

# Deciding on a New Restaurant for Johnson City, Tennessee

---

Student: Jonathan Burritt

Submitted: 8-4-20

<b>Introduction and Business Problem.....</b>	<b>2</b>
About Johnson City.....	2
<b>Data Sources.....</b>	<b>3</b>
Foursquare API.....	3
U.S. Census Bureau .....	3
On-the-Ground Experiences .....	3
Jupyter Notebook.....	4
<b>Data Wrangling .....</b>	<b>4</b>
Foursquare API.....	4
U.S. Census Bureau .....	5

## Introduction and Business Problem

---

We are tasked with gathering information on the downtown restaurant market in Johnson City, Tennessee. The business problem that we want to solve is providing foundation data for deciding on if opening a new restaurant in downtown Johnson City would be advisable. And if so, what kind of restaurant should it be.

This primary user for this report is a restaurateur who has a broad range of skills, experience, and cuisine tastes. The user should have a working knowledge of the general restaurant market in Johnson City.

We feel that we will sufficiently solve our problem when we answer the following questions:

- How many venues are there in downtown Johnson City?
- What categories make up the venues and how many are there?
- Where are they located?
- What do the venues look like visually?
- How many restaurants are there in downtown Johnson City?
- Where are they located?
- What are key details of these restaurants?
- What are the key economic indicators for the area?
- How do those key economic indicators compare to the entire state?

## About Johnson City

Johnson City, Tennessee was founded by William Beam, Tennessee's first colonizer, in 1768 when he built his cabin along Boone's Creek. The city itself was officially founded in 1856 by Henry Johnson as a railroad station. The city quickly emerged as a major rail hub for the southeast U.S. And in 1869, it was officially incorporated.

Today, Johnson City is best known as a gateway to the important lake and mountain recreation areas of the region. In addition, it is home to East Tennessee State University, a major medical school, and a teaching hospital. Siemens, Eastman Chemical, and American Water Heater are home to Johnson City.

Johnson City is located in the upper East Tennessee Valley against the ridge of the Appalachian Mountains. The area enjoys four pronounced seasons. And while topography is variable – which can influence weather – in general winters are mild except in the higher environs.

## Data Sources

---

Our sources of data included Foursquare API, the U.S. Census Bureau, and on-the-ground experiences of the author.

### Foursquare API

Foursquare is a location technology platform that provides developers with data about venues, users, ratings, and tips. The company is popular among developers and has more than 150,000 partners, including Apple, Samsung, and Twitter.

That data provided by Foursquare was broad and deep. It is organized through Endpoint Groups, which include venues, users, tips, checkins, and others. Regular endpoints include basic data like category, ID, name, and location. Premium endpoints include ratings, URLs, photos and others. Our data was collecting using the “venue” endpoint group and the “search” endpoint. Accessing the data was provided by typical API with credentialing.

Site: <https://foursquare.com/>

### U.S. Census Bureau

The U.S. Census Bureau is the federal government’s largest statistical agency. It is tasked with provided high quality data about the U.S., including its people, businesses, and economy.

We utilized a section of the Census Bureau’s site called QuickFacts. This interface allowed us to gain a broad range of data on Johnson City, Tennessee and the State of Tennessee. From population and race to education and the economy, we were able to collect key data that we thought was most germane to our task at hand. Accessing the data was provided by a csv download from the U.S. Census Bureau website.

Site:

<https://www.census.gov/quickfacts/fact/table/johnsoncitycitytennessee,TN/PST045219>

### On-the-Ground Experiences

The author used to work in Johnson City when he lived in nearby Asheville, NC. In addition, he has visited the city on numerous occasions. Through these experiences, he

can attest to the general makeup of downtown Johnson City, including a high-level view of its businesses, development, and overall trendiness. These experiences helped to organize and color the conclusions in this report. However, no hard data was collected and used.

## Jupyter Notebook

The coding for this project is housed in a Jupyter Notebook, created in Jupyterlab.

## Data Wrangling

---

### Foursquare API

Raw data from Foursquare had to be wrangled and cleaned.

The setup process for opening a developer account at Foursquare was straight forward. While a sandbox account would have given us data access, by adding a credit card we gained access to a personal account. This gave us access to 99,500 regular calls/day and 500 premium calls/day. In general, we found this access to be more than sufficient for our analysis.

Once credentialing was complete, we experimented with a variety of search calls from the venues endpoint group.

We decided our first job was to build a dataframe of all venues within 1,000 meters of downtown and a maximum of 500 results. To determine the precise location of downtown, we used an address web search and then input the data into geopy. With that latitude and longitude information, we were able to provide sufficient parameters to the Foursquare API to produce results. This 1,000-meter radius of downtown is our target area.

We extracted the relevant part of JSON from the Foursquare API and created a filtered dataframe of all venues within our target parameters. Our results included a total of 123 venues in our target area from a wide range of categories, including restaurants, nightclubs, bridal shops, and businesses. In addition, we used 15 features, including name, categories, and address. We felt these were sufficient for our analysis.

With that our all venues dataframe in hand and our first job complete, we felt our second job was to produce a second dataframe of restaurants. We were able to use the existing JSON that we used for the all venues dataframe. Then we simply added additional search parameters of the categories feature and created a new dataframe. Our results included 6 restaurants with the same 15 features as the all venues dataframe. We felt these were sufficient for our analysis.

In addition to these dataframes, we also produced a folium map and bar plot of all venues and a folium map of restaurants within our target area. These were created to help visualize the results.

We also exported the restaurant dataframe to an excel file. We felt this would be a plus for the user.

We will discuss our analysis of the these dataframes, bar plot, and folium maps in the Methodology section.

## U.S. Census Bureau

Raw data from the U.S. Census Bureau had to be wrangled and cleaned.

The U.S. Census Bureau has a fairly friendly user interface. By navigating to the QuickFