# Still market for new restaurants in Lyon? — Data Analyst’s viewpoint

Three years ago, I felt I was in a crossroad in my life. I had spent two great years working for a global institution in a city that I could describe a perfect place to live rich social life, Lyon, France. Major changes in the organisations left me two options: either start next adventurous endeavour in Lyon or return to my home country that had also brought me security and peace of mind with its beautiful nature and wilderness. Me and my friend had got a business idea to establish a Nordic coffee shop or coffeehouse chain in France and start testing and experimenting it in Lyon.

I returned back to home without any regrets. The business idea remained to be found again. Now Corona pandemic has closed me home and given me time to play with the old ideas. Here, I describe a study where I extract, process and visualize data from Foursquare technology platform to locate optimal place to start testing the business idea. Maybe, this article sparks somebody to make some testing.

And in case you want to repeat the analysis in any other city I provide the link to the Python code that help you do the work. You can easily make changes to assumptions how to make profitable business. In addition, I would be happy to provide more details about our drafting of the Nordic coffeehouse chain.

## 1. Introduction - Business Problem Description

In this article, I prepare a study for a Nordic coffeehouse chain that plans to establish new franchises in Lyon. Lyon is a vibrant city in Southern France with 0,8% yearly population growth rate.  The detailed study names districts that could be optimal places to establish new coffee shops in Lyon. The Foursquare is an excellent location data and technology platform to study different options for locations. Next I will describe a business concept, requirements and assumptions for profitable business. Only districts that meet these requirements can be selected for potential locations for coffeeshops.

The business concepts

The coffee shops infuse warm and cold drinks prepared from Nordic berries, vegetarian light cuisine such as pastries, sandwiches and light snacks served on Nordic design cutlery. The design tableware is presented in coffee shops. Customers can purchase Nordic tableware such as cups, mugs, jugs, serving dish, bowls and serving dishes in online store.

Requirements and business assumptions

It is very essential that franchise entrepreneurs can make profitable business preferable already during the first year. Consequently, the business concept owner helps to locate potential districts and give transparent metrics and assumption for profitable business. Here I describe three essential areas:

* Sales assumptions
* Location selection criteria
* Customer profiles

Sales assumptions:

The space for customer area is planned to be ca. 150m2 in coffeehouses. If each customer needs space of 3 m2, coffeehouses can serve same time 50 people. With 6 table rounds, the coffeehouse can serve 300 customers daily. In case 10% of local people find the coffeeshop daily to their place to visit, the district should have 3000 potential local customers.

Transit hubs such as train and tram stations are expected to bring occasional customers.

Traditional coffeehouse products are expected to bring sales of 1800 euros and tableware online sale 1200 euros daily. Consequently, the total daily revenue were 3000 euros daily. The coffeeshop should be profitable also outside tourist seasons.

Location selection criteria:

Public transportation hubs and near pedestrian streets have been found good places to establish a new coffee shop. On pedestrian streets people often seek out to window shop and find what they’re craving in the moment. The location should have several complimentary cafes and restaurants, multiple eating options, but not a one that has the same business concept. Complimentary venues are other restaurants, cafés, steakhouses, breakfast venues, noodle shops, bistros, burger and taco restaurants. However, very high number of cafes and restaurants may lead to fierce competition and bad service level what drives away customers and depletes good coffee shop culture in the area.

Customer profiles:

The most potential customers are in their 30-45 years, median income, single and married women who value relax social ambiance and something extra in service. Their coffee shop visits are often connected to another activity like shopping or training in sport centres. They are often willing to change their basic kitchen table-wares to design cutlery. They rely on friends’ recommendations.

## 2. Data

Data is acquired to test if the district meets the following criteria:

* Growth rate of residents is increasing
* Number of female potential customers in the age of 30-45 years is substantial - 20% of all women residents
* number of customers divided by the number of total numbers of complimentary restaurants is minimum 3000
* Local venues build an optimal profile with transit hub and attractive complimentary services

The primary date source to test first two criteria is the website 'Map-of-France’. 'Map-of-France’ has data sets such as historical data of the population, population distribution by sex, births and deaths, distribution of the population by age and women population distribution by age. The World of Population Review data sets will be used as an additional data source to get new data and check demographical data from other data sources. In addition, the National Institute of Statistics and Economic Studies collects, analyses and disseminates information on the French economy and society.

The Foursquare location data and technology is used to test two last criteria. Foursquare provides excellent data that enables us to explore and cluster venues in districts of the city of Lyon.

In the Reference section I provide a full list of data sources, their data elements and links to the data sources. In addition, the section lists literature that is used to create business assumption presented in the previous chapter.

3. Methotology

The methodology section describes step by step how the analysis is conducted.

First, we check if demographic data meets the criteria by comparing the assumption and statistical facts presented in selected data sources.

