

Starting a gym/fitness area in Metro Manila

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1. Introduction

The Philippines is an island country in South-East Asia with a population of more than 100 million [<https://www.psa.gov.ph/content/highlights-philippine-population-2015-census-population>]. It is the 8th most populated country in Asia, and 12th most populated country in the world [https://en.wikipedia.org/wiki/List_of_countries_and_dependencies_by_population]. It is also an emerging economy - currently it is the 36th largest economy by GDP in the world [[https://en.wikipedia.org/wiki/List_of_countries_by_GDP_\(nominal\)](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal))] and is projected to grow to be the 20th largest by 2050 [<http://www.goldmansachs.com/our-thinking/archive/archive-pdfs/brics-book/brics-chap-13.pdf>].

Metro Manila is the most densely populated metropolitan area in the Philippines, and the 5th most densely populated in the world [https://en.wikipedia.org/wiki/List_of_largest_cities]. It also accounts for 37.2% of the Philippine GDP [https://en.wikipedia.org/wiki/Economy_of_the_Philippines].

As an economy grows and the population get more spending power, so will the need for non-essential goods and services. For this reason, I would like to look at the best place to setup gym/fitness area in Metro Manila - mainly because it accounts for a large part of the economy, and there is good access to a large population. With this, we can now determine our problem statement:

2. Problem Statement

Which area should I set up a new gym/fitness area in Metro Manila?

For the scope of this capstone, we need to look at two things:

1. Size of potential market - Having a large potential customer base would be a big factor in starting a business. We can determine this by picking districts from the cities with the largest per capita income. We will be looking at this in combination with population density.
2. Competitors in the area - Having competitors in the area is also a big factor. Putting a business where there are no competing establishments would benefit us positively. We will determine this by getting data on nearby venues in foursquare, and by checking the venue types related to gyms and recreation.

3. Data Sources and cleaning

The list of cities in Metro Manila, along with the population densities, were scraped from the Metro Manila Wikipedia page (https://en.wikipedia.org/wiki/Metro_Manila). Data on income per capita in Metro Manila was downloaded from the Philippine Statistics Authority website. <https://psa.gov.ph/sites/default/files/attachments/hsd/article/Table%202%20AVERAGE%20PER%20CAPITA%20INCOME%20AND%20AGE%20PER%20CAPITA%20EXPENDITURE.pdf>

The respective districts in the target cities in Metro Manila was determined from ZIP code data that was scraped from Wikipedia page of the List of ZIP codes in the Philippines https://en.wikipedia.org/wiki/List_of_ZIP_codes_in_the_Philippines.

Data on the venues in the selected districts were queried using the Foursquare Places APIs.

4. Methodology

4.1 Population Density

To select the best city for setting up a gym/fitness area, the first factors considered were population and income. Population density was calculated by taking the total population of each city and dividing it by the area (Figure 1).

City	Population	AreaKM	Density
Manila	1780148.0	42.88	41514.645522
Mandaluyong	386276.0	11.06	34925.497288
Caloocan	1583978.0	53.33	29701.443840
Pasig	755300.0	31.46	24008.264463
Malabon	365525.0	15.96	22902.568922
Pasay	416522.0	18.64	22345.600858
Navotas	249463.0	11.51	21673.588184
Makati	582602.0	27.36	21293.932749
San Juan	122180.0	5.87	20814.310051
Marikina	450741.0	22.64	19909.054770
Las Piñas	588894.0	32.02	18391.442848
Taguig	804915.0	45.18	17815.737052
Quezon City	2936116.0	165.33	17759.124176
Parañaque	664822.0	47.28	14061.379019
Valenzuela	620422.0	45.75	13561.136612
Muntinlupa	504509.0	41.67	12107.247420

FIGURE 1. CITIES IN METRO MANILA SORTED BY POPULATION DENSITY

4.2 Per capita income

Cities were then sorted by per-capita income as first priority, and population density.

From this data, the top city was selected for area and venue selection. Makati turned out to be the top city in Metro Manila in terms of per capita income (140,275PHP), and in the top 8 cities in terms of population density (Figure 2).

