n = the number of sites at which measurements were taken

The answer will always be between 1 (a perfect positive correlation) and −1 (a perfect negative correlation). The closer R^2 is to +1 or −1, the stronger the likelihood of a correlation. Basically, the grater the value of R^2 the greater the significance level

+1	0	−1
Perfect Positive Correlation	no correlation	Perfect Negative Correlation
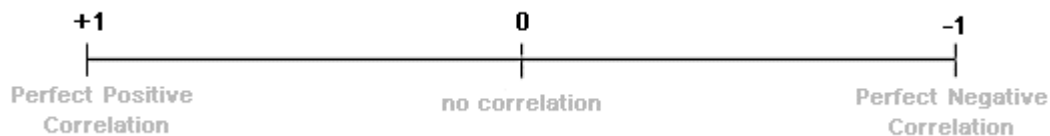
Now, to test the significance of the relationship, the value of R^2 must be looked up in the Spearman Rank significance table.
Sample 1: €0.50, €0.65, €0.69, €0.60, €0.70, €0.65
Sample 2: €0.75, €0.80, €0.80, €0.75, €0.65, €0.80

A table to show the value of d² for each of the values

Sampling location (furthest to nearest to the cultural centre)	Rank	Price of convenience item (€)	Rank	Difference between ranks (d)	d²
1	1	0.50	12	11	121
2	2	0.65	9	7	49
3	3	0.69	4	1	1
4	4	0.60	11	7	49
5	5	0.70	6	1	1
6	6	0.65	9	3	9
7	7	0.75	4.5	2.5	6.25
8	8	0.80	1	7	49
9	9	0.80	1	8	64
10	10	0.75	4.5	5.5	30.25
11	11	0.65	9	2	4
12	12	0.80	1	11	121
					Sum = 504.5

R^2 = -0.763986014

A graph to find out the significance of the Spearman's rank correlation coefficients and degrees of freedom
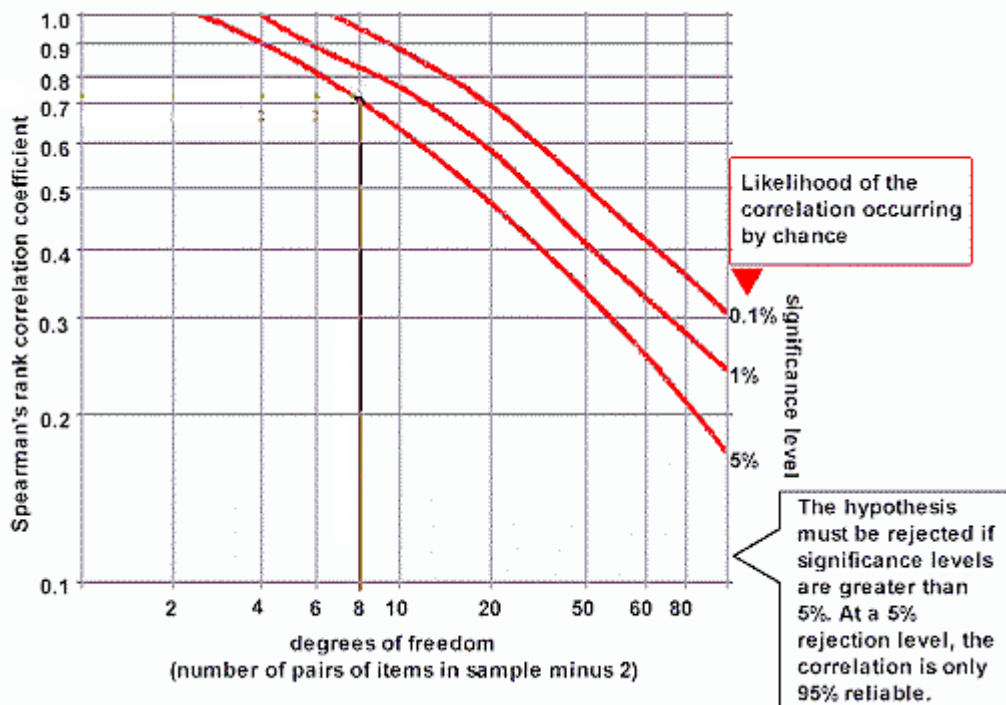

From this test, the significance level is about 1%, meaning that the probability of the relationship I have found being a chance event is about 1 in 100. I am 99% sure that my hypothesis is correct, and 99 out of 100 researchers would be expected to get the same results.

Secondary data

I took secondary information about the population origin and the average household income from a census from previous years.

A diagram to show how the land was divided into different zones for the census
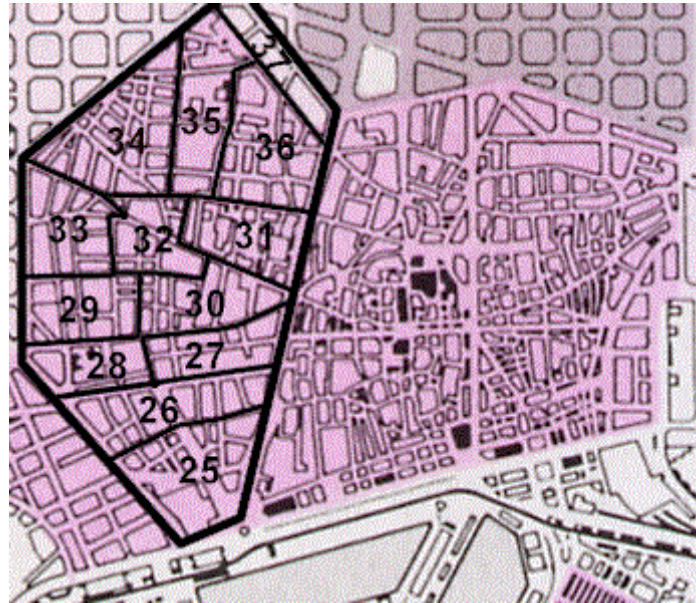
Only certain zones from this census are of any value to me, as they correlate to the zones which I took results for in my study.

*A table to show which zones correlate with each other*

My sampling areas	Sampling areas from the census from 1996
Zone1	Zone36
Zone2	Zone34
Zone3	Zone30
Zone4	Zone29

Land value

A table to show the average land value per dwelling (millions of pesetas) in three separate years

Year	1988	1991	1996
barcelona	1.5	1.7	1.9
Zone29	0.4	0.4	0.5
Zone30	0.5	0.6	0.7
Zone34	0.6	0.7	0.8
Zone36	0.9	0.8	1.0

To present my data and to make it easier to visualise the results I drew a bar chart showing the average land value per dwelling in each individual zone, meaning that the results could be easily compared.

A bar chart to show the land values of different zones in three years
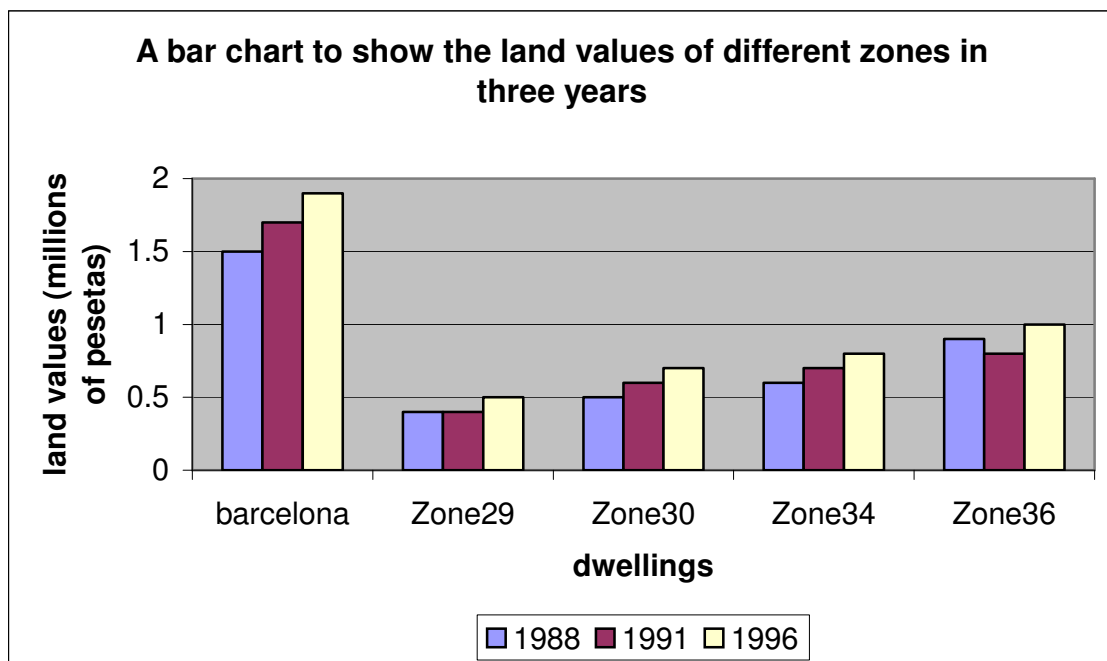
Population origin

