



# BATTLE OF THE NEIGHBORHOODS

NEW YORK CITY AND TORONTO



# CONTENTS

1. Introduction
  2. Data
  3. Methodology
  4. Results and Discussion
  5. Conclusion
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# 1. Introduction

The Umbrella Corporation is considering expanding to North America where there is potentially a large demand for their services. One of their businesses is a boutique targeting the mass affluent market. They want to explore whether the cities of New York or Toronto which could both be potential locations for the new North American business.

## Objectives

They have commissioned this project to analyse both cities, based on the following objectives:

- How large is the population, and therefore what is the size of the potential target for the local customer base?
- What are some of the key characteristics of some of the larger neighbourhoods in each city?
- What are the typical salary levels in each city? As we will have to recruit staff and will also be helpful for some of our relocating employees.
- What are the typical housing costs for each city? Will also be useful data to identify the higher and lower income neighbourhoods.
- What are the main types of retailers and other businesses already established? To give an indication of potential competitors and partners.

## 2. Data

The data is based on a number of open sources. The methodology to obtain the data will vary depending on the source.

Wherever possible the data is collected directly from the webpages, either through scraping or by reading downloadable csv or Excel files.

Businesses data from Foursquare is obtained from their open API for developers.

The intention is to report on the following items:

- Overall population levels in each city and some information on neighbourhood populations where available.
- Demographic data, showing average incomes.
- Housing costs, including average rents.
- The nature and distribution of different types of businesses and amenities in a selection of neighbourhoods in each city.

Main data sources used

	New York City	Toronto
Housing Costs	<a href="https://www.zillow.com/research/data/">https://www.zillow.com/research/data/</a>	<a href="http://trreb.ca/">http://trreb.ca/</a>
Population Data	<a href="https://uspopulation2020.com/population-of-new-york-city-2020-largest-city-of-new-york-state.html">https://uspopulation2020.com/population-of-new-york-city-2020-largest-city-of-new-york-state.html</a> <a href="https://www.census.gov/quickfacts/fact/table/newyorkcountymanhattanboroughnewyork,bronxcountybronxboroughnewyork,queenscountyyqueensboroughnewyork,kingscountybrooklynboroughnewyork,richmondcountystatenislandboroughnewyork,newyorkcitynewyork/INC110218">https://www.census.gov/quickfacts/fact/table/newyorkcountymanhattanboroughnewyork,bronxcountybronxboroughnewyork,queenscountyyqueensboroughnewyork,kingscountybrooklynboroughnewyork,richmondcountystatenislandboroughnewyork,newyorkcitynewyork/INC110218</a>	<a href="https://populationstat.com/canada/toronto">https://populationstat.com/canada/toronto</a>
Income Data	<a href="https://www.averagesalarysurvey.com/new-york-city-united-states">https://www.averagesalarysurvey.com/new-york-city-united-states</a>	<a href="https://www.averagesalarysurvey.com/toronto-canada">https://www.averagesalarysurvey.com/toronto-canada</a>
Geographical Data	US Zip codes with latitude/longitude <a href="https://gist.github.com/erichurst/7882666">https://gist.github.com/erichurst/7882666</a>	Toronto neighborhoods: <a href="https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M">https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M</a>  Latitude and Longitude: <a href="http://cocl.us/Geospatial_data">http://cocl.us/Geospatial_data</a>
Local Businesses Data	Foursquare.com data downloaded using developer open API: <a href="https://foursquare.com/">https://foursquare.com/</a>	

# 3. Methodology

## Housing, population and income data

Data was obtained from open sources online – either scraped directly from the tables on the website or imported using csv or Excel files provided by the sites as downloadable data.

## Business data

Latitude and Longitude coordinates mapped to each location were used for requests made to the Foursquare API server.

Foursquare API “search” and “venues” parameters were used to obtain listings of businesses within a selection of neighborhoods in each city. A maximum of 100 venues per neighborhood within a radius of 500metres was specified.

## Analysis

Extensive side by side comparisons were carried out based on the cities as well as some more detailed analysis for a selection of neighborhoods.

“K- means clustering” (unsupervised machine learning) was used for the analysis.

## Results

Python visualization libraries were used to output the results such as charts as well as interactive map based visuals.

