FINAL REPORT

1. Introduction:

Toronto is Canada's largest city. Its large population of immigrants from all over the globe has also made Toronto one of the most multicultural cities in the world. Toronto is a world leader in areas such as business, finance, technology, entertainment and culture. Its large population of immigrants from all over the globe has also made Toronto one of the most multicultural cities in the world. This means that the market is highly competitive. As it is highly developed city so cost of doing business is also one of the highest. Thus, any new business venture or expansion needs to be analyzed carefully. The insights derived from my analysis will give good understanding of the business environment which will help in strategically targeting the market. This will help in reduction of risk. And the Return on Investment will be reasonable.

Business Problem

Toronto is a global city filled with vast opportunity and is home to an array of distinctive and dynamic neighborhoods that reflect the diversity of its population. The city is known for its vibrant arts and entertainment scene, incredible cultural festivals, delicious food, thriving sports culture, excellent shopping, beautiful parks and beaches, and much more.

By opening for business in Toronto, we must position ourselves in the heart of a thriving metropolis, with incredible opportunities available to us, regardless of the industry.

Sushi restaurants have become very popular and thriving in Canada, now it seems that there is one on every corner, not only in major cities but also in smaller cities. Starting a sushi restaurant can be a great business opportunity, but one needs to distinguish themselves from others to enjoy long-term success in the market.
If you plan a real restaurant that can demand higher prices for fresh fish, delivered daily from Japan, focus on neighborhoods and outlets that already attract a sophisticated Japanese client. If you plan a cheap buffet restaurant, points to the masses looking for affordable high-traffic locations with large shopping centers and other local points of interest.

To plan a real restaurant that could demand higher prices for fresh fish delivered daily from Japan, we should focus on neighborhoods and outlets that already attract a sophisticated Japanese client. If we're planning a cheap buffet restaurant, points to the masses looking for affordable high-traffic locations with large shopping centers and other local points of interest. So, it is evident that to survive in such competitive market it is very important to strategically plan. Various factors need to be studied in-order to decide on the Location.

So, since most of the businesses, shopping centers and entertainment areas are mostly centered in Downtown, Toronto, it would be best to choose a location within Downtown area to set up our sushi restaurant.

My Client has preferred to open his business in Downtown, Toronto area, so I will only be focusing on that borough during my analysis. The objective is to locate and recommend to the management which location in Downtown area will be the best choice to start a

restaurant. The Management also expects to understand the rationale of the recommendations made.

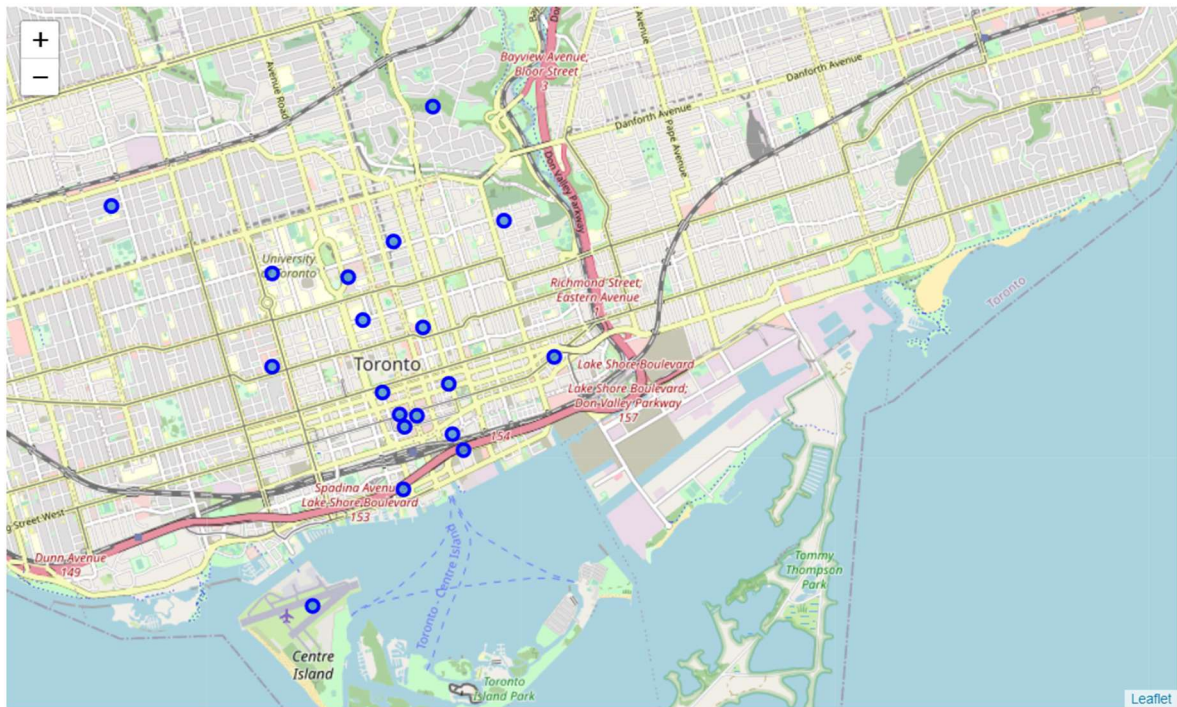This would interest anyone who wants to start a new restaurant in Downtown, Toronto city.