City	Population	AreaKM	Density	PerCapitalIncome
Makati	582602.0	27.36	21293.932749	140275.0
San Juan	122180.0	5.87	20814.310051	103855.0
Las Piñas	588894.0	32.02	18391.442848	93172.0
Quezon City	2936116.0	165.33	17759.124176	75465.0
Parañaque	664822.0	47.28	14061.379019	75207.0
Pasig	755300.0	31.46	24008.264463	73961.0
Mandaluyong	386276.0	11.06	34925.497288	67143.0
Manila	1780148.0	42.88	41514.645522	60687.0
Pasay	416522.0	18.64	22345.600858	57212.0
Muntinlupa	504509.0	41.67	12107.247420	57121.0
Caloocan	1583978.0	53.33	29701.443840	52855.0
Taguig	804915.0	45.18	17815.737052	52528.0
Marikina	450741.0	22.64	19909.054770	51198.0
Malabon	365525.0	15.96	22902.568922	50720.0
Valenzuela	620422.0	45.75	13561.136612	46603.0
Navotas	249463.0	11.51	21673.588184	31431.0

FIGURE 2: CITIES SORTED PER CAPITA AND DENSITY

All cities that rank higher than Makati in terms of population density earn less than half in terms of income per capita. For instance, Manila is the densest city in terms of population, but per capita income is less than half compared to Makati (60,687PHP). Pasig

is the closest in terms of population density, but is still about half compared to per capita income (73,961PHP).

San Juan comes in second in terms of per capita, but there is a difference of almost 40,000PHP per capita. The population density is comparable to Makati's, although the land area covered is much less (5.87 sqKM). Las Piñas is also a good candidate, even if the difference in per capita with Makati is almost 50,000PHP.

Quezon City comes in at 4th and has good per capita income of 75,000PHP but the difference with Makati is almost double per capita (and also illustrates the wealth discrepancies between districts in the Philippines).

City	Population	AreaKM	Density	PerCapitalIncome	TotalIncome
Makati	582602.0	27.36	21293.932749	140275.0	2.987006e+09
Manila	1780148.0	42.88	41514.645522	60687.0	2.519399e+09
Mandaluyong	386276.0	11.06	34925.497288	67143.0	2.345003e+09
San Juan	122180.0	5.87	20814.310051	103855.0	2.161670e+09
Pasig	755300.0	31.46	24008.264463	73961.0	1.775675e+09
Las Piñas	588894.0	32.02	18391.442848	93172.0	1.713568e+09
Caloocan	1583978.0	53.33	29701.443840	52855.0	1.569870e+09
Quezon City	2936116.0	165.33	17759.124176	75465.0	1.340192e+09
Pasay	416522.0	18.64	22345.600858	57212.0	1.278437e+09
Malabon	365525.0	15.96	22902.568922	50720.0	1.161618e+09
Parañaque	664822.0	47.28	14061.379019	75207.0	1.057514e+09
Marikina	450741.0	22.64	19909.054770	51198.0	1.019304e+09
Taguig	804915.0	45.18	17815.737052	52528.0	9.358250e+08
Muntinlupa	504509.0	41.67	12107.247420	57121.0	6.915781e+08
Navotas	249463.0	11.51	21673.588184	31431.0	6.812226e+08
Valenzuela	620422.0	45.75	13561.136612	46603.0	6.319896e+08

FIGURE 3. MARKET SIZE ESTIMATION FROM PER CAPITA INCOME AND DENSITY

To get a better picture of the potential market size, we'll get the total income for each city by multiplying the per-capita income by the population density (Figure 3), which gives us an estimate of the available income for the area considering both factors (population and income).

From this we can see that Makati is the top city. We will pick Makati for the city in this analysis, as this gives us the best access to a good market size - it has good access to a dense population with high income.

4.3 Venue types and frequencies

Apart from market size, the other important factor that we need to look at when selecting an area for setting up a gym/fitness area is the competition - if there are any venue types that are the same or similar. To do this, we need to look at all gyms and sport/fitness areas in Makati's districts. Having sport clubs and gyms existing in an area would be competition for our business as they also target the same group of people looking for recreational activities. We'll use the major sports played in the Philippines as an identifier for which venues we will select [https://en.wikipedia.org/wiki/Sport-s_in_the_Philippines]. We'll filter the venues by Venue Category, and we will only take the venues of the following types:

- Yoga studios
- Volleyball courts
- Basketball courts
- Soccer/Football fields
- Boxing gyms

- Athletics gyms
- Badminton courts
- All other gyms
- Recreation areas (other general purpose gyms that are set up for each district)
- Fitness centers

Using the list of districts in Makati City, we queried the Foursquare API to get the list of available venues in the districts. This list was further narrowed down to the types mentioned above, and visualized using Folium to confirm area coverage (Figure 4).

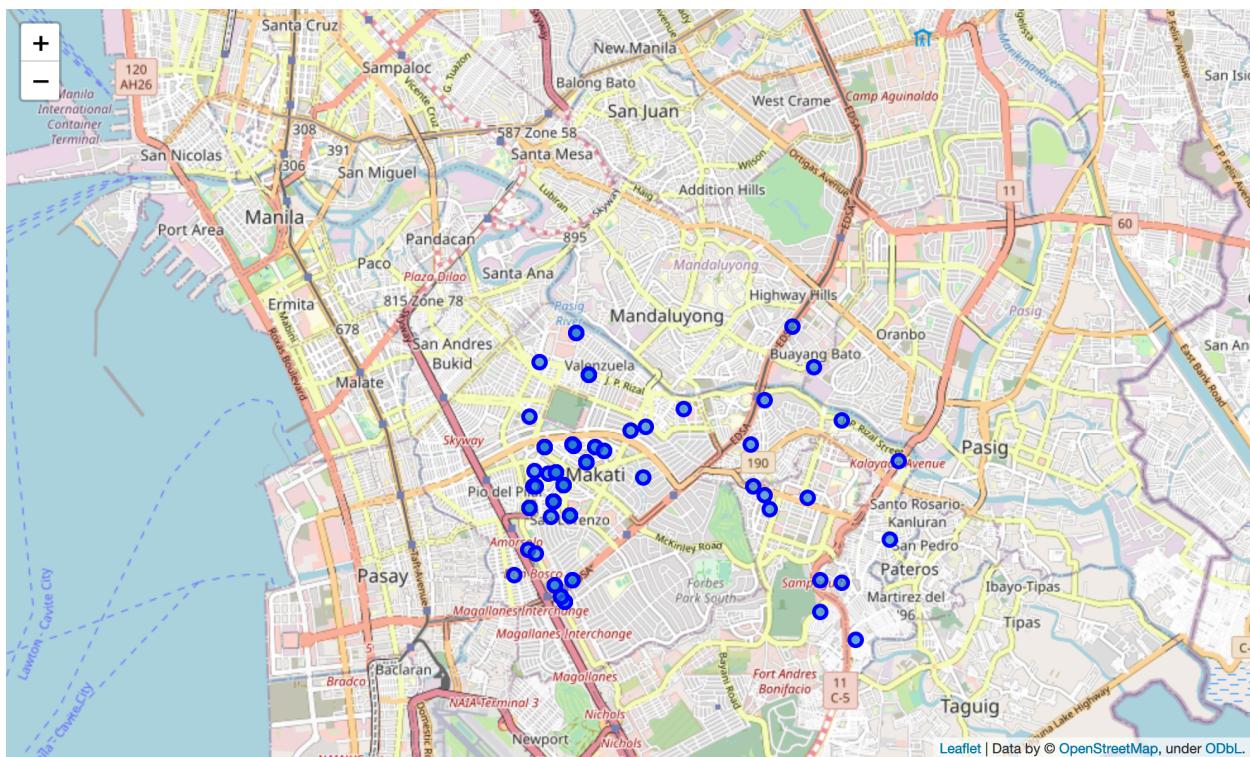


FIGURE 4: MAP OF COMPETING VENUE TYPES IN MAKATI

The frequencies of venues with competing types in Makati was analyzed by plotting using bar charts. Figure 5 shows a plot of all the unique competing venue types in

Makati. The most frequent type is Gym, followed by Yoga Studio and Gym/Fitness (which is similar to Gym).