The following Python Libraries were used:

Library	Description/Use
Pandas, Numpy	Data Cleaning, Validation and Analysis
JSON	Working with JSON source files
Geopy	Obtaining location data
Sklearn	Python analytics and machine learning
Matplotlib	Python charts and visualizations
Folium	Mapping library for interactive geospatial visualizations

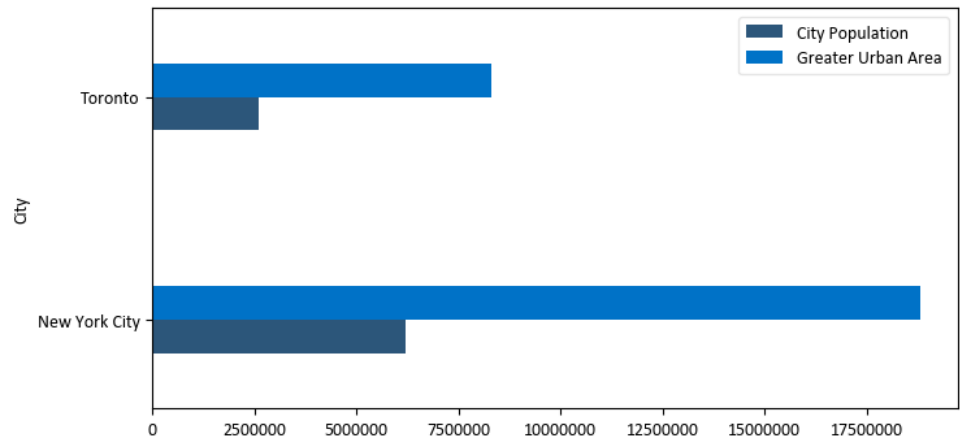


## 4. Results and Discussion



# Population comparison

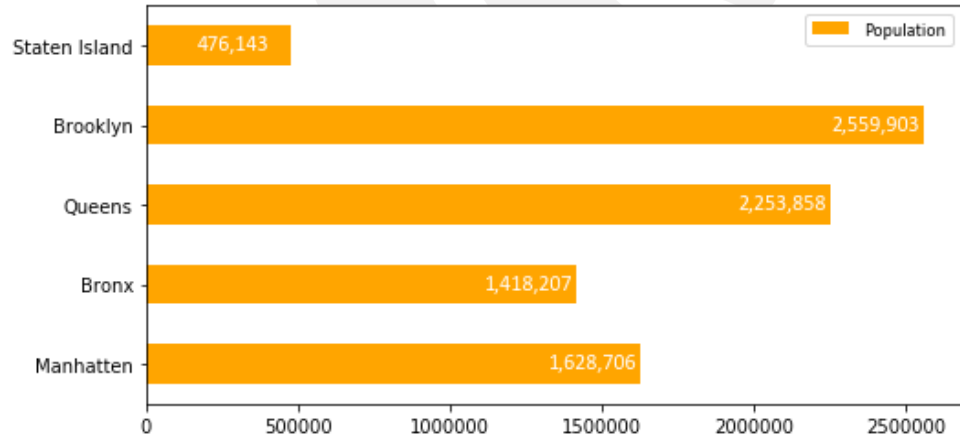
## Overall Population



New York City's population (6.2million) is over twice the size of Toronto's city population (2.6million).

Considering the wider surrounding urban areas, over 18million people live in the greater New York area within commuting distance, compared with 8million for Toronto.

## New York Population by Borough

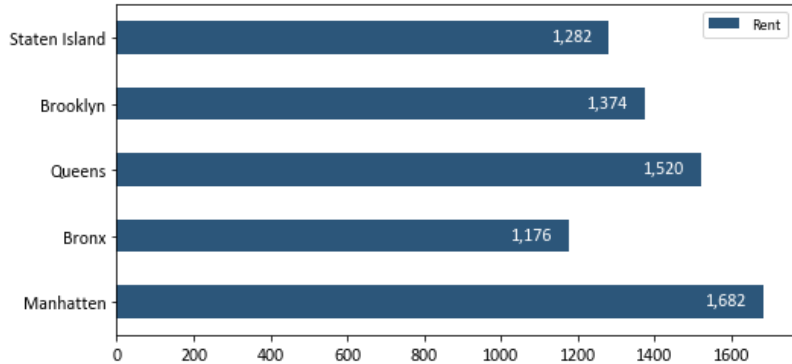


New York City has 5 boroughs. Queens and Brooklyn with 2.5million people are both similar size to the whole population in Toronto's city area.

We have a much larger potential target customer base and potential labour force to hire from in New York.