2. Data

Data 1: Neighborhood has a total of 8 boroughs and 140 neighborhoods. In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the 8 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood. This dataset exists for free on the web. Link to the dataset is: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

	Postal Code	Borough	Neighborhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
3	M6A	North York	Lawrence Manor, Lawrence Heights	43.718518	-79.464763
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494

Data 2: Toronto's geographical coordinates data will be utilized as input for the Foursquare API, that will be leveraged to provision venues information for each neighborhood. We will use the Foursquare API to explore neighborhoods in Toronto. The below is image of the Foursquare API data.
In addition, Sushi category Id 4bf58dd8d48988d1d2941735 is used for retrieving data from Foursquare API.

3. Methodology

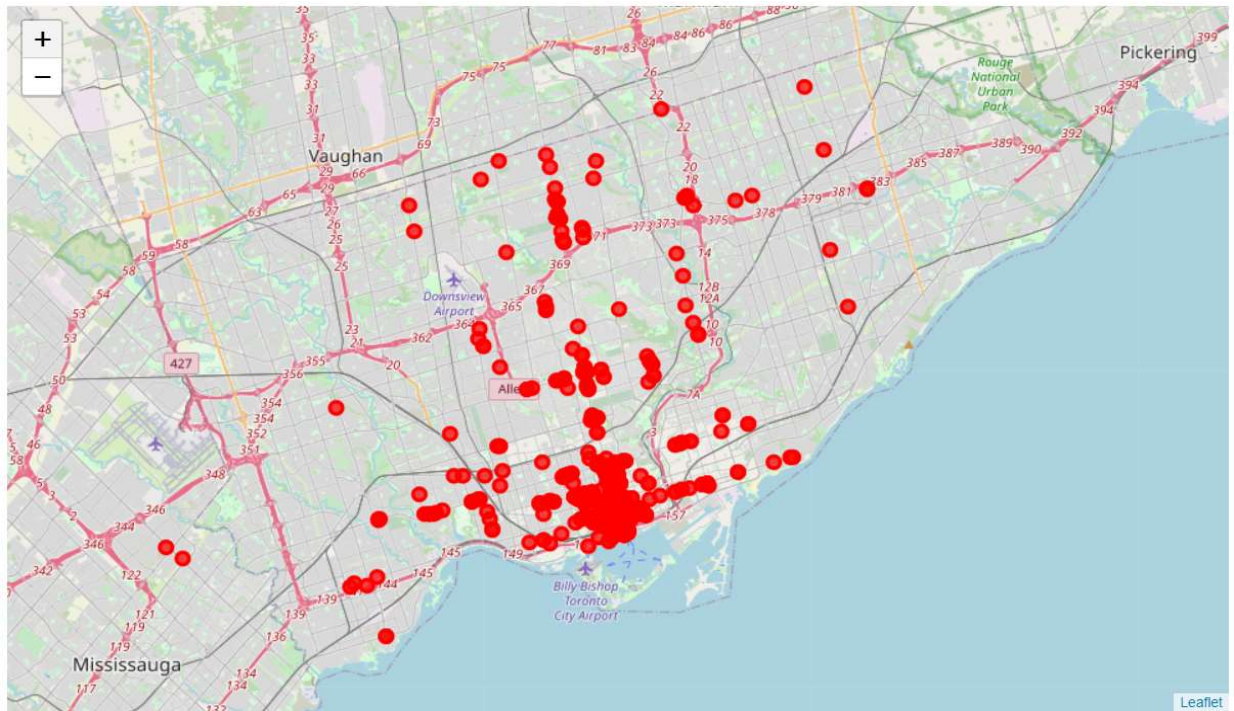In this project, I will use the basic methodology as taught in Week 3 lab.

