Cluj-Napoca

Investment Opportunity in Health and Fitness

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INTRODUCTION

Background

Cluj-Napoca, known as Cluj, is a city located in Romania, Eastern Europe that is attrackting more international attention due to its innovation ecosystem and access to employment. It has 393 companies, 8 universities and 22 catalyst organizations, which encourage start-up formation and give plenty of hiring opportunities to the already established businesses. At the same time, it was ranked the second European city in terms of access to employment which attracts youth to establish in this area of the country.

A good indicator of the growth of the city is the real estate market. As study published in 2018, shows that real estate transactions increased by 30% for a total of approximately 600 millions. This sum represents twice the amount of the city budget.

Being on a steady growth, Cluj in adapting to the desires of its population with investments in numerous aspects that increase well being.

Problem

The population density of neighbourhoods increases and access to health and fitness is also on the rise. At the moment there is a disproportionate access to gyms depending on the area of the city and with is a business opportunity lies.

Interest

The purpose of this paper is to look at the population density of Cluj by neighbourhoods and availability of health and fitness centers. This should help investors make a more informed decision on where to open a new location.

DATA

In order to be able to decide which neighbourhoods are the best places for opening a health and fitness location, I will look at the population density, growth of the neighbourhood based on real estate acquisitions and their prices and the availability of gym services in the area.

Data sources

The information regarding population density and real estate transactions can be found in publications done by the city hall. Population density per neighbourhoods can be found here, while real estate transaction can be found here and here. And last but not least the information regarding the venues will be accessed from Foursquare via an API.

Data formatting and cleaning

As it can be seen from the above links, the upside is that the data is clear and is not missing information. At the same time, it comes in formats that are not easily transformed into dataframes for analysis. For example, population density per neighbourhood is available in picture format that represents the map of Cluj. Thus, I went through the publications, gathered the data that was relevant to this report and manually aggregated it into a database that can be found here.

Feature selection

After data aggregation, 45 features were available for analysis. Upon analysis, it was clear that redundant or irrelevant features were present. For example, data on how individuals financed their real estate purchases (via mortgage or cash) has no relevance on whether a health and fitness center should be opened in a specific neighbourhood, thus it was excluded.
Also, the number of real estate transactions per year was available as well as percentage change over time. These features convey similar information, thus only the latter was kept.

The dropped features can be found in the Appendix, Table 1.

As a final result, 23 features were identified to be relevant for this report.

Table 2: Kept features

Feature Name	Feature Definition	Reason for keeping
Neighbourhood	Name of neighbourhood from city	Main feature for the report.
Population Density	Population density for each neighbourhood	Feature used in the analysis as predictor of potential market. Assumption: the more dense the population, the more opportunities for higher demand for health and fitness services.
Latitude	Latitude of neighbourhood	Feature needed in venue analysis from Foursquare
Longitude	Longitude of neighbourhood	Feature needed in venue analysis from Foursquare
Growth_Land	% change in the number of land properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_House	% change in the number of house properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_Condo	% change in the number of condo properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_Other	% change in the number of other properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_Total	% change in the number of total properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_Price_Land	% change in the price of land properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_Price_House	% change in the price of house properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_Price_Condo	% change in the price of condo properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_Price_Other	% change in the price of other properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_Price_Total	% change in the price of total properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Growth_Average_Price	% change in the average price of total properties acquired	Feature represents investment in a particular neighbourhood. Relationship with population density and potential investment to be investigated further.
Price_Fin_Alone_2017	Total cash real estate transactions in 2017	Assumed to be a representation of wealth in a particular neighbourhood.
Price_Fin_Total_2017	EURs spent on real estate properties in 2017	Assumed to be a representation of wealth in a particular neighbourhood.
Average_Price_2017	Average price of real estate properties in 2018	Assumed to be a representation of wealth in a particular neighbourhood in relation to the percentage paid in cash.
Price_Fin_Alone_2018	Total cash real estate transactions in 2018	Assumed to be a representation of wealth in a particular neighbourhood.
Price_Fin_Total_2018	EURs spent on real estate properties in 2018	Assumed to be a representation of wealth in a particular neighbourhood.
Average_Price_2018	Average price of real estate properties in 2018	Assumed to be a representation of wealth in a particular neighbourhood in relation to the percentage paid in cash.
Per_Fin_Alone_2017	% of real estate transactions paid in cash in 2017	Assumed to be a representation of wealth in a particular neighbourhood.
Per_Fin_Alone_2018	% of real estate transactions paid in cash in 2018	Assumed to be a representation of wealth in a particular neighbourhood.