Second, city of Lyon is divided in 22 districts and population data per district is collected. The districts are Lyon 1 - Place des Terreaux, Lyon 2 - Place Bellecour, Lyon 3 - La Part-Dieu, Lyon 4 - Croix-Rousse, Lyon 5 - Old Lyon, Lyon 6 - Parc de la Tete dOr’, Lyon 7 - Rhone, Lyon 8 - Cinema, Lyon 9 - Vaise, Tassin-la-Demi-Lune, La Mulatière, Villeurbanne, Caluire-et-Cuire, Sainte-Foy-lès-Lyon, Saint-Cyr-au-Mont-dOr, Écully’, Oullins, Saint-Fons, Vaulx-en-Velin, Bron, Meyzieu and Rillieux-la-Pape.

Third, all districts are located by using latitude and longitude values and a map is produced.

Forth, Foursquare service is used to retrieve data of venues within a radius of 500 meters in district centre. The data element ’Venue category’ is used to identify complimentary restaurants and their number of occurrences

Fifth, 10 the most common venue categories per a district is identified and sorted.

Sixth, K-Means method is used to cluster districts. The categories are labelled to describe the characteristics of the district.

Seventh, the results are presented in a table and a map with clustering labels is printed.

Finally, the results of different parts of the analysis are combined in a table.  The table has an assessment that reflects viability of a coffeehouse concept in different districts. The viability of a business measures long-term profitability.

## 4. Results

Lyon has ca. 500 000 inhabitants and 53% of them are women. The population is growing steadily ca. 0,8% in a year. New people are born much faster than dying. In 2008 Lyon new babies were 7 339 births and less than half of births,  3 324 inhabitants died. Women in the age group of  30-45 years is approximately 20%. Younger women are also potential customers and the age group of 15-29 forms 29% of all women in Lyon.

There are 15 districts had less than 10 complimentary restaurants and services in Lyon. They were dropped from the list of potential locations for new coffeeshops.

Clustering analysis resulted in 8 districts. However, one of the clusters, cluster 1, includes 14 different districts out of 22 total amounts of districts. The result implies that several districts resemble each other in terms of venue categories.

I studied through 10 ten the most common venue categories cluster by cluster. Based on the study I created clusters names that describe categories best based on my subjective opinion.  Cluster names are presented in the table below. The district and its cluster label can also be found on the map graph.

|  |  |  |  |
| --- | --- | --- | --- |
| Cluster | Cluster name / description | Color label on map | Number of districts in the cluster |
| 0 | International restaurants and shops | Red | 1 |
| 1 | French restaurants and shopping streets | Purple | 14 |
| 2 | Bankers, boutiques and restaurants | Navy Blue | 1 |
| 3 | Grocery shops and small food shops | Petrol Blue | 1 |
| 4 | Hotels, fancy dining and jewelry | Dark Green | 2 |
| 5 | Playgrounds and young adults | Light Green | 1 |
| 6 | Medical centre and pharmacy | Yellow | 1 |
| 7 | Amphitheater and outside hanging | Orange | 1 |

A picture containing text, map

Description automatically generated

Four districts had less than 3000 inhabitants per total number of complimentary venues. These were Lyon 1 - Place des Terreaux, Lyon 2 - Place Bellecour, Lyon 4 - Croix-Rousse, Lyon 5 - Old Lyon and Lyon 6 - Parc de la Tete dOr’. Especially, the tourist location Lyon 1 and Lyon 2 have extreme fierce competition. Lyon 1 - Place Bellecour district have only 564 restaurants per an inhabitant.

Finally, only two districts turned out to be viable to establish restaurants in Lyon. Lyon 3 - La Part-Dieu that resides near railway station and big shopping center and Lyon 7 - Rhone that is located near southern tram and railway connection. Assessment of business viability in different districts are presented in the table below.

A close up of a piece of paper

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## 5. Discussion

Based on demographic characteristics Lyon is very promising city to establish a Nordic coffeehouses. Women in the age group of  15-45 years make almost 50% of all women in Lyon. However, competition is fierce on several districts in coffeehouse business. Clustering analysis and careful study on complimentary services reduce the number of potential districts to only two. In the district Lyon 3 one of the biggest shopping centre predominates commercial services including restaurants. It is possible several restaurants and cafes operate in the shopping centre, but they are not necessary mentioned in the  Foursquare service platform. Consequently, only one district remains as an option for coffeehouse, Lyon 7 - Rhone area.

## 6. Conclusions

Desktop analyses including web searching, exploratory data analysis and inferential statistical testing give you a good base for a market research. The study helps you to limit the range of potential business locations. In other words, they save time and money compared to visits on different districts and cities. However, the desktop study do not fully replace visits.  Maybe, the locations is not easily accessible due to road construction work. The streets might not be safe. You have to check if your assumptions are true in reality, before initiate any detailed planning for new business in the city.