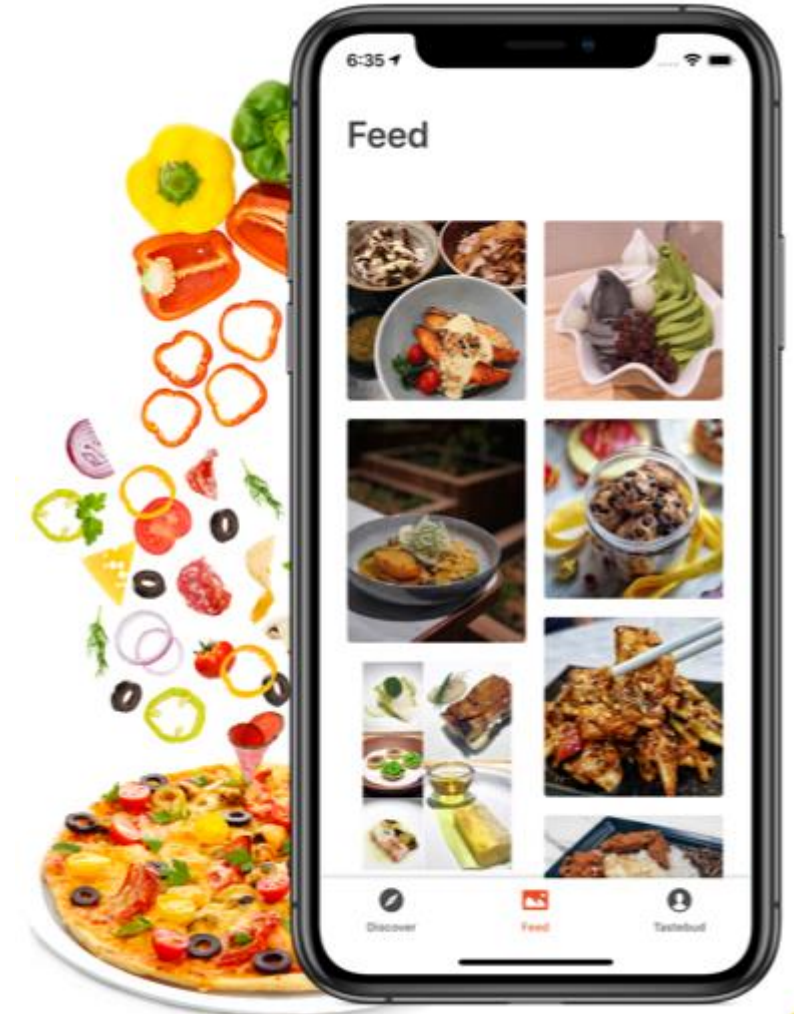


Food Delivery Apps in Mexico: Where can it work?






Business problem



ASSUPTIONS:

- Imagine that in Mexico there are no delivery food services, like UberEATS, Postmates or Rappi, yet.
- You work for a food delivery service company. Specifically, at the strategical area.
- The company has decided to enter the Mexican market
- So you need to know **where the delivery service is profitable.**



The gainfully and complexity of entering Mexico

Mexico is an attractive and strategical country for the company because of its size and consumption habits:

Population	128,649,565	10th most populated country in the world
GDP	\$2,715 trillions	11th largest economy by Purchase Power Parity
Area	1,972,550 km ²	13th largest country

However, within the largest cities there is a huge heterogeneity in the consumption habits. The challenge is to identify where the delivery service is profitable.

This project aims to answer the next questions:

In which neighborhoods can the service work?

Which cities are the most profitable for this service?

How to address the problem?

- First, it is necessary to determine which postal codes have :
 - the largest population densities,
 - the most restaurant concentration,
 - the variety of restaurants that each neighborhood has, and
 - the closeness with another postal code (restaurants or commensals of a neighbor postal code maybe require the service).
- With this information, it is possible to build a model that determines the potential demand of the food delivery service within the cities.
- Finally, the most profitable neighborhoods where the company may enter are recommended.