METHODOLOGY

As the aim of this report is to help investors find the neighbourhoods in Cluj which are in need for health and fitness centers, the analysis of the data was split in two - demand and supply. Demand representing the characteristics of an area which could favour the opening a fitness business, while supply covers any already existing such services.

Before diving into the demand and supply analysis, the relationship among features was assessed.

Correlation of Population Density and % Growth in Real Estate Transactions

A closer look at the correlation between population density and the % growth in real estate transactions shows that a weak relation between the two.
A strong relationship is present between the growth in condos and other types of real estate transactions and the total growth of the market. This, however, has no impact or relevance in solving the problem at hand.

	Population Density	Growth_Land	Growth_House	Growth_Condo	Growth_Other	Growth_Total
Population Density	1.000000	0.354045	0.295784	-0.338356	-0.341240	-0.294046
Growth_Land	0.354045	1.000000	0.270103	-0.108630	-0.008033	-0.041708
Growth_House	0.295784	0.270103	1.000000	0.275144	0.315344	0.204868
Growth_Condo	-0.338356	-0.108630	0.275144	1.000000	0.895570	0.930122
Growth_Other	-0.341240	-0.008033	0.315344	0.895570	1.000000	0.895470
Growth_Total	-0.294046	-0.041708	0.204868	0.930122	0.895470	1.000000

Fig 1 - Correlation of Population Density and % Growth in Real Estate Transactions

Correlation of Population Density and % Growth in Real Estate Prices

Based on the correlation between population density and the price fluctuations in the real estate market, there seems to be little correlation between the two.
Just as above, a strong relationship exists between the prices condos and other types of real estate and the total growth of prices in the market. This, however, has no impact or relevance in solving the problem at hand.

	Population Density	Growth_Price_Land	Growth_Price_House	Growth_Price_Condo	Growth_Price_Other	Growth_Price_Total
Population Density	1.000000	0.246499	0.349548	-0.329404	-0.431836	-0.376291
Growth_Price_Land	0.246499	1.000000	0.087686	-0.118764	-0.171205	-0.126341
Growth_Price_House	0.349548	0.087686	1.000000	0.228683	0.283776	0.273783
Growth_Price_Condo	-0.329404	-0.118764	0.228683	1.000000	0.638757	0.966600
Growth_Price_Other	-0.431836	-0.171205	0.283776	0.638757	1.000000	0.715127
Growth_Price_Total	-0.376291	-0.126341	0.273783	0.966600	0.715127	1.000000

Fig 2 - *Correlation of Population Density and % Growth in Real Estate Prices*

Demand

The characteristics of neighbourhoods that are good candidates for investing in health and fitness centers and the assumptions made are as follows:

1. *High population density*. The assumption is that the higher the number of people in an area, the higher the demand and thus the higher the potential for revenue.
2. *High wealth*. The assumption is that the more wealth people have, the more willing they are to pay for such services. In the context of this report, wealth of a neighbourhood was determined by high average prices of real estate transactions and high percentage of these transactions being funded by cash.
3. *High growth*. The assumption is that if a neighbourhood had a significant growth in the last couple of years, the population is on the rise and thus demand for fitness centers is high or it will increase. Investors who will penetrate these neighbourhood first will have a competitive advantage. In the context of this report, growth was measured by the increase in real estate transactions.

In order to identify the most desirable areas, the demand based on the above assumptions was explored. The information used was from the created database and selected features.

The first glance is at the population density, which looks as follows:

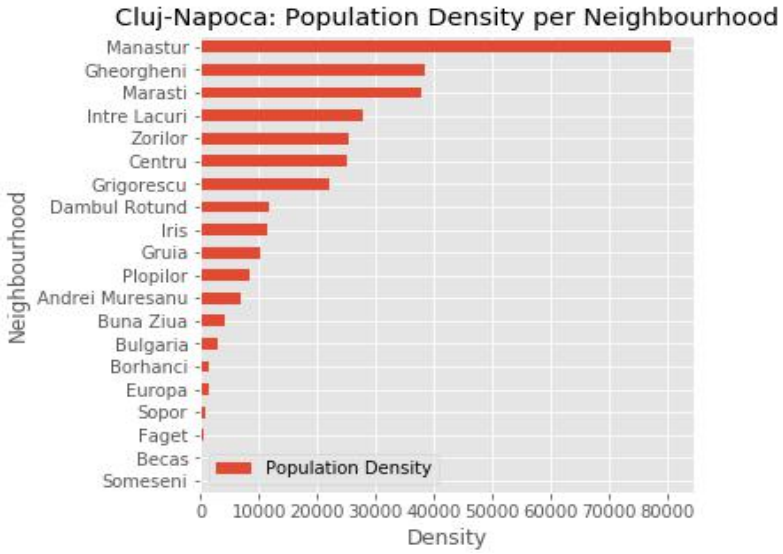

Fig 3 - Population density per neighbourhood

The growth of the neighbourhoods calculated by the increase in real estate transactions from 2017 to 2018 looks as follows:

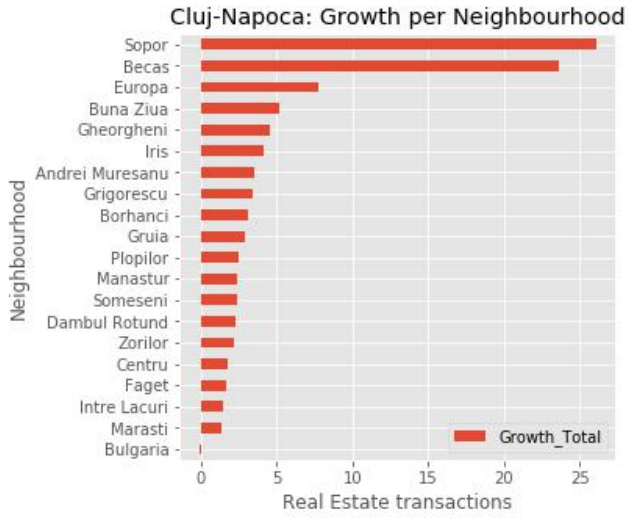

Fig 4 - Growth per neighbourhood

As mentioned, wealth of a neighbourhood was determined by high average prices and high percentage of real estate transactions funded by cash.

The activity in prices looks as follows:

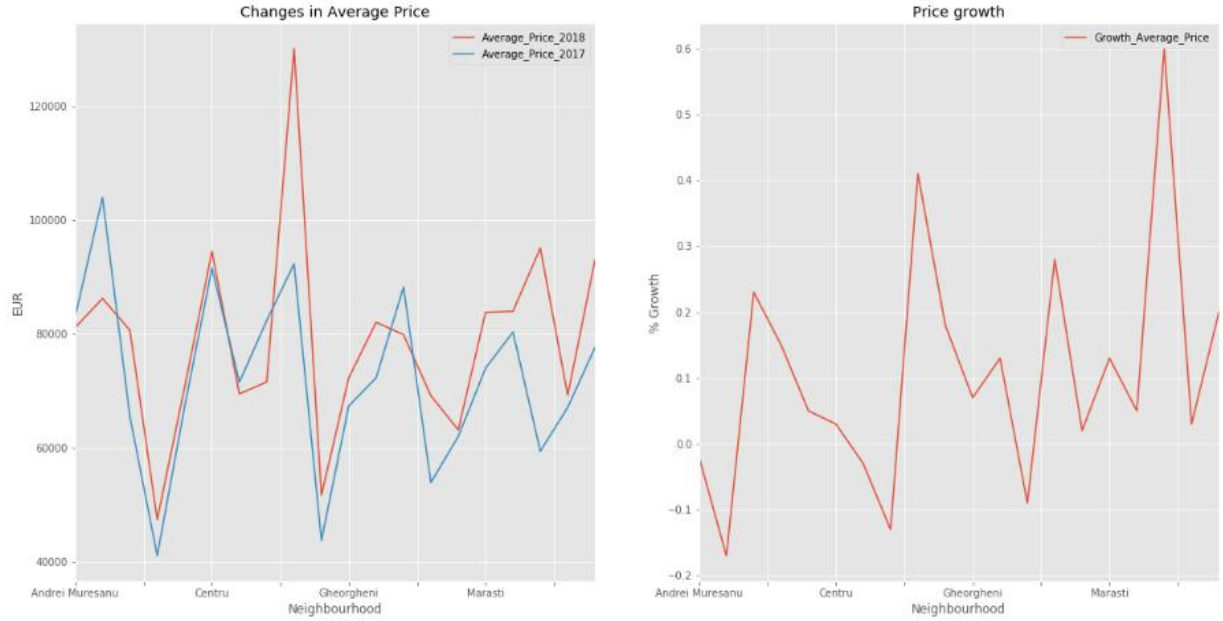

Fig 5 - Price fluctuations per neighbourhood 2017 - 2018

Another way to look at it:

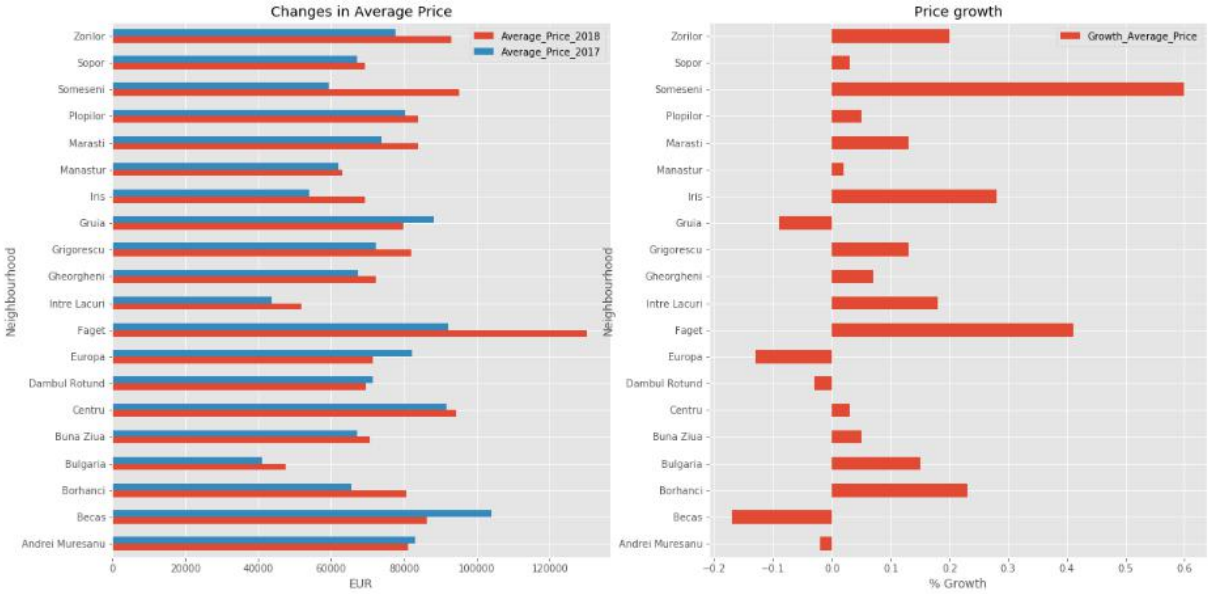

Fig 6 - Price fluctuations per neighbourhood 2017 - 2018

While the transactions funded by cash is like this:

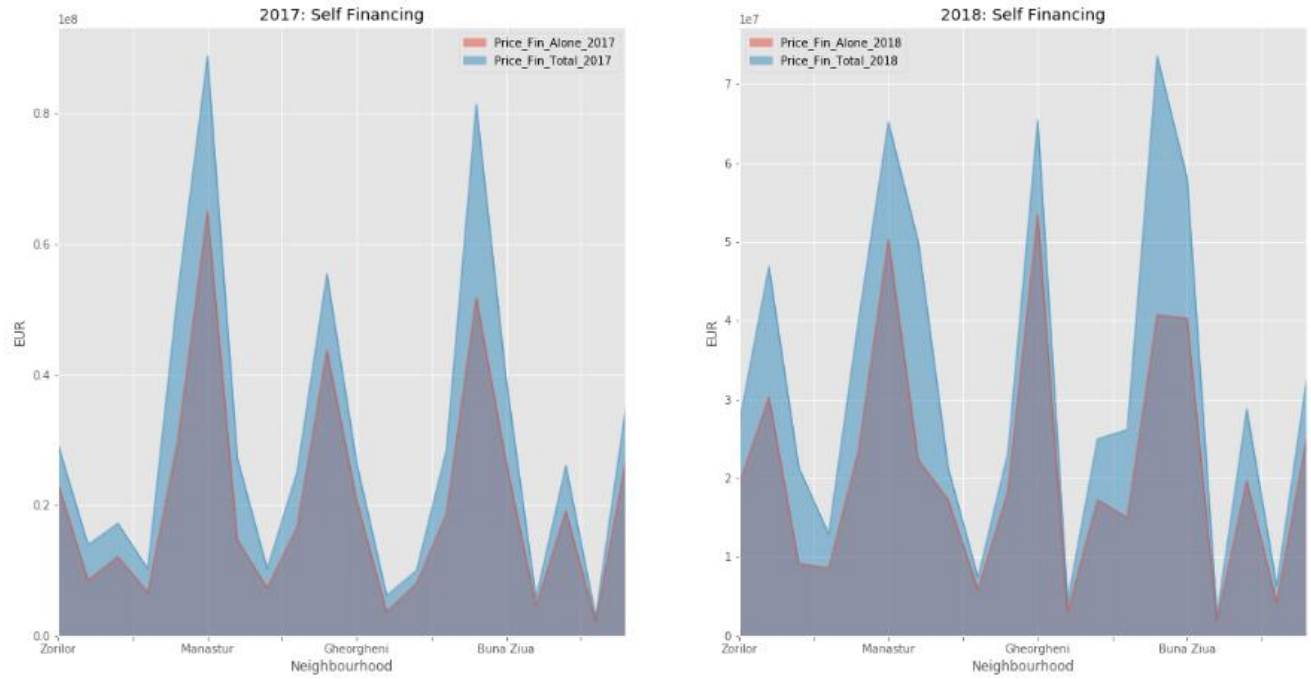

Fig 7 - Transactions funded by cash in comparison to total transactions

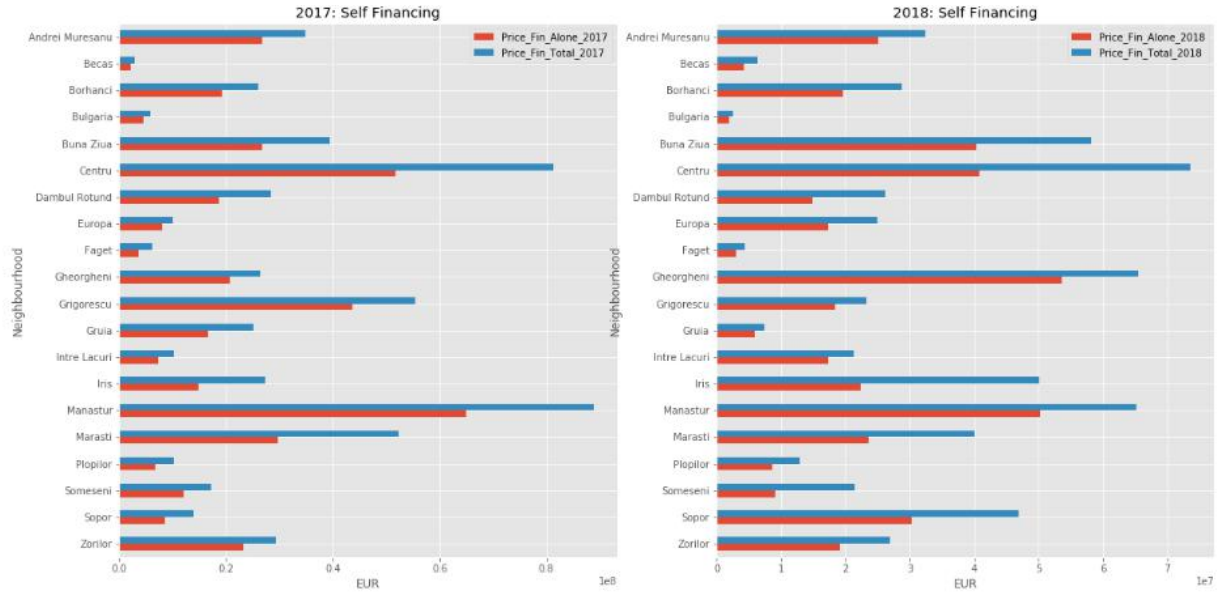

Fig 8 - Transactions funded by cash in comparison to total transactions

Supply

The supply side was explored and identified using Foursquare.

The search for venues rendered a total of 381 values. From those, only the ones containing the word “gym” as category were selected for further processing and the result was as follows:

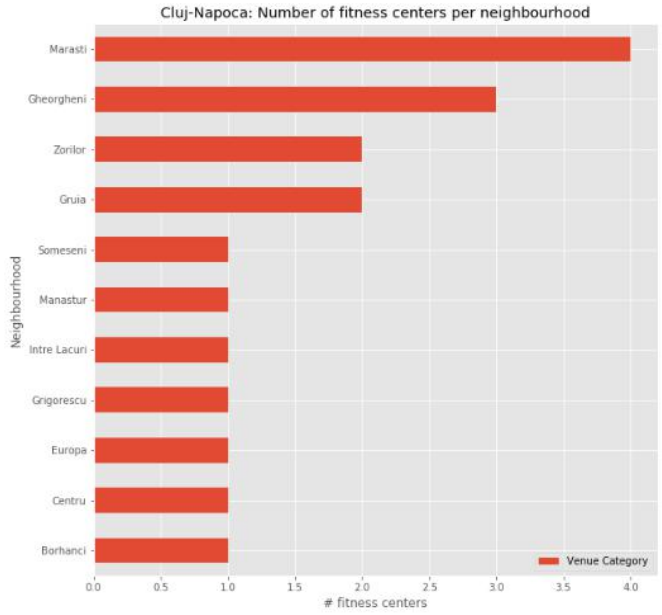

Fig 8 - Number of fitness centers per neighbourhood

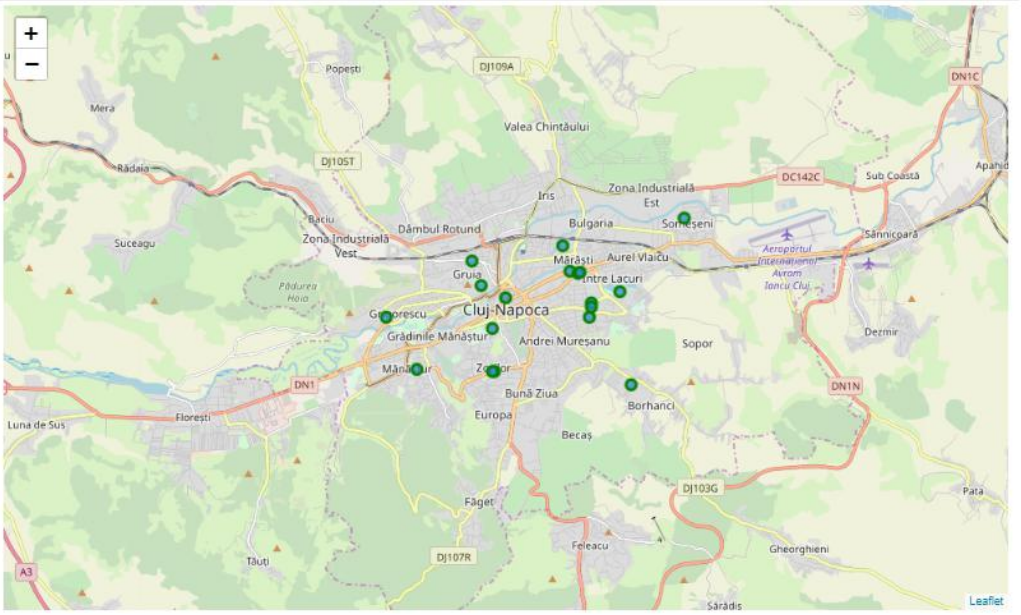

Fig 9 - Map of fitness centers in Cluj

In can be seen that very few centers are available and the potential for investment seems large.

RESULTS

Based on the above it is clear that the investment in health and fitness centers is needed. In the entire city of Cluj only 18 centers are available.

Further analysis of the demand shows that:

- **Based on the Population Density assumption:** top 5 candidates for investment are Manastur, Gheorgheni, Marasti, Intre Lacuri and Zorilor.
- **Based on the Growth assumption**: top 5 candidates for investment are Sopor, Becas, Europa, Buna Ziua, Gheorgheni.
- **Based on the Wealth assumption**: top 6 candidates for investment are Andrei Muresanu, Becas, Europa, Faget, Grigorescu, Zorilor. The wealthiest neighbourhoods were identified by taking the intersection of the top 10 areas with the highest average price and top 10 with the highest percentage of cash transactions in 2017 and 2018.

Bringing in the supply data (see Table 3), it can be concluded that from the identified demand:

- Becas and Sopor have no centers even though they had a significant growth in the past two years.