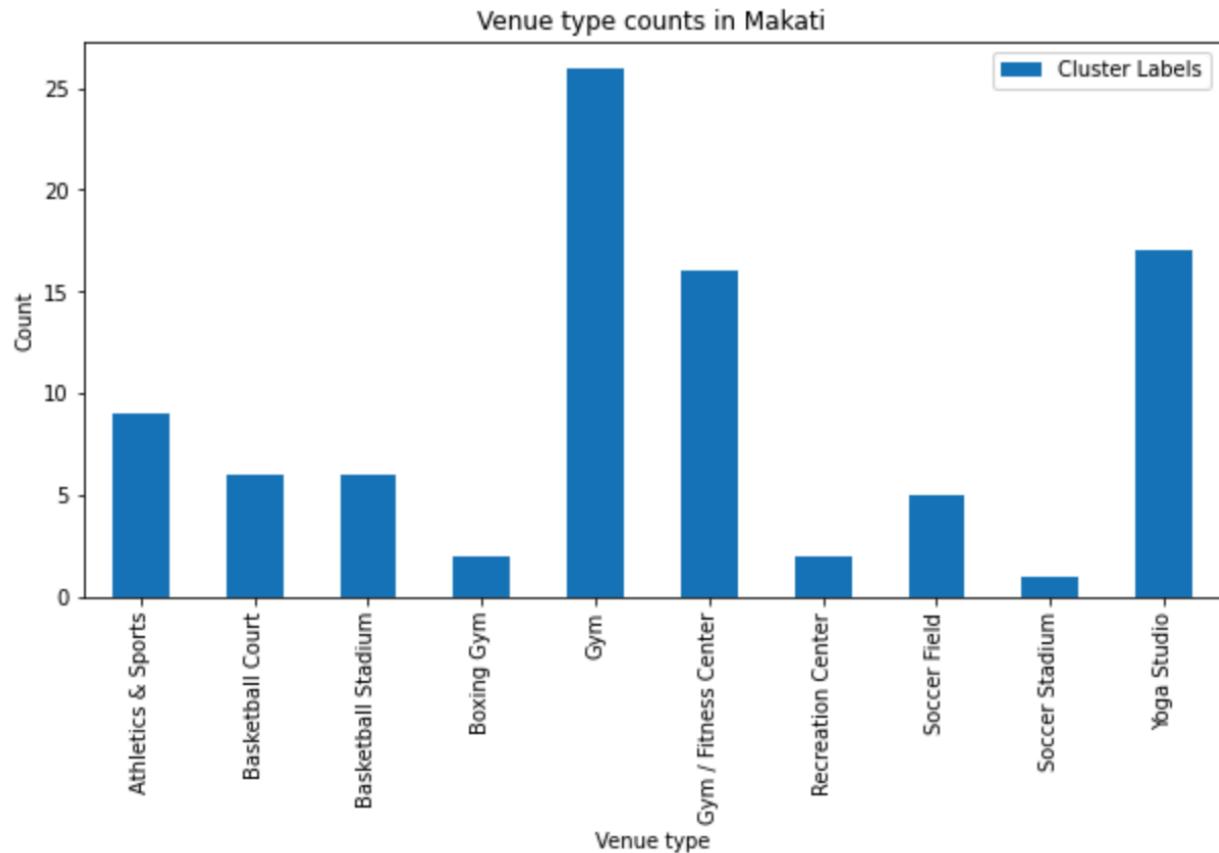


FIGURE 5: PLOT OF VENUE TYPE COUNTS FOR THE CITY OF MAKATI

4.4 Cluster analysis

Because of the amount of competing venues in Makati, we need to pick the districts which have the least competition. To do this, we used k-means clustering. We clustered the districts in Makati using the frequencies of venues in each area, with **k = 5**.

Figure 6 shows the map of the venues, clustered by venue frequency type.

To compare the venue types within each cluster, we analyzed the frequency of venues for each of the clusters.

