Optimal location for a new Kebab Restaurant/Pizzeria in Tampere, Finland

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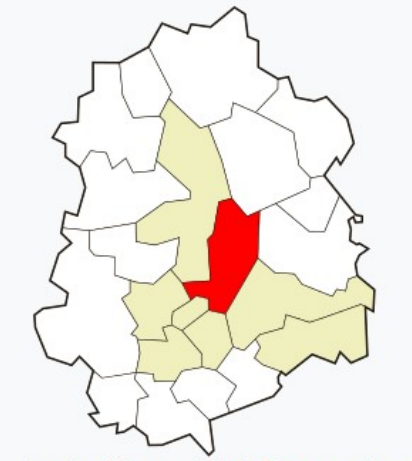
1. Introduction

1.1 Background

Kebab Restaurants, Pizzerias and Fast food places are quite popular in Finland. There are some big companies like Mc Donald's, the big Finnish and international company Hesburger, and franchising pizzerias like Kotipizza. This is also true in Tampere. In many cases the current Kebab places are run by Turkish or Kurdish people or people from that area. Also the Kebab places and pizzerias are combined together. Thus Kebab places sell pizzas, and many pizzerias sell kebab food.

Tampere is a city in Pirkanmaa, southern Finland. It is the most populous inland city in the Nordic countries. Tampere has a population of over 235 000 with the urban area holding over 334 000 people and the metropolitan area, also known as the Tampere sub-region, holding over 385 000 inhabitants in an area of 4,970 km2.Tampere is the second-largest urban area and third most-populous individual municipality in Finland, after the cities of Helsinki and Espoo. It's also the most populous Finnish city outside the Greater Helsinki area and a major urban, economic, and cultural hub for central Finland.[1] The web site of Tampere in English is https://www.tampere.fi/en/city-of-tampere.html.



Location of Tampere in the Pirkanmaa region and the Tampere sub-region [2]

[1] https://en.wikipedia.org/wiki/Tampere
[2] https://en.wikipedia.org/wiki/Tampere

Location of Tampere in Finland
Coordinates: 61°30′N 23°46′E

Country	Finland
Region	Pirkanmaa
Sub-region	Tampere

[3]

1.2 Business Problem

In this project we will try to find an optimal location for a new Kebab Restaurant/Pizzeria/fast food place in Tampere. Specifically, this report will be targeted to stakeholders interested in opening such a new place in Tampere, Finland. So this could be an opportunity for an immigrant to start a new business or to get a job. Pizzerias also are run by Turkish or Kurdish people, but also by other people. Thus this project is also aimed to a larger population and franchising companies.

We are going to find out how many Kebab Restaurants/Pizzerias/fast food places there are in Tampere, and how they are located in different areas, neighbours, and boroughs. We are going to see how many possible customers are in the area, and try to find places with as few competitors as possible, and on the other hand find attractive places where people go, like shops or bars in vicinity.

We will use our data science powers to generate a few most promising neighborhoods based on our criteria.

[3] https://en.wikipedia.org/wiki/Tampere

2. Data

2.1 Data needed

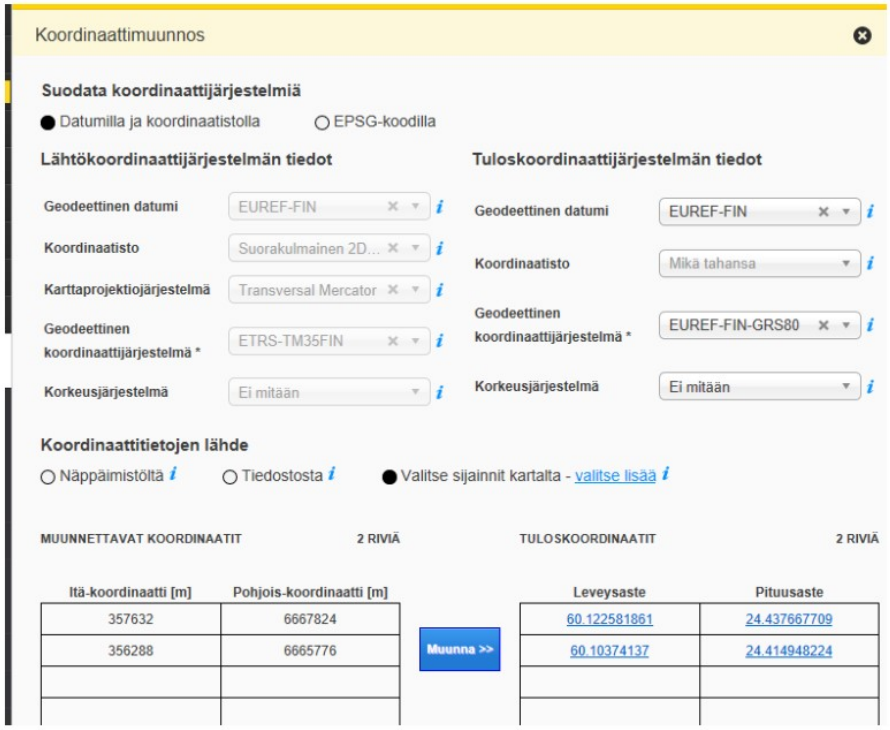
Based on definition of our problem, factors that will influence our decision are:

- number of existing kebab restaurants/pizzerias/fast food places or other restaurants in the neighborhood (any type of restaurant)
- number of people per kebab restaurants/pizzerias/fast food places or other restaurants in the neighborhood or borough
- number of competitors in the near vicinity, if any.
- number of shops around the kebab restaurant/pizzeria/fast food place/other restaurant
- number of bars around the kebab restaurant/pizzeria/fast food place/other restaurant.

2.2 Data sources

We get the following information from https://fi.wikipedia.org/wiki/Luettelo_Tampereen_tilastoalueista: neighbours, boroughs, planning area, the number of inhabitants in borough.

The location of the neigbours were mainly calculated using the Nominatim library of geopy.geocoders. However, it did not give all the results, and the missing results were varying, and in some cases the result was not accurate. Therefore, in addition to geopy, I also used the open data available in https://geodata.tampere.fi/geoserver/kiinteistot/ows?service=WFS&version=1.0.0&request=GetFeature&typeName=kiinteistot:NIMISTO_MVIEW&outputFormat=json. The coordinates are not in the form of latitudes and longitudes, but in the format: ETRS-GK24 (EPSG:3878). Therefore I changed those coordinates using a converter on the page https://kartta.paikkatietoikkuna.fi/?lang=fi .



I also calculated the distances from neighbourhoods to the Tampere city center (Keskustori) by Google Maps, using either distance by car, walk or bike. At the moment there are big tram constructions on the way to Tampere Center, and the easiest way to get to the Center is either by walk or by bus. Some traffic is only allowed for public traffic or taxis. Using your own car mean longer routes to get to the center. Finally, I figured out Radius information for each neighbourhood according to the size of the neighbourhood. This is used as an information how far we are going to search places around the neighbourhood center. All the

data mentioned above which was not available in https://fi.wikipedia.org/wiki/Luettelo_Tampereen_tilastoalueista I collected and stored into a local file.

The number of kebab restaurants/pizzerias/fast food places and other restaurants and their type and location in every neighborhood will be obtained using **Foursquare API.** We also use that same api to get the number of competitors, shops and bars in the near vicinity of the kebab restaurants/pizzerias/fast food places and other restaurants.

2.3 Data cleaning

First I read the data from https://fi.wikipedia.org/wiki/Luettelo_Tampereen_tilastoalueista , and put it into a pandas dataframe. Then I dropped the not needed column 'Kaupunginosan numero'. Then I renamed columns and borouhs into English for better readibility. The 'NumberOfPeople' data includes a special charachter '\xa0' between numbers which had to be removed. This peculiar space like character was noticed when type conversion from object type to int type gave an error.

Next I read from my locally saved data/csv file the following information into a different dataframe

- Neighbourhood
- Latitude
- Longitude
- Distance from center (by car or public transportation or if close by walk or bycycle)
- Radius used to seek places nearby

Then I Repaired the data so that scandinavic characters are included (ae -> ä and eo -> ö) and drop the column 'Unnamed: 0'. After that I joined data read from https://fi.wikipedia.org/wiki/Luettelo_Tampereen_tilastoalueista and from my local file. When checking the data I could see that there were neighbourhoods with the same Latitude, Longitude. I joined these neighbourhoods together (Amuri A and Amuri B to Amuri, Kyttälä A and Kyttälä B to Kyttälä, and Tammela A and Tammela B to Tammela).

Then I used Foursquare API to search kebab restaurants/pizzerias/fast food places or other restaurants in the neighborhood using a specific radius for each neighborhood. After that I removed multiple venues leaving only the food place closest to the neighbourhood. When visualizing and investigating the map thorougly near Tampere boarders I could find that there are still two venues outside Tampere. One is 'Jagin Kööki' which is clearly in Ylöjärvi, and the other is 'Kokkinurkkaus' which is just close to the border, and it locates in Kangasala. I removed these venues. Finally I counted the number of shops and bars and other competitors 100 meters around each kebab/pizza/fast food place or other restaurant.

3. Methodology

In this project we will direct our efforts on detecting Tampere neighbourhoods, and see if there would be possible places (low number of kebab/pizza/fast food places) for new kebab / pizza restaurant.

In first step we have collected the required data. We have also identified kebab/pizza/fast food places and other restaurants (according to Foursquare categorization). In Addition we searched the number of shops and bars in near vicinity (100 m) of each food place. The expectation is that when people go to shopping or to a bar they also may want to by some fast food.

Second step in our analysis will be analysing the collected data. We continue calculating data, and make some first notes. Then as an explanatory analysis we cluster the data, and see what conclusions can be made. Also we analyse how the number of inhabitants correlates the number of food places, and present graphs.

Third step is to get idea from the results if there are places with low number of kebab / pizza places where one could start a new one. Also we are interested if there are shops or bars in the vicinity of which no kebab / pizzeria places exist or if the number of inhabitants in the area in big enough to start a new business.

4. Analysis

4.1. Number of restaurants and kebab / pizzeria places in neighbourhood

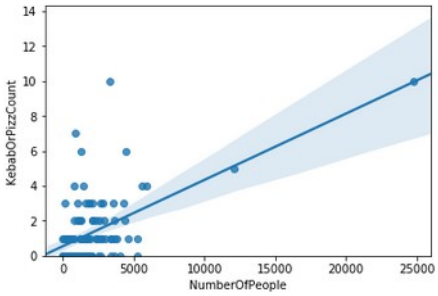
First we counted the number of restaurants and kebab / pizzeria places for each neighbourhood. Some of the results, in descending order, can be seen below.

Neighborhood	Borough	Inhabitants	Kebab/Pizzerias	Other Restaurants
Kyttälä	Middle	3354	10	24
Hervanta	Southeastern	24738	10	8
Särkänniemi	Middle	877	7	3
Kaleva	Middle	4491	6	3
Tesomajärvi	Southwestern	1280	6	2
Kaukajärvi	Southeastern	12134	5	2
Linnainmaa	Northeastern	5957	4	0
Hakametsä	Northeastern	819	4	0
Tammela	Middle	5564	4	10
Tasanne	Northeastern	1432	4	0

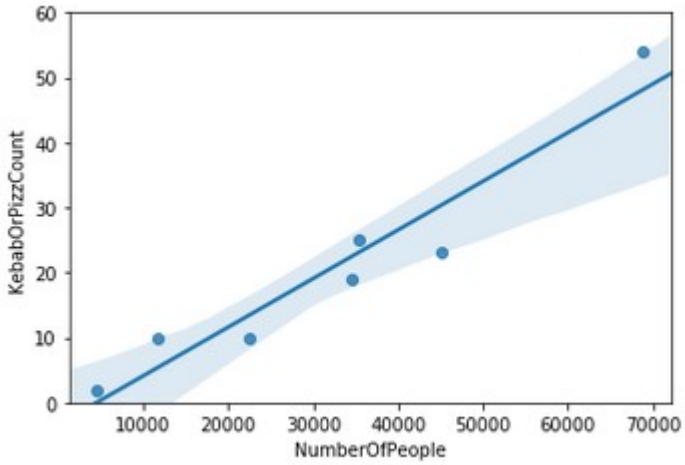
The center neighbourhood Kyttälä has the biggest number of kebab/pizzeria/fast food places and also a great number of other restaurants. Hervanta is a big area outside the center, and it too has 10 kebab/pizzeria/fast food places. Surprisingly, Tasanne which is quite far from Tampere center, has four restaurants, even though there are only 1432 people in the neighbourhood. So there might not be room for a new kebab/pizzeria/fast food place.

4.2. Correlation

We looked how the number of people in the neighbourhood and the number of kebab/pizzeria/fast food places are correlated.



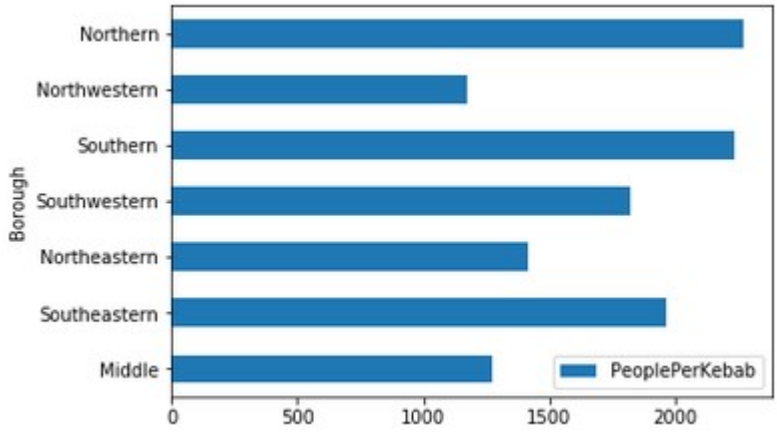
The correlation was not big. But when looking at the borough level there was a strong correlation.



	NumberOfPeople	KebabOrPizzCount
NumberOfPeople	1.000000	0.957728
KebabOrPizzCount	0.957728	1.000000

4.3. The number of people per kebab/pizzeria/fast food place or restaurant

Then we calculated how many people there are per kebab/pizzeria/fast food place or restaurant. At the borough level the situation considering kebab/pizzeria/fast food places was as follows:



According to the chart the most promising boroughs could be Northern or Southern boroughs. However, the Middle area should be thought as its own, because people from Tampere and all over Finland and also

abroad go to the Middle part borough or at least to some of the neighbours in that borough. Thus the number of inhabitants does not tell the whole truth.

We calculated the same for neighbourhoods, and noticed that there existed 46 neighbourhoods with zero kebab/pizzeria/fast food places. We also calculated that there are 1557 people per one kebab/pizzeria/fast food place in Tampere. Then we picked up those neighbourhoods with zero kebab/pizzeria/fast food places and where the number of people was at least 1600. We got the following results (sorted descending by the number of people).

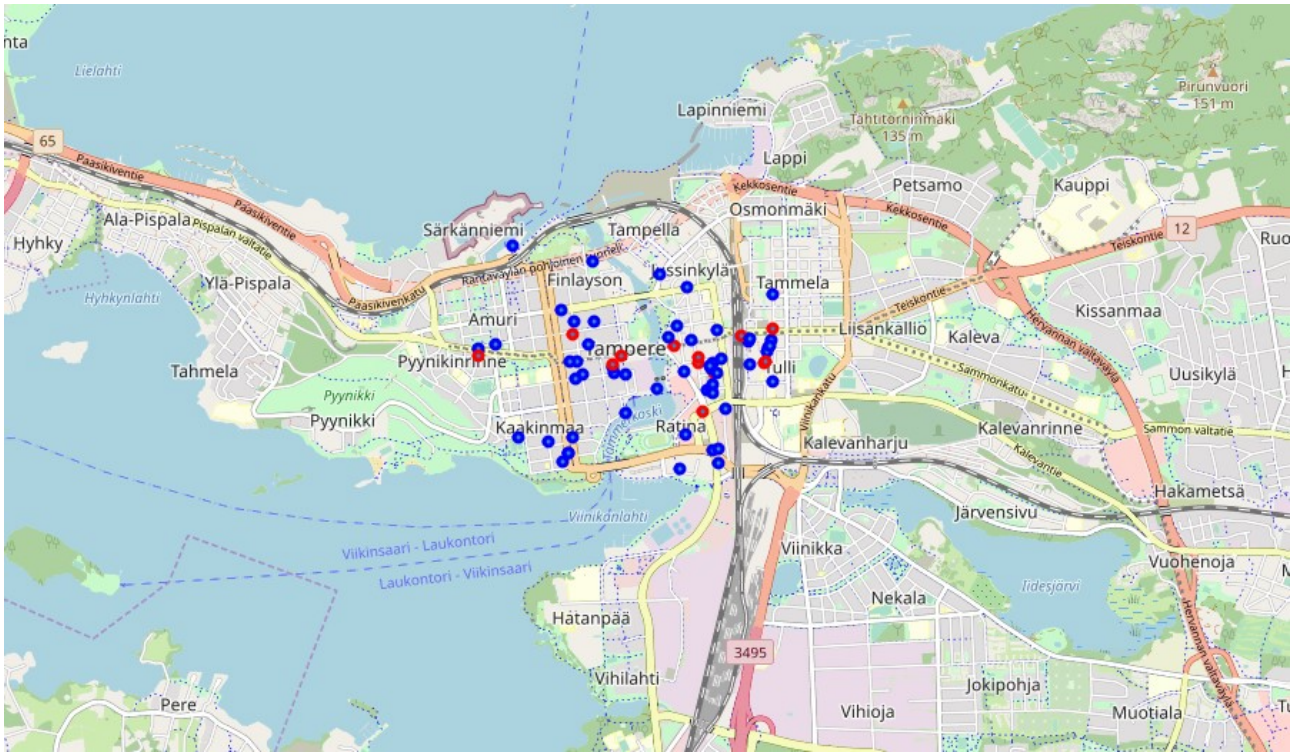
Neighborhood	Borough	NumberOfPeople	Distance
Amuri	Middle	5311	1.0
Tampella	Middle	4058	0.8
Petsamo	Middle	3666	3.2
Kalkku	Southwestern	3382	11.3
Rantaperkiö	Southern	2689	4.9
Holvasti	Northeastern	2486	11.2
Kämmenniemi	Northern	2055	27.3
Ristimäki	Southwestern	2031	7.9
Kalevanrinne	Middle	2000	2.7
Kalevanharju	Middle	1978	1.5
Koivistonkylä	Southern	1937	5.6
Olkahinen	Northeastern	1808	13.1
Osmonmäki	Middle	1712	1.4
Ylä-Pispala	Southwestern	1706	2.8
Muotiala	Middle	1698	5.5

Then we looked at the people per zero kebab/pizzeria/fast food places where there exists at least one fast food place, and ordered it by PeoplePerKebab column. We could find that, for example Härmälä and Rahola are promising places.

Neighborhood	Borough	PlanningArea	NumberOfPeople	Latitude	Longitude	Distance	Radius	KebabOrPizzCount
Härmälä	Southern	Härmä	5259	61.470583	23.739260	5.6	1200	1
Rahola	Southwestern	Raho	3807	61.498364	23.631977	8.3	1000	1
Pappila	Northeastern	Messu	3617	61.490865	23.863134	7.5	1000	1
Peltolammi	Southern	Peltoo	3427	61.453009	23.754549	7.0	1000	1
Liisankallio	Middle	Sampo	3396	61.499121	23.791252	1.8	500	1
Kaakinmaa	Middle	Keskusta	2983	61.493447	23.750052	1.1	370	1
Kissanmaa	Middle	Sampo	2752	61.500139	23.819561	3.3	600	1
Hervanta	Southeastern	Herva	24738	61.450903	23.851424	10.4	1500	9
Hallila	Southeastern	Kauka	2685	61.464759	23.829035	8.2	750	1
Kaukajärvi	Southeastern	Kauka	12134	61.470183	23.876313	8.7	1700	5

4.4. Kebab places and pizzerias and fast food places in Tampere Center

We searched and visualized the venues 1 km around Tampere Center.



4.5. Looking the amount of shops and bars around kebab/pizzeria/fast food places

We sorted the food places according to the number on shops and bars 100 meters around the place. We could see that the food places in the neighbourhoods of the Middle borough near Tampere center had lots of shops or bars around. We also noticed that almost all the food places had at least one shop or bar in the near vicinity. We also saw that restaurants in the Middle borough had many competitors.

4.6. Clustering venues

When clustering we found there are clearly different types:

1. The restaurants in the center.
2. The restaurant just a little bit further from the center.
3. Restaurants in neigbourhoods not in the center.
4. Restaurants in Hervanta which is not in the center but is very populated.
5. Restaurants very far from the center in landscape area.

Finally we picked up the neighbourhoods where there are zero kebab/pizzeria/fast food places and enough inhabitants and those neighbourhoods where there are many people per zero kebab/pizzeria/fast food place. From these we picked up only Härmälä.

Then we made a choice to investigate only the neighbourhoods not right in the center (3 kms far from the center). Then we sought shops and bars in the vicinity of which new kebab place or pizzeria could be started.

5. Results and Discussion

Our analysis shows that there are over 140 kebab/pizzeria/fast food places and over 180 other restaurants in Tampere, which means kebab/pizzeria/fast food places are quite popular in Tampere. We could see that most of the kebab/pizzeria/fast food places locate in the Middle borough. These places are also surrounded by many shops and bars, as one would suppose. Also it has the most population.

We analyzed how the number of people and the number of kebab/pizzeria/fast food places are correlated in boroughs and in neigbourhoods. At the borrow level there was a strong positive correlation. We also counted that there are about 1550 people per one kebab/pizzeria/fast food place in Tampere. At the neighbourhood level the correlation is not so strong. There are about 110 neighbourhoods in Tampere, and in 46 of there exists no kebab/pizzeria/fast food place at all. One reason is that many neighbours has quite small population.

I also made a clustering analysis of all the kebab/pizzeria/fast food places and other restaurants in Tampere. These places had the following features according to which they were analyzed: 'Shop Count around 100 meters', 'Bar Count around 100 meters', 'Competitor Count of Kebab/pizzeria/fast food places','Competitor Count of other Restaurants', 'Inhabitants', 'Neighbourhood's Distance from Center'. We noticed that there were clearly different types:

* Restaurants in the center.
* Restaurants just a little bit further from the center.
* Restaurants in neigbourhoods not in the center.
* Restaurants in Hervanta which is not in the center but is very populated.
* Restaurants very far from the center in landscape area.

We noticed that in near Tampere center there are Tampella and Amuri which have many inhabitants per restaurants. However, it is so close to the center that in the neighbouhoods around there are plenty of competitors. Also the center places should be estimated more specifically. Thus I chose those neighbourhoods with zero kebab/pizzeria/fast food places and enough people, and Härmälä in addition from those which are over 3 kms from the center. We could find several good candidates, for example Kalkku in Southwestern area which is far from the center. One good choise is also Kämmenniemi, because it is far from Tampere center (over 27 kilometers, and there is only one other type restaurant there.

Finally I show all the good candidates pointing out the shops and bars on the map.

6. Conclusion

In this project we tried to find an optimal location for a new Kebab Restaurant/Pizzeria/fast food place in Tampere. Specifically, this report was be targeted to stakeholders interested in opening such a new place in Tampere, Finland, for example for an immigrant to start a new business or to get a job. We found out how many Kebab Restaurants/Pizzerias/fast food places there are in Tampere, and how they are located in different areas, neighbours, and boroughs. We calculated how many possible customers there are in the area and per restaurant, and on the other hand find attractive places where people go, like shops or bars in vicinity.

Final decision on optimal restaurant location will be made by stakeholders based on specific characteristics of neighborhoods and locations in every recommended zone, taking into consideration additional factors like attractiveness of each location (proximity to park or water), levels of noise / proximity to major roads, real estate availability, prices, social and economic dynamics of every neighborhood etc.