- Faget, Buna Ziua, Andrei Muresanu have no centes and Europa has only one even though they seem to be wealthy neighbourhoods.
- Marasti, Gheorgheni, Zorilor, Grigorescu, Manastur and Intre Lacuri have few centers for the population density they contain.

Neighbourhood	Venue Category	Population Density	Growth_Total	Average_Price_2018	Average_Price_2017	Growth_Average_Price	Per_Fin_Alone_2017	Per_Fin_Alone_2018
Marasti	4.0	37897.0	1.34	83825	74022	0.13	0.57	0.59
Gheorgheni	3.0	38311.0	4.55	72338	67396	0.07	0.78	0.82
Zorilor	2.0	25328.0	2.19	93004	77657	0.20	0.79	0.71
Europa	1.0	1319.0	7.73	71596	82347	-0.13	0.80	0.69
Grigorescu	1.0	22114.0	3.42	82045	72311	0.13	0.79	0.79
Manastur	1.0	80731.0	2.43	63200	62049	0.02	0.73	0.77
Intre Lacuri	1.0	27766.0	1.50	51742	43838	0.18	0.72	0.81
Andrei Muresanu	NaN	6990.0	3.49	81140	83015	-0.02	0.77	0.77
Becas	NaN	286.0	23.67	86222	103932	-0.17	0.74	0.67
Faget	NaN	588.0	1.62	130026	92305	0.41	0.59	0.69
Sopor	NaN	796.0	26.08	69266	67147	0.03	0.61	0.65
Buna Ziua	NaN	4116.0	5.19	70680	67269	0.05	0.68	0.69

Table 3 - Summary of neighbourhoods' data

DISCUSSION

The numbers above speak for themselves - Cluj is is need of fitness centers.