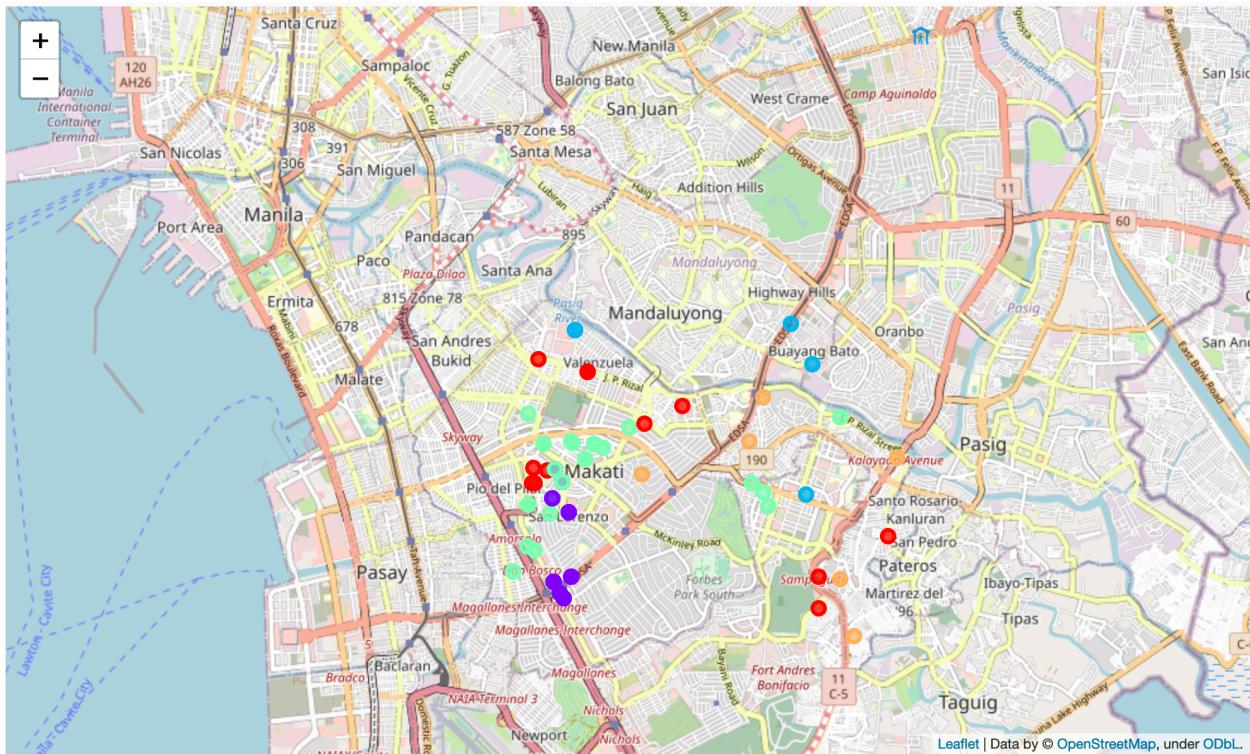


FIGURE 6: VENUES CLUSTERED VIA K-MEANS CLUSTERING (K = 5)

For each cluster, a bar plot was generated to visualize the frequency of each venue type (Figure 7). In cluster 0, the most frequent venue type is Basketball Stadium/Court. The second most is Gym/Fitness Center. In cluster 1, the top two types are other Gym or Gym/Fitness Center. In cluster 2, the top type is Basketball Court. In cluster 3, the top type is Yoga Studio, with Gym coming in second. For cluster 4, the top two types are Gym/Fitness Center, and Soccer Field.

From this data, we picked cluster 2, which had a notable absence of the competing venue type.