A table to show the origin of the population taken from a census from 2000

		Africa	America		Asia		
	Total population	**Morocco**	**Equador**	**Peru**	**Pakistan**	**Filipines**	**India**
Zone29	3712	299	78	5	406	76	1
Zone30	1754	64	13	7	95	70	27
Zone34	9554	323	217	60	360	867	23
Zone36	2598	22	4	17	23	88	4

A table to show the percentage of immigrants over the total population in each zone

	Total number of immigrants	**Percentage of immigrants over total population (%)**
Zone29	865	23
Zone30	276	16
Zone34	1850	19
Zone36	158	6

To present my data and to make it easier to visualise the results I drew a bar chart showing the percentage of immigrants over the total population in each individual zone, meaning that the results could be easily compared.
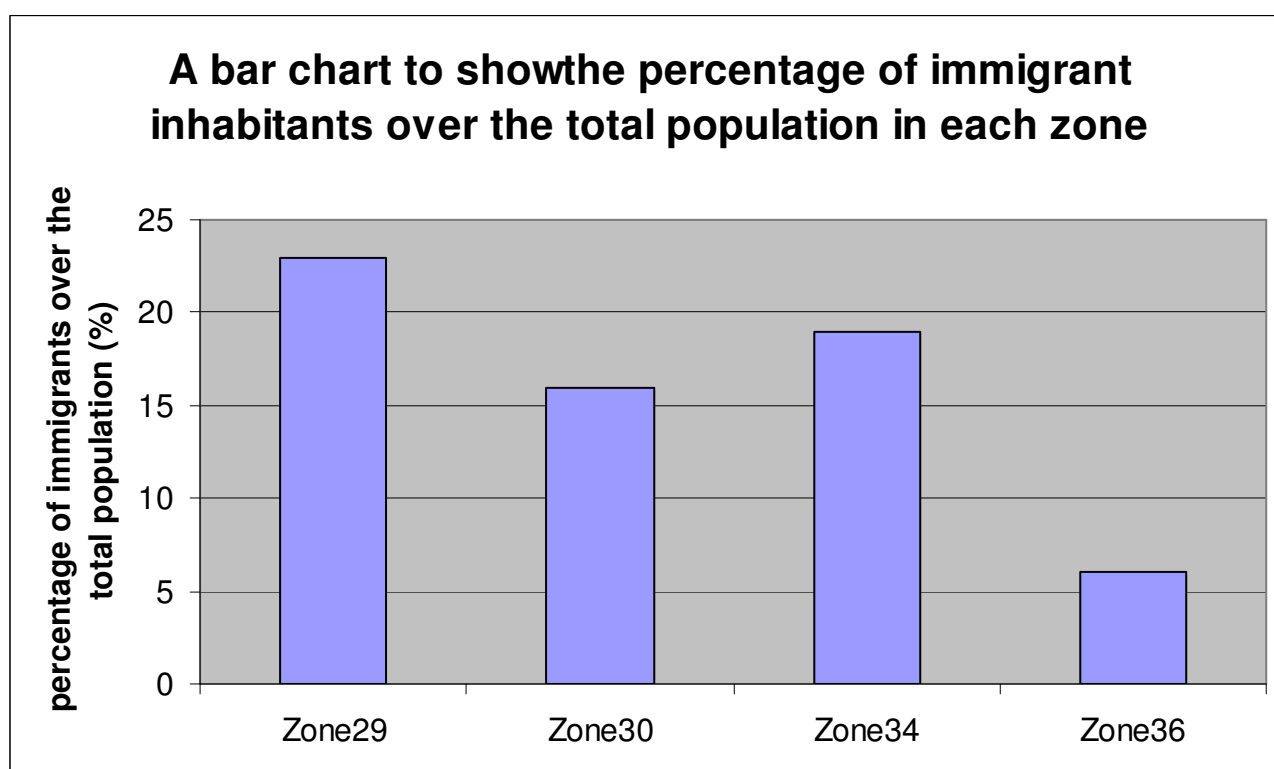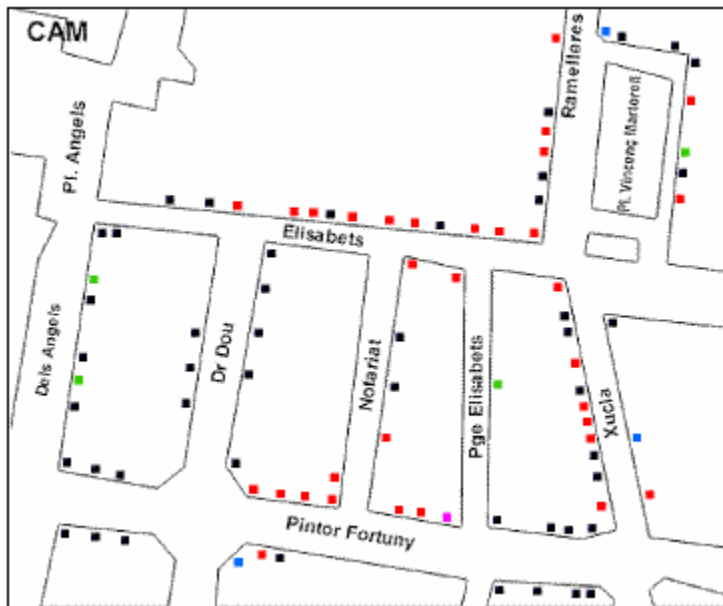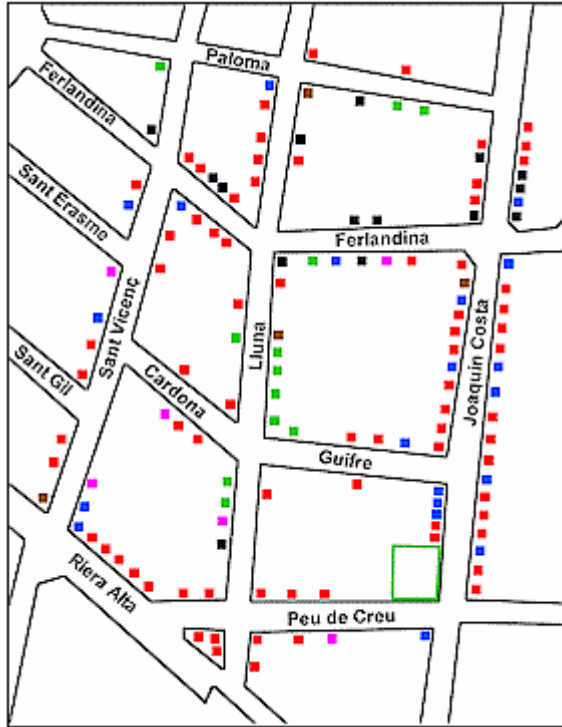
Land use maps (census 2002)