# New York: Housing Costs and Income Levels

Rental Costs for New York City

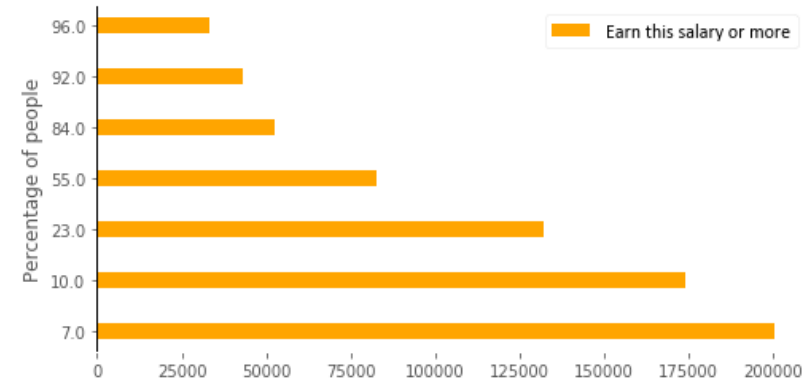


This comparison of housing costs against salary levels provides an indication of disposable income, as rent will usually be one of the largest monthly expenses.

Rental costs are taken from census data and are median values. There is a wide distribution of rents by neighborhood.

Manhattan rents of around \$1,700 per month (\$20,200 p.a.) are over 40% higher than the Bronx. As the business' target customers are higher end businesses this suggests Manhattan as a potential location to consider in more detail.

Distribution of salaries for New York City



Market salary data may be used as reference for budgeting purposes when hiring staff.

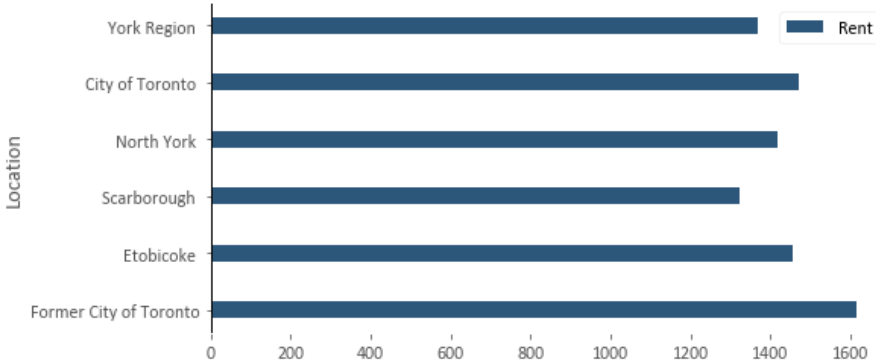
Over 55% of the market survey earn over \$80,000 p.a.

The distribution of salary levels in the survey also suggests that housing costs make up around 25% of income levels.



# Toronto: Housing Costs and Income Levels

Rental Costs for Toronto



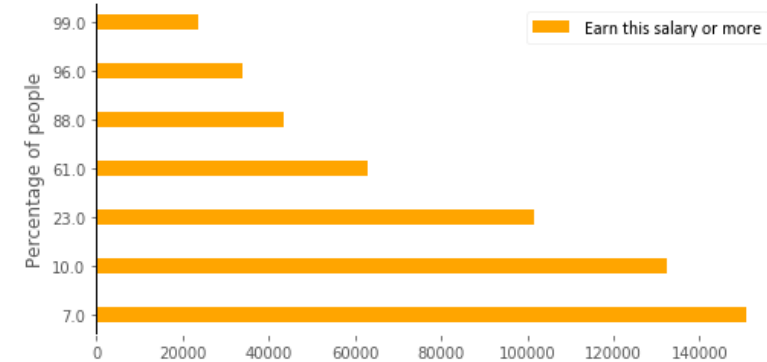
A similar comparison can be made for Toronto.

Rental costs are taken from market survey data and are median values. There is not as much variation in the distribution of rents by neighborhood compared to New York.

Rents of around CAD\$1,600 per month (CAD\$19,200 p.a.) for the “former city of Toronto” neighborhood are around 20% higher than the lowest rent neighborhood of Scarborough.

Also in absolute terms, Toronto is a much cheaper city to live in as US\$1 is around CAD\$1.36.