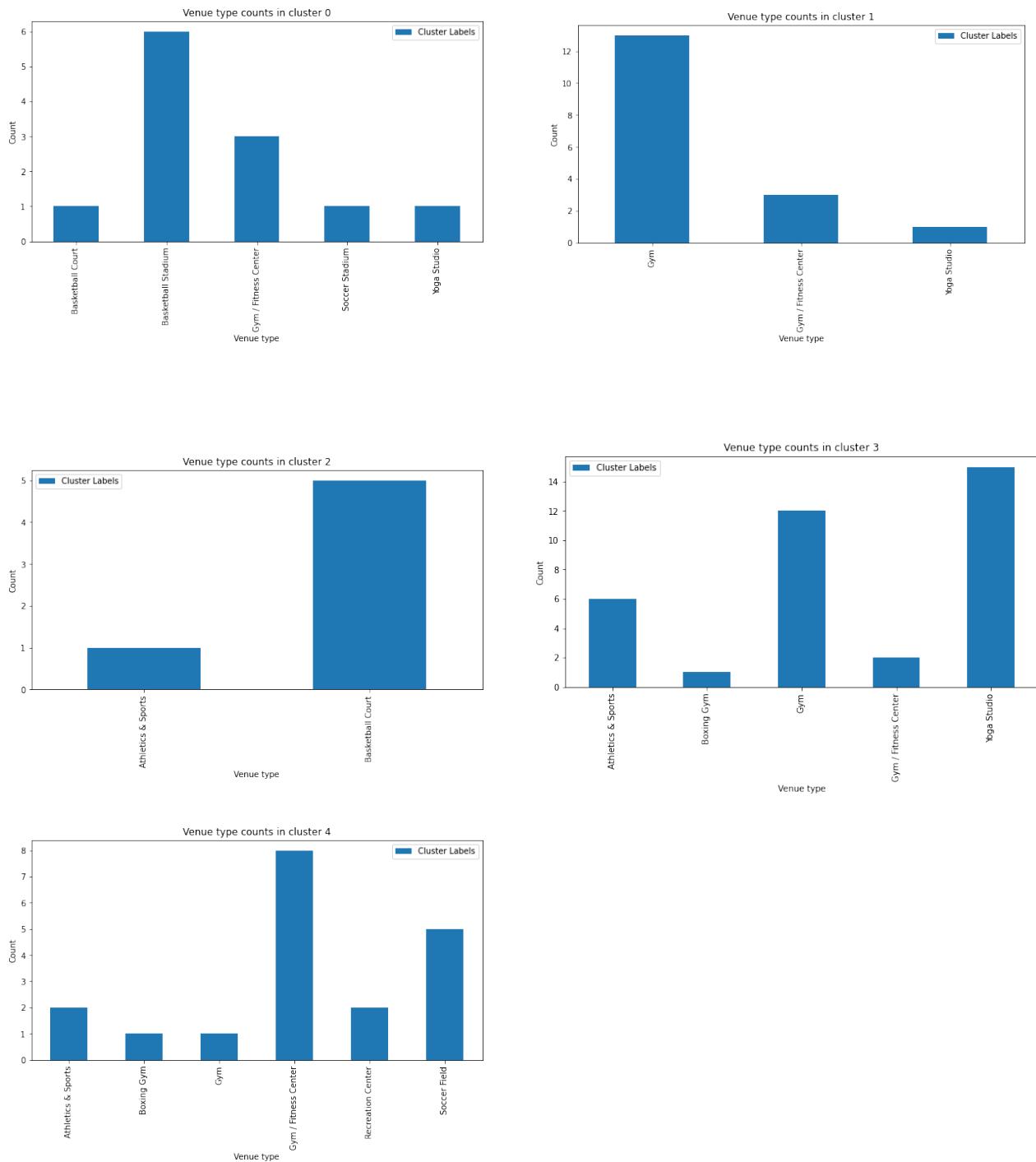


FIGURE 7: VENUE FREQUENCIES FOR EACH CLUSTER

Next, we look at the areas in cluster 2 to see the candidate districts for setting up our new business:

- Rizal Commercial Banking Corporation (RCBC Plaza)
- Cembo and South Cembo
- East Rembo–Malapad na Bato
- Pembo
- Pio del Pilar

5. Results

To set up a new gym/fitness area in Metro Manila, we looked at population, income per-capita and competing businesses to select potential areas of interest for setting up our business. From our analysis, we found that Makati City is the city with the largest market in terms of population and per-capita income. We looked at the venues in Makati that competed with our business, and clustered the areas/districts in Makati based on venue frequency to find which cluster of areas are the best candidates in starting our business. From this, we found 5 potential areas of interest:

- Rizal Commercial Banking Corporation (RCBC Plaza)
- Cembo and South Cembo
- East Rembo–Malapad na Bato
- Pembo
- Pio del Pilar

All five areas are in the city of Makati, have good access to a dense population, and lack of competing venues in the area.

6. Conclusion

In our analysis, by looking at the data on per-capita and income, we found that Makati City has a good potential for setting up a gym/fitness area. We found 5 districts/areas in Makati that has a low frequency of competing venues via cluster analysis. This analysis is helpful in narrowing down potential markets in Makati (and in turn Metro Manila), which can help businesses get started in one of the largest emerging markets in the world.

7. Recommendations

The per-capita information here was based on per-capita income on a city level. Data from the Philippine Statistics Agency is limited to per-capita income on a city level. A better understanding of district/area income would help us better select a potential location in the future.

Also, our analysis was limited by the number of venues available via the Foursquare Places API. Metro Manila (and Makati) is a large metropolis with a very dense urban area, where many “informal” businesses are set up - and might not be available in any official database. Depending on the venue type you are analyzing, it is useful to also look at other venue data sources.

Another factor used in selecting a location is the value of real estate. Unfortunately there is no data available on this from the Philippine Statistics Agency, and this factor was not included in this analysis. In the future, if the data is available, it is recommended to take into account the value of real estate in selecting the location for a business.