The characteristic's of the population emphasize the need as well. The employment market is dominated by the services sector, containing 51% of the workforce. This in turn is characterized by static jobs and therefore, the need to exercise the body in order to maintain good health and life quality is essential.

Also, the students make up approximately 30% of the population and by nature they want to keep a healthy life style.

It is not only about the population desire to work out, fitness centers play an important role in health care costs as well. As the Greek saying goes: "a sound mind is in a sound body". The healthier the population is physically, the healthier it will also be emotionally and mentally and the lower the health care costs, which are financed by the government.

In short, my recommendation is to build the health and fitness centers in the identified neighbourhoods.

CONCLUSION

Cluj-Napoca is a growing city in need of health and fitness centers. For a population of 350,000 without students and approximately 430,000 with students from other areas of the country, it only has 18 centers.

While the entire city shows good potential investment, based on population density, growth and wealth 12 out of the 20 neighbourhoods stand out: Andrei Muresanu, Becas, Buna Ziua, Europa, Faget, Gheorgheni, Grigorescu, Intre Lacuri, Manastur, Marasti, Sopor, Zorilor.

FURTHER DIRECTIONS

This study can be further developed and used to identify the type of fitness center that best fits each neighbourhood's population. Data on disposable income, age, proximity to parks are a couple of variables that could be gathered to identify the specific services, type of memberships, and prices to be offered. Also, potential revenue and return on investment may be calculated.

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APPENDIX

Table1 : Dropped features and the reason for it

Feature Name	Feature Definition	Reason
Type_Land_2017	Number of land properties purchased in 2017	Redundant
Type_House_2017	Number of house properties purchased in 2017	Redundant
Type_Condo_2017	Number of condo properties purchased in 2017	Redundant
Type_Others_2017	Number of other properties purchased in 2017	Redundant
Type_Total_2017	Number of total properties purchased in 2017	Redundant
Type_Fin_Alone_2017	Number of properties purchased by cash in 2017	Irrelevant
Type_Fin_Bank_2017	Number of properties purchased by mortgage in 2017	Irrelevant
Price_Land_2017	EURs spent on land transactions in 2017	Redundant
Price_House_2017	EURs spent on house transactions in 2017	Redundant
Price_Condo_2017	EURs spent on condo transactions in 2017	Redundant
Price_Others_2017	EURs spent on other real estate in 2017	Redundant
Type_Land_2018	Number of land properties purchased in 2018	Redundant
Type_House_2018	Number of house properties purchased in 2018	Redundant
Type_Condo_2018	Number of condo properties purchased in 2018	Redundant
Type_Others_2018	Number of other properties purchased in 2018	Redundant
Type_Total_2018	Number of total properties purchased in 2018	Redundant
Type_Fin_Alone_2018	Number of properties purchased by cash in 2018	Irrelevant
Type_Fin_Bank_2018	Number of properties purchased by mortgage in 2018	Irrelevant
Price_Land_2018	EURs spent on land transactions in 2018	Redundant
Price_House_2018	EURs spent on house transactions in 2018	Redundant
Price_Condo_2018	EURs spent on condo transactions in 2018	Redundant
Price_Others_2018	EURs spent on other real estate transactions in 2018	Redundant
Price_Fin_Bank_2017	Total mortgage real estate transactions in 2017	Redundant
Price_Fin_Bank_2018	Total mortgage real estate transactions in 2018	Redundant
Per_Fin_Bank_2017	% of real estate transactions paid by mortgage in 2017	Redundant
Per_Fin_Bank_2018	% of real estate transactions paid by mortgage in 2018	Redundant