Diagrams to show the data mapping results of each zone taken from the census from 2002

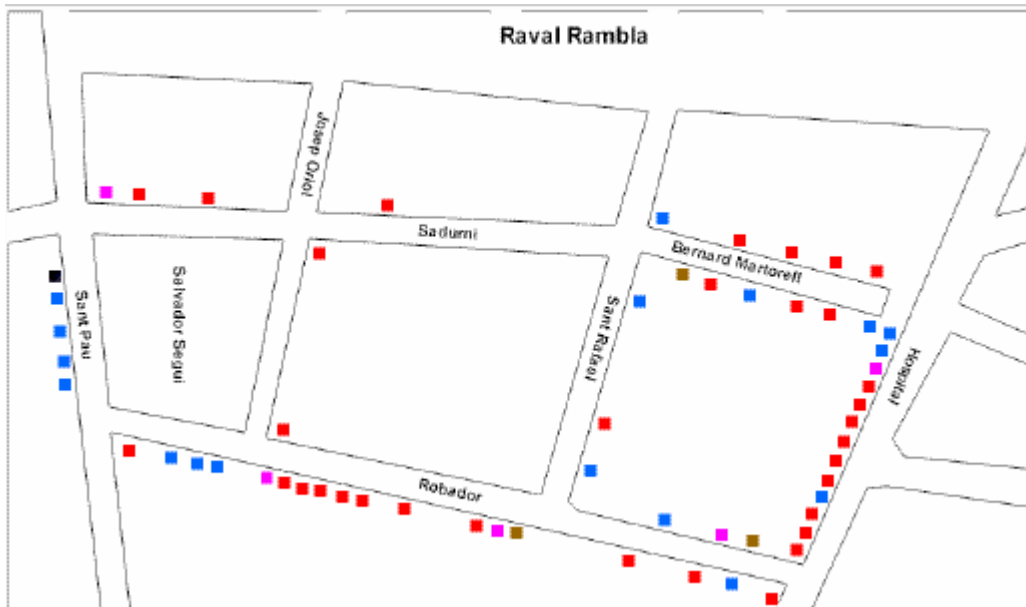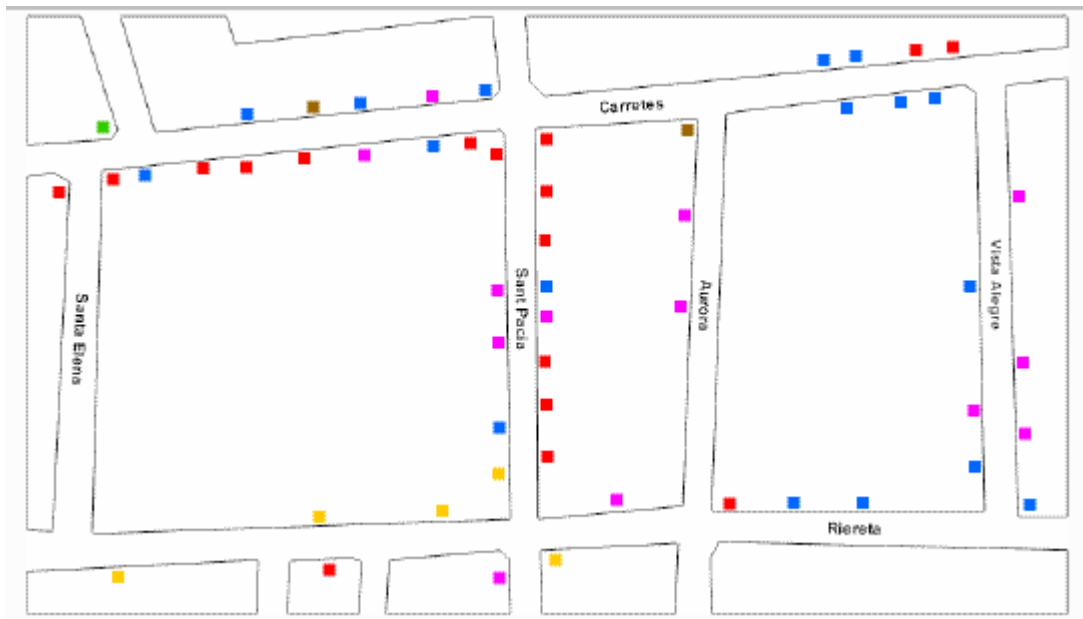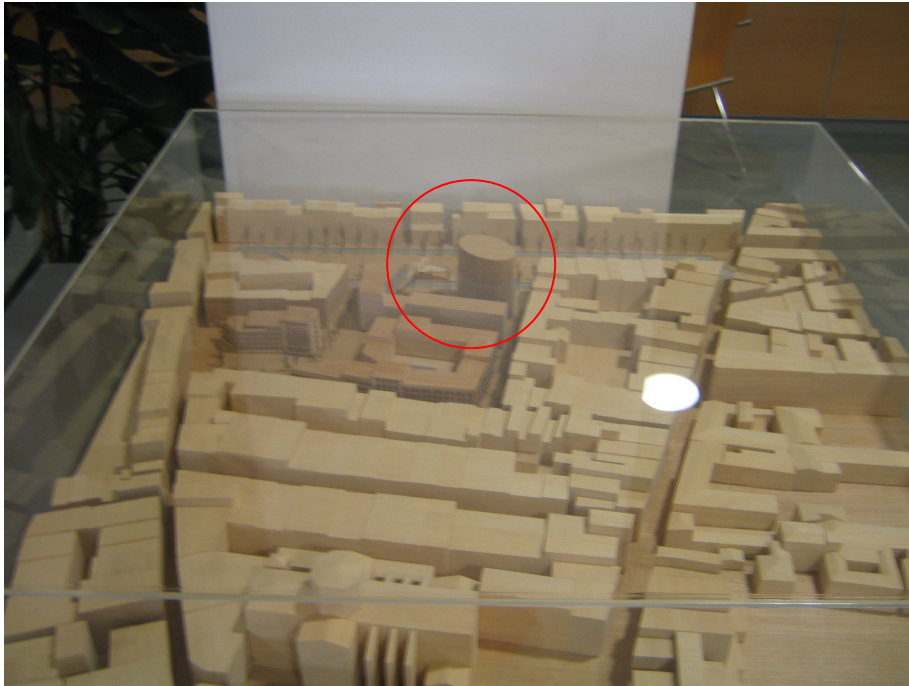| key:	
■	gentrified
■	training centres
■	workshops
■	immigrant services
■	local services
■	professional services
■	services of poverty

Zone 1

Zone 2

Zone3

Zone4

Photographs of El Raval

A small-scale model of an area in El Raval (near zone 3), found in the information centre for the regeneration plans, showing the regeneration projects which they are planning to enforce and currently enforcing. The planned four-star hotel can be is circled in red. Catalan films centre and TV film library are also planning to be transferred to this area. The new 'Rambla del Raval' can be seen in the background, behind the new hotel.