	Postal Code	Borough	Neighborhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
3	M6A	North York	Lawrence Manor, Lawrence Heights	43.718518	-79.464763
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494

Above, I have done convert addresses into their equivalent latitude and longitude values. Then we will use the Foursquare API to explore neighborhoods in Downtown, Toronto. After that, explore function to get sushi restaurant categories in each neighborhood.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Regent Park, Harbourfront	43.65426	-79.360636	Lime Sushi	43.655771	-79.363776	Sushi Restaurant
1	Regent Park, Harbourfront	43.65426	-79.360636	Bento Sushi	43.651207	-79.370352	Sushi Restaurant
2	Regent Park, Harbourfront	43.65426	-79.360636	Nari Sushi	43.651385	-79.367790	Sushi Restaurant
3	Regent Park, Harbourfront	43.65426	-79.360636	Ueno Sushi Deli Cafe	43.652525	-79.368731	Sushi Restaurant
4	Regent Park, Harbourfront	43.65426	-79.360636	Qi sushi	43.662552	-79.364258	Sushi Restaurant

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toronto_venues_sushi.shape
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(781, 7)
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Sushi restaurants in Downtown, Toronto

	Neighborhood	Asian Restaurant	Fast Food Restaurant	Grocery Store	Hawaiian Restaurant	Japanese Restaurant	Korean Restaurant	Restaurant	Seafood Restaurant	Sushi Restaurant
0	Regent Park, Harbourfront	0	0	0	0	0	0	0	0	1
1	Regent Park, Harbourfront	0	0	0	0	0	0	0	0	1
2	Regent Park, Harbourfront	0	0	0	0	0	0	0	0	1
3	Regent Park, Harbourfront	0	0	0	0	0	0	0	0	1
4	Regent Park, Harbourfront	0	0	0	0	0	0	0	0	1

Then use this feature to group the neighborhoods into clusters K-means clustering algorithm will be use to complete this task. And also, the Folium library to visualize the neighborhoods in Downtown, Toronto and its emerging clusters.

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
0	Agincourt	Sushi Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Japanese Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant
1	Bathurst Manor, Wilson Heights, Downsview North	Sushi Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Japanese Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant
2	Bayview Village	Sushi Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Japanese Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant
3	Bedford Park, Lawrence Manor East	Sushi Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Japanese Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant
4	Berczy Park	Sushi Restaurant	Restaurant	Japanese Restaurant	Asian Restaurant	Seafood Restaurant	Korean Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant

4. Results

K-mean Cluster Using K-mean to clustering data area with less number of sushi bars

Cluster 0

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
4	Downtown Toronto	0	Sushi Restaurant	Restaurant	Japanese Restaurant	Asian Restaurant	Seafood Restaurant	Korean Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant
8	Downtown Toronto	0	Sushi Restaurant	Restaurant	Japanese Restaurant	Seafood Restaurant	Korean Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant
15	Downtown Toronto	0	Sushi Restaurant	Restaurant	Japanese Restaurant	Asian Restaurant	Seafood Restaurant	Korean Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant

Cluster 1

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
0	Downtown Toronto	1	Sushi Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Japanese Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant
11	Downtown Toronto	1	Sushi Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Japanese Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant
13	Downtown Toronto	1	Sushi Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Japanese Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant
16	Downtown Toronto	1	Sushi Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Japanese Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant

Cluster 2

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
6	Downtown Toronto	2	Japanese Restaurant	Sushi Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant

Cluster 3

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
1	Downtown Toronto	3	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Fast Food Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Hawaiian Restaurant	Grocery Store
2	Downtown Toronto	3	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Fast Food Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Hawaiian Restaurant	Grocery Store
3	Downtown Toronto	3	Sushi Restaurant	Restaurant	Japanese Restaurant	Asian Restaurant	Grocery Store	Seafood Restaurant	Korean Restaurant	Hawaiian Restaurant	Fast Food Restaurant
5	Downtown Toronto	3	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Grocery Store	Fast Food Restaurant	Seafood Restaurant	Restaurant	Korean Restaurant	Hawaiian Restaurant
7	Downtown Toronto	3	Sushi Restaurant	Japanese Restaurant	Restaurant	Asian Restaurant	Grocery Store	Seafood Restaurant	Korean Restaurant	Hawaiian Restaurant	Fast Food Restaurant
9	Downtown Toronto	3	Sushi Restaurant	Japanese Restaurant	Restaurant	Grocery Store	Asian Restaurant	Seafood Restaurant	Korean Restaurant	Hawaiian Restaurant	Fast Food Restaurant
10	Downtown Toronto	3	Sushi Restaurant	Japanese Restaurant	Restaurant	Asian Restaurant	Grocery Store	Seafood Restaurant	Korean Restaurant	Hawaiian Restaurant	Fast Food Restaurant
12	Downtown Toronto	3	Sushi Restaurant	Seafood Restaurant	Japanese Restaurant	Hawaiian Restaurant	Restaurant	Korean Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant
17	Downtown Toronto	3	Sushi Restaurant	Japanese Restaurant	Restaurant	Asian Restaurant	Grocery Store	Seafood Restaurant	Korean Restaurant	Hawaiian Restaurant	Fast Food Restaurant
18	Downtown Toronto	3	Sushi Restaurant	Japanese Restaurant	Restaurant	Korean Restaurant	Fast Food Restaurant	Asian Restaurant	Seafood Restaurant	Hawaiian Restaurant	Grocery Store

Cluster 4

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
14	Downtown Toronto	4	Sushi Restaurant	Korean Restaurant	Seafood Restaurant	Restaurant	Japanese Restaurant	Hawaiian Restaurant	Grocery Store	Fast Food Restaurant	Asian Restaurant

Based on data frame analysis above Cluster 2 and Cluster 4 areas are the best places to open a new sushi bar business.

5. Discussion

In this section, I would be discussing the observations I have noted and the recommendation that I can make based on the results.

This analysis is performed on limited data. This may be right or may be wrong. But if good amount of data is available there is scope to come up with better results.

• There is high competition in cluster 1 and cluster 3 areas so it is very risky to open business in these areas.

• Cluster 0 also has potential.

• It can be done with more detailed analysis by adding other factors such as transportation and demographics of inhabitants.

Finally, FourSquare proved to be a good source of data but frustrating at times. Despite having a "developer account", I regularly exceeded my hourly limit locking me out for the day.

6. Conclusion

Although all of the goals of this project were met there is definitely room for further improvement and development as noted below. However, the goals of the project were met and, with some more work, could easily be developed into a fully pledged application that could support the opening a business idea in an unknown location.

As per the neighborhood or restaurant type mentioned like Sushi restaurants analysis can be checked. A venue with lowest risk and competition can be identified.