Distribution of salaries for New York City

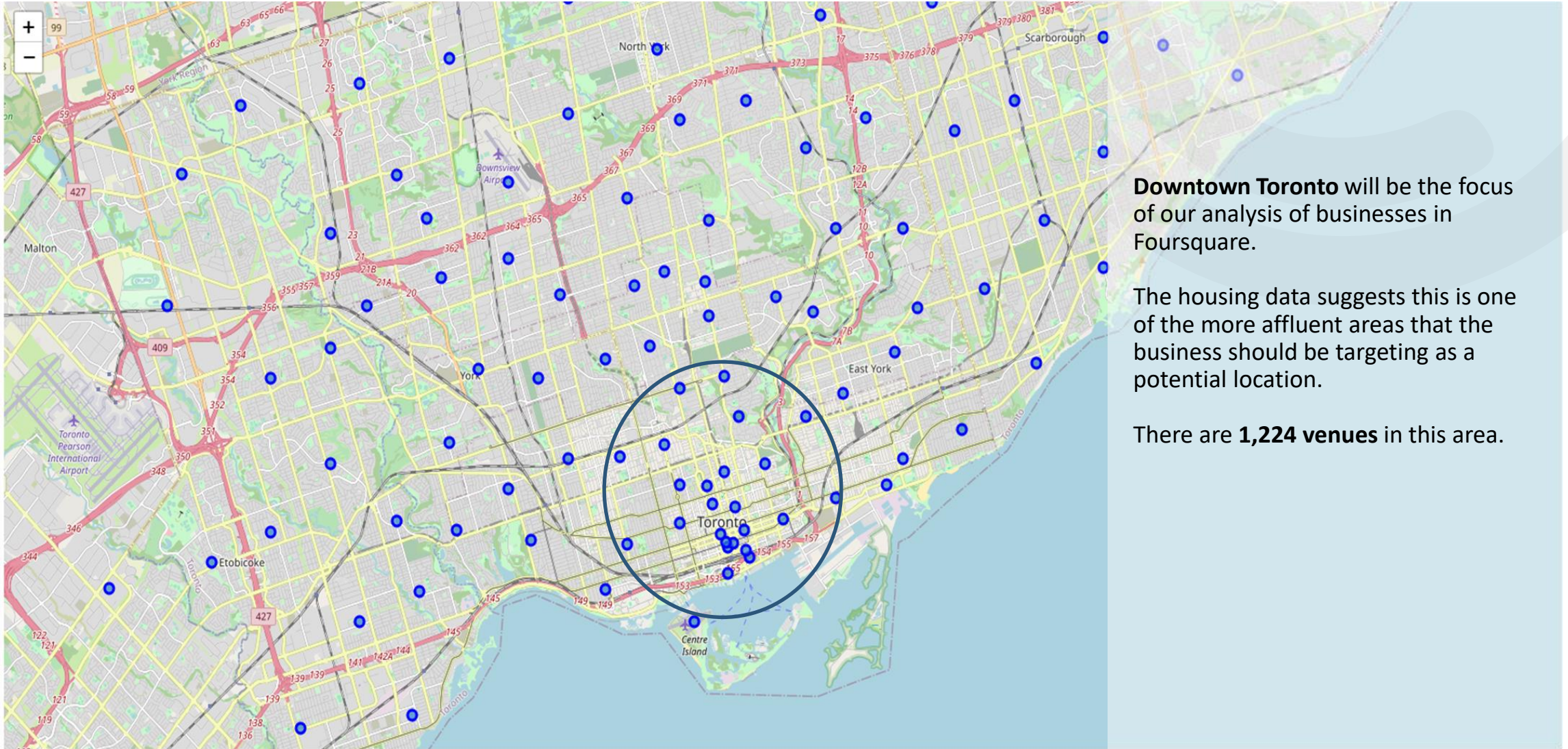


Market salary data may be used as reference for budgeting purposes when hiring staff.

Over 60% of the market survey earn over CAD\$60,000 p.a. (around \$44,000).

The distribution of salary levels in the survey also suggests that housing costs in Toronto make up around 30% of income levels. Therefore customers may have less disposable income in Toronto than in New York. However this would also suggest lower hiring costs.