A photograph of the new Raval Rambla. Trees have been planted and seating areas have been constructed in an attempt to gentrify the area. Lighting has been introduced to the area, to try and make it more open and less dingy, in hope that this would discourage crime at night.

Dense, cheap overcrowded housing is still an issue in some areas.

Demolition is the only solution in some areas, which are 'too far gone'.

Whole blocks have been demolished to open up the area

A new property agent has just arrived on the edge of zone along the 'Rambla del Raval', indicating that demand for properties is increasing and investments are being made.

The newly pedestrians 'Calle Luna' in zone 2. The presence of poverty is still present, shown for example by the graffiti lining the walls. However traffic flow has been dramatically affected by the introduction of automatic bollard, which only allow residents to get past (as circled in red).

The new cultural centre found in zone 1. In front is a large square, although this has had many positive affects on the area, poverty and crime is still present in the area. Drug addicts are found amongst the playing children and the skateboarders, the question being weather these differences will be bridgeable.

Changes and construction are still apparent around the cultural centre. Opposite is a construction site, where they are planning to build a library and university of geography, history and philosophy.

Gentrified shops are to be found all over zone 1, which are clearly not directed at the poorer population but the wealthier population who are willing to buy extra luxury commodities (such as the air shop) The artistic aspect of these new shops is quite apparent.

Gentrified restaurants are to be found, which are clearly not directed at the lower class population, but at the wealthier population who have money to spend on such luxuries. The artistic aspect of these places is quite apparent and the traditional Barcelona design is to be seen amongst the architecture

A photograph of a government supported library in zone 1. Personal investment has needed to be encouraged by government support.

Government installations are also apparent in zone 2. In the Photograph we can see a government-supported doctor.

Government support is clearly advertised to the public and is quite apparent.

This photograph illustrates the poverty which was once present in the area. This is a hole in the wall of a orphanage run by nuns where unwanted babies were left that could not be looked after by there mothers, who were possibly prostitutes. The small collection slot at the top was for people who wished to give donations to the orphanage.

The presence of immigrants can be seen in the abundance of immigrant businesses. However the photo above of the restaurant is for sale, maybe indicating the diminishing demand for these services in that area.

The photograph shows a mosque in zone 3, illustrating the presence of immigrants in the area.

Evangelical churches are still found in the poorer districts, indicating the presence of immigrants. The photographs above were taken in zone 3 and 4.

The old factory building on the right illustrates the major industrial significance of the area that is still present in some areas. However the fact that it is now being used for storage illustrate the changes which are occurring. To further highlight this point we can see a training centre on the right presumably to train the old workers of the factory.

You can estimate the age of the inhabitants by looking at the washing on the balconies.

The photograph above shows the ward that Gaudi, a famous architect of Barcelona, was taken to, unrecognised when run over by a tram, and eventually died.

One of Barcelona's best restaurants, 'Casa Leopold', can be found in zone 3, where one of the most expensive dishes costs over 100€. The restaurant is clearly not aimed at the poorer population of Barcelona who you might expect to live in this area.

Poverty services (this one found in zone 3) indicate the average income of the population. This laundry service indicates that the population are quite poor.

Local shops indicate that the area is not completely directing itself towards being a tourist location.

Old workshops indicate the local and traditional aspect of the area.

The dark narrow streets is exactly what the government is trying to avoid by demolishing complete blocks, although many are still to be found. The narrow cramped condition of the housing is undesirable for living conditions and will not attract the wealthier population.

Poor hotels can also be found, apart from the newer four-star hotels, indicating the still present poverty of the area.

A photograph of the interior square of the CCCB (cultural centre). The tall old factory chimneys can be seen in the reflection of the windows. The presence of the chimneys is there to remind us that the area was once, and in some parts still is, used for industrial purposes.

We can see that although strong action has been taken to try and improve the area, there are still some fundamental problems. The banner at the top directly translates as 'no to nocturnal noise, yes to mutual respect'. This illustrates the noise problems of the area.