Data sources and exploratory data analysis

Population density by postal codes

In Mexico there are 37,635 postal codes. This analysis considers the 3000 most populated postal codes. In sum these 3000 postal codes concentrated 61 million of habits— the 47% of the country population

	Population	Area_km	Population_Density
count	3000.000000	3000.000000	3000.000000
mean	20333.511667	21.720269	7747.386383
std	15786.279129	91.695397	12872.839112
min	9554.000000	0.045987	4.778035
25%	11681.500000	1.652000	2130.328510
50%	15325.500000	3.333000	5478.115801
75%	22695.500000	9.200000	10256.145458
max	318988.000000	2072.400000	266511.165824

Data sources:

CYBO is a web site that uses tools and data from other sites like Google maps, Wikipedia, national census, etc.

In this page the postal codes are listed with their city, population and area.

	Postal_Code	City	Administrative_region	Population	Area	Area_km	Population_Density
2073	53687	Naucalpan	State of Mexico	12340.0	46,302 m²	0.046302	266511.165824
1963	57739	Chimalhuacán	State of Mexico	12771.0	48,964 m²	0.048964	260824.279062
983	53799	Naucalpan	State of Mexico	19543.0	78,989 m²	0.078989	247414.196913
2646	53788	Naucalpan	State of Mexico	10461.0	45,987 m²	0.045987	227477.330550
1407	09704	Iztapalapa	Mexico City	16099.0	73,925 m²	0.073925	217774.771728
2518	01259	Álvaro Obregón, Mexico City	Mexico City	10814.0	51,600 m²	0.051600	209573.643411
1697	57719	Ciudad Nezahualcóyotl	State of Mexico	14217.0	0.11 km²	0.110000	129245.454545
1766	09706	Iztapalapa	Mexico City	13839.0	0.117 km²	0.117000	118282.051282

Geographical location for the postal codes

Data sources:

ArcGIS Online Geocoding service turn addresses into coordinates, coordinates into addresses, or to locate a point-of-interest.

With this tool it can obtain the latitude and longitude of the postal codes.



	no_restaurant	no_categories
count	618.000000	618.000000
mean	5.763754	4.012945
std	8.451742	4.263200
min	1.000000	1.000000
25%	1.000000	1.000000
50%	3.000000	2.000000
75%	6.000000	5.000000
max	64.000000	30.000000

Number and type of restaurants by postal codes

Data sources:

Foursquare is a technology company that built a massive dataset of location data. Using the Foursquare API, we can search for specific type of venues or stores at a given location.

In this data base we can query the restaurants by a specific postal code.



Parameters about the consumers behavior observed by the company in other counties.

For example, the frequency and percentage of people and restaurants that used the delivery service.



Data sources:

This information is unavailable because this is a fictious company and other similar companies do not publish this kind of information.

So, 3 possible scenarios (best- case, base-case and worst-case) can be established.

Assumptions:	Variable	Value
Price	P	\$1.00
Cost (variable)	c	\$0.05
Cost (fixed)	C	\$20,000
Alpha (best-case)	α^+	15%
Alpha (base-case)	α^0	10%
Alpha (worst-case)	α^-	5%



Methodology

Postal codes in cities

Summarize the postal codes data in cities

Zip codes -----> cities

382 -----> 120

Grouped cites in clusters

K-means method with a minimization of Euclidean distance:

$$\text{dis}(p, r, c) = \sqrt{\sum_{i=1}^n (p_i - p_{i+1})^2 + (r_i - r_{i+1})^2 + (c_i - c_{i+1})^2}$$

Make projections
of revenues per
cluster

Estimates the profits with the following function:

$$\pi_i = P \cdot Q(X_i) - C(X_i)$$

Demand function:

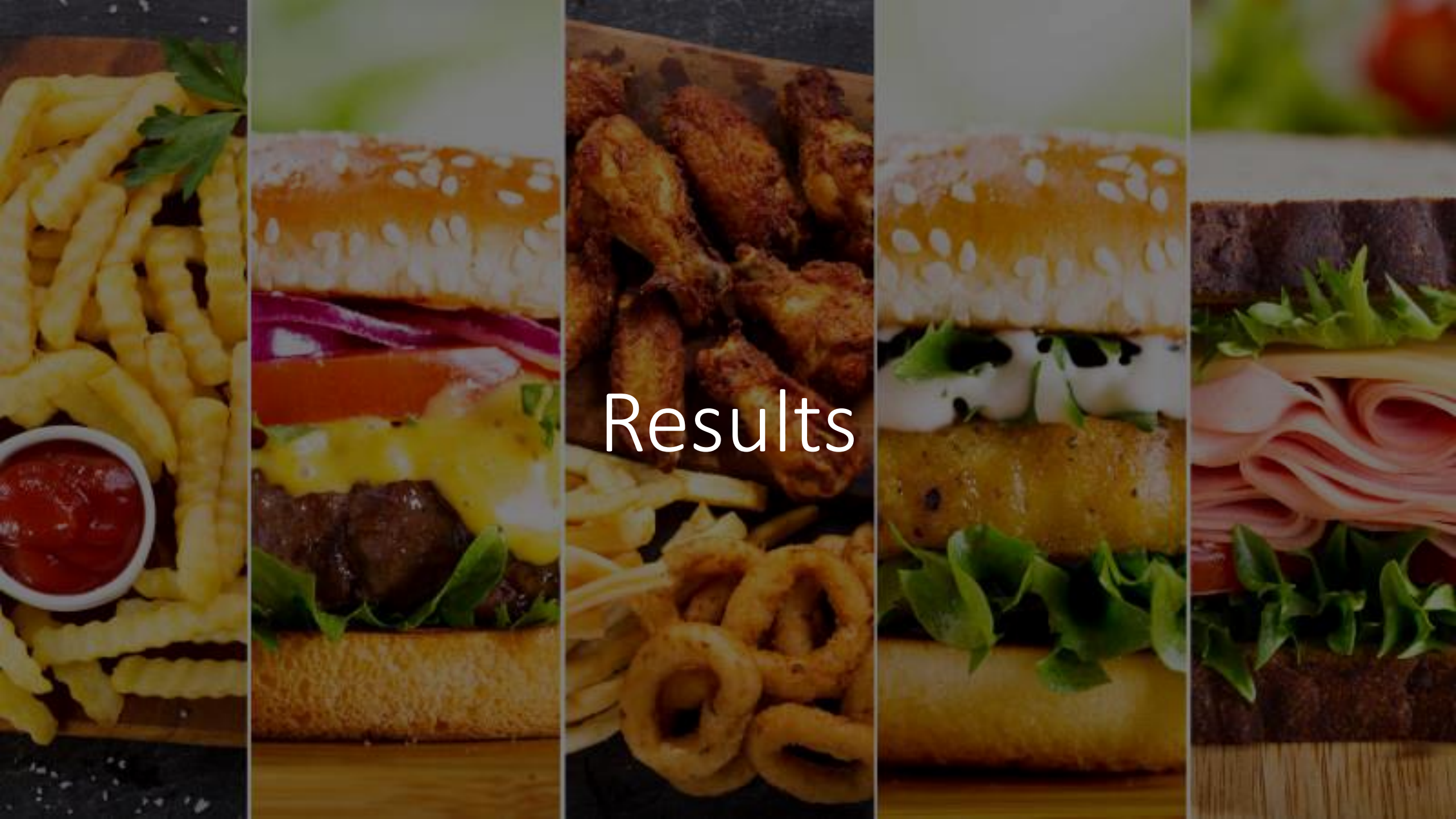
$$Q(X_i) = p(x) \cdot \text{population}_i$$

Probability of buying function:

$$p(x) = 0.8 \cdot \alpha_s + 0.15 \cdot \beta_i + 0.05 \cdot \gamma_i$$

Cost function:

$$C(X_i) = c \cdot Q(X_i) + C$$

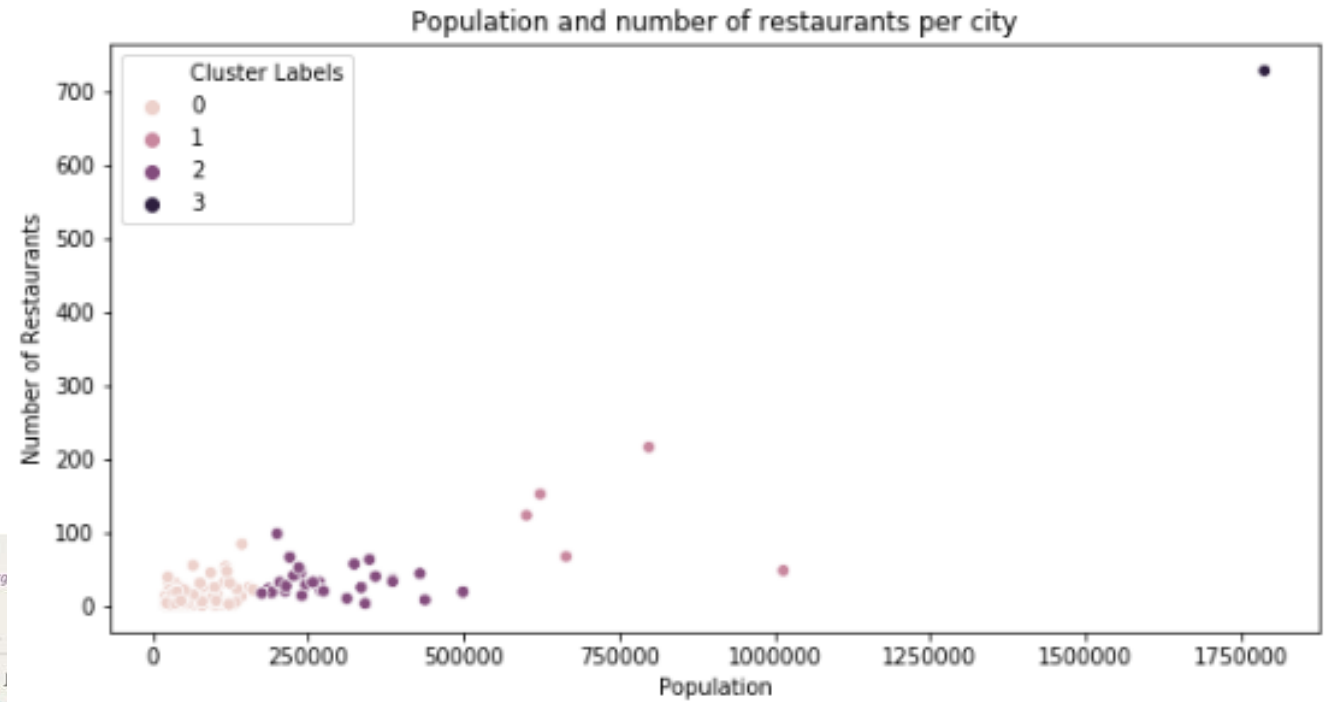


Results

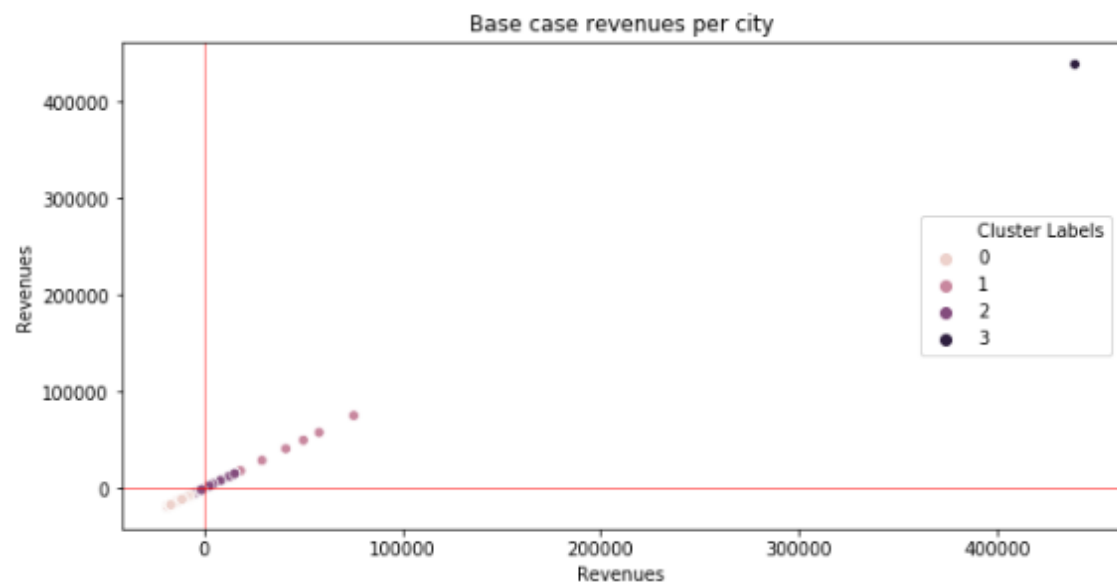
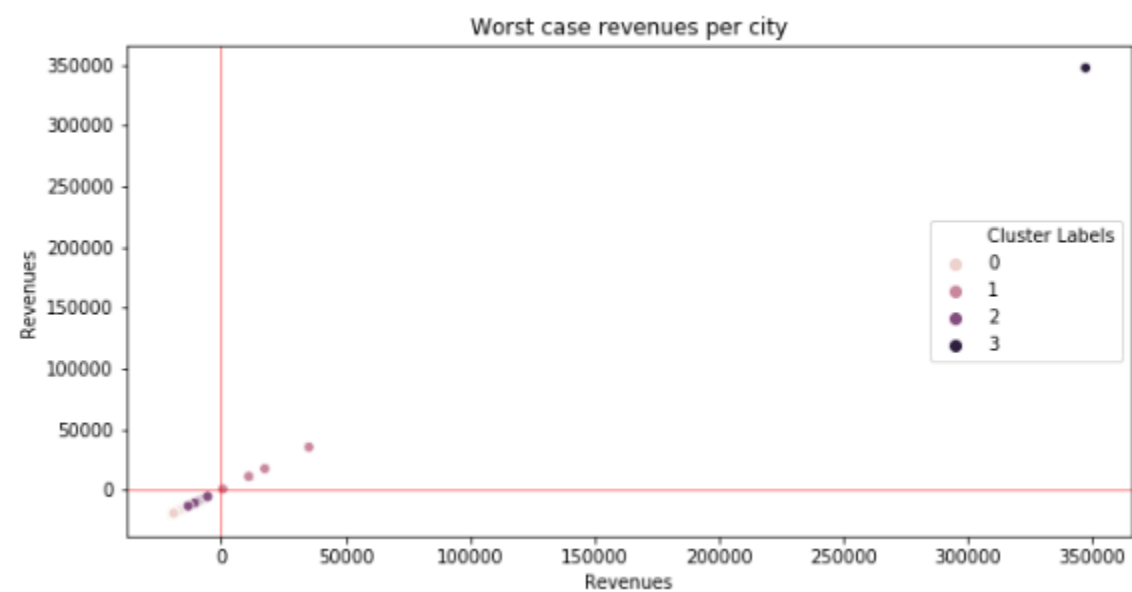
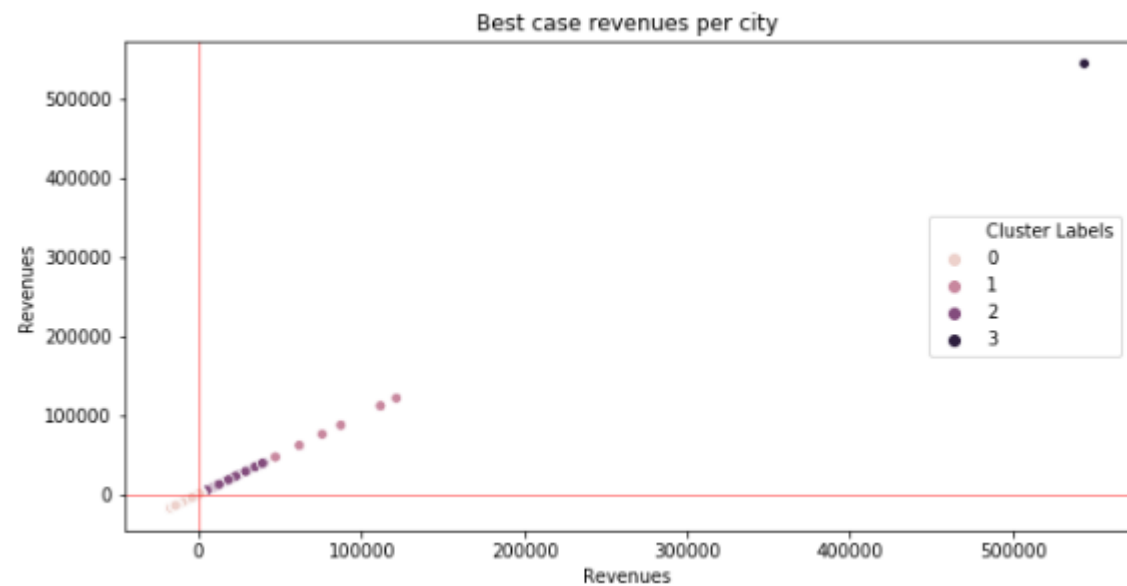
Clusters of cities

K=4

Algorithm= k-means



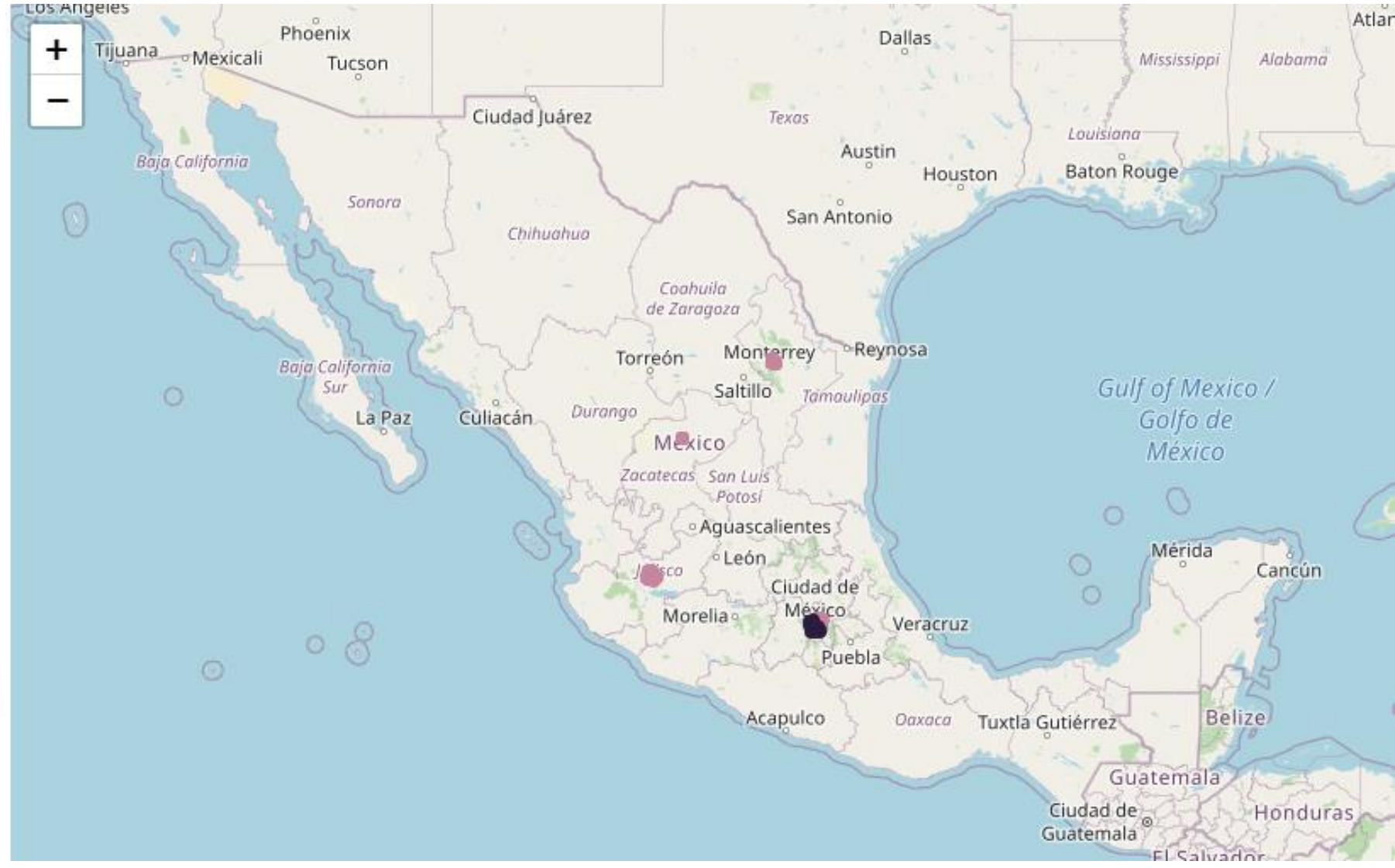
Profit prediction



The result was that the most profitable cities for the service are:

Mexico City
Guadalajara
Ecatepec de Morelos
Nezahualcoyotl City
State of Mexico
Zapopan
Apodaca

The neighborhoods in which the service can work are the zip codes labeled in the map!



THANK YOU!