# Toronto: Downtown



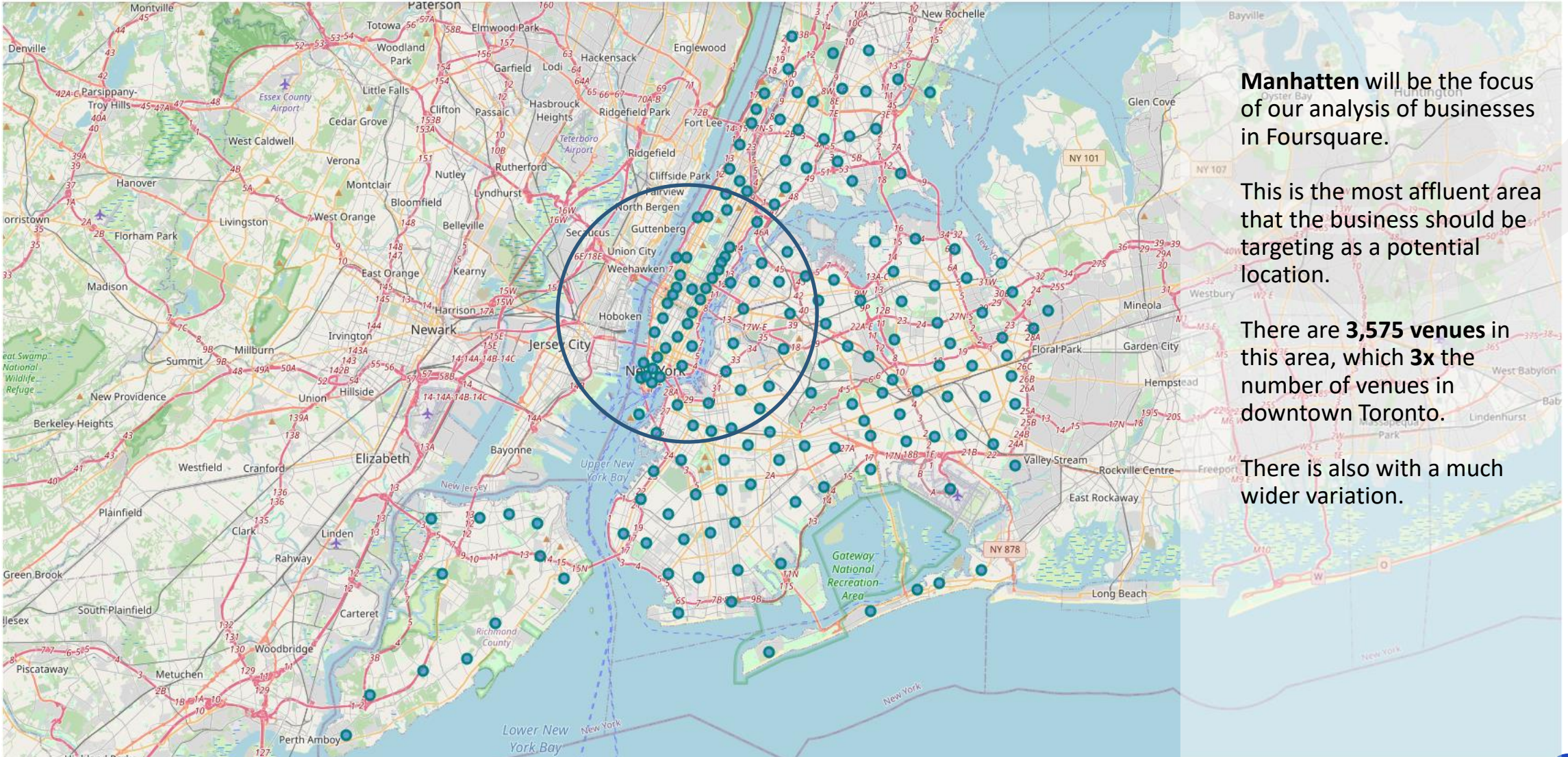
**Downtown Toronto** will be the focus of our analysis of businesses in Foursquare.

The housing data suggests this is one of the more affluent areas that the business should be targeting as a potential location.

There are **1,224 venues** in this area.



# New York: Manhattan



**Manhattan** will be the focus of our analysis of businesses in Foursquare.

This is the most affluent area that the business should be targeting as a potential location.

