1. A description of the problem and a discussion of the background.

The computational advance in the field of data science has provided the opportunity to answer different questions from our environment using databases and machine learning models. Companies and governments invest in research in data science to improve their income statements (companies) and the well-being of their inhabitants (governments).

The objective of our project is to carry out a clustering of the different municipalities of Nicaragua based on the types of businesses and places of recreation found in each of the municipalities. Our project will allow public institutions to know the internal structure of each cluster to take public policy measures to guarantee the economic growth of the country. It will also allow this clusterization to be offered to private agencies with the aim of attracting private investment to the country. The private company will be able to carry out in its analysis what are the types of businesses that are in certain clusters and thus invest to complement the offer.

2. A description of the data and how it will be used to solve the problem.

Firstly, we will build a database that contains all the departments and autonomous regions of Nicaragua with each of its municipalities, in each of the municipalities we will locate their respective latitude and longitude. We will extract these data from the page https://www.geodatos.net/.

```
In [5]: df = pd.read_excel('geo_nic.xlsx')
        df.head()
```

Out[5]:

	Borough	Neighborhood	Latitude	Longitude
0	Managua	Managua	12.13282	-86.25040
1	Managua	Ticuantepe	12.02263	-86.20493
2	Managua	San Rafael del Sur	11.84854	-86.43839
3	Managua	El Crucero	11.99008	-86.30954
4	Managua	Tipitapa	12.19732	-86.09706

To compile business and leisure data for each municipality in Nicaragua, we will use the data provided by Foursquare.

```
In [37]: nearby_venues
```

Out[37]:

	name	categories	lat	lng
0	Termales Tipitapa	Hot Spring	12.202835	-86.091691
1	Sopas Mirna	Soup Place	12.191147	-86.100832
2	Asados Guadalupe	BBQ Joint	12.197969	-86.094788
3	Pollo Estrella	Fried Chicken Joint	12.201215	-86.097057
4	Restaurante Silva	Seafood Restaurant	12.201381	-86.096420
5	Bar El Chanchito	Restaurant	12.163399	-86.117496

With these data through machine learning models we can create a K-means classification algorithm to cluster the municipalities of Nicaragua and analyze the composition of each clusters. Then we will plot them on a map using Folium!