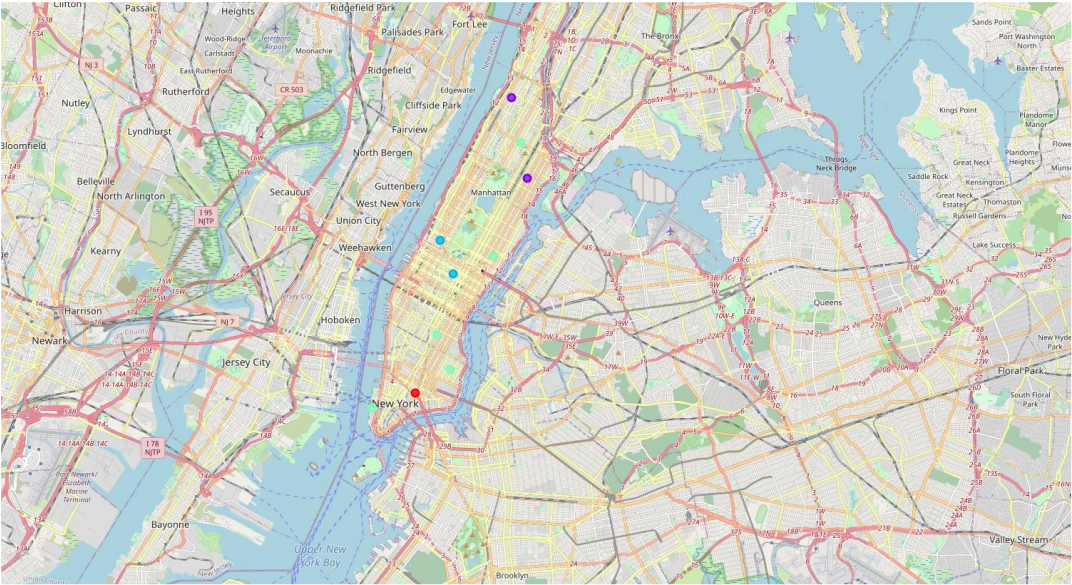
There are **3,575 venues** in this area, which **3x** the number of venues in downtown Toronto.

There is also with a much wider variation.



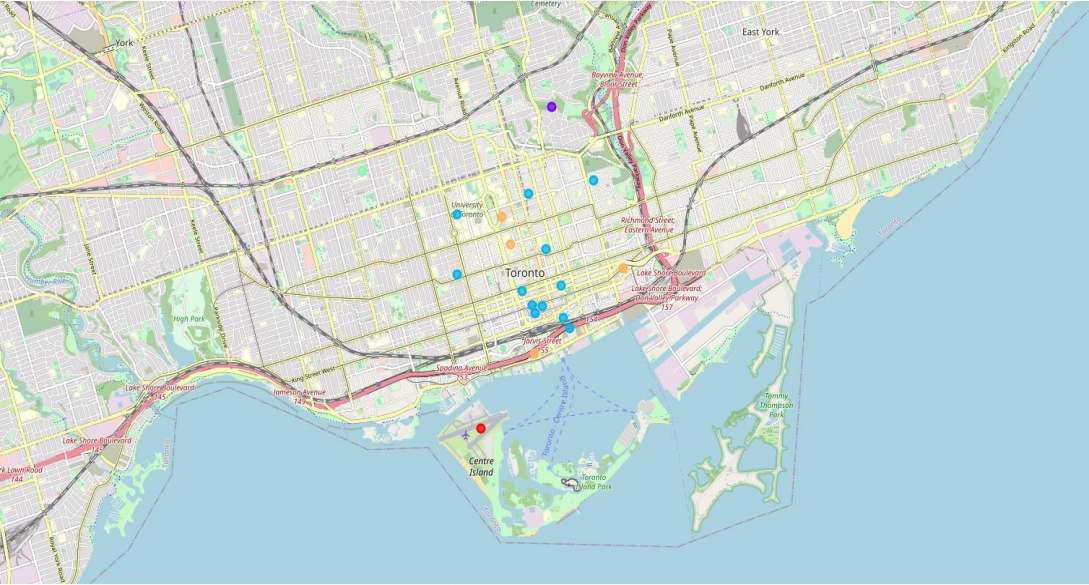
# Foursquare analysis – most common venues

K – means clustering results: Manhattan



Overall Number of venues	3575
Cluster 1	Chinese Restaurant
Cluster 2	Pizza Place, Bakery
Cluster 3	Hotel, Italian Restaurant
Cluster 4	Park, Bar, Wine shop, Coffee Shop, Clothing Store
Cluster 5	Bakery

K – means clustering results: Downtown Toronto



Overall Number of venues	1,224
Cluster 1	Airport Services
Cluster 2	Park
Cluster 3	Coffee Shop
Cluster 4	Grocery Store
Cluster 5	Coffee Shop

# 5. Conclusion

## Manhattan, New York

We would recommend the Manhattan neighborhood in New York based on the following:

- Larger target market of mass affluent customers
- Higher disposable incomes would potentially mean higher sales and revenue.
- Greater diversity of businesses
- Larger pool of potential hires







# THANK YOU!

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[https://github.com/hp-analytica/Coursera\\_Capstone](https://github.com/hp-analytica/Coursera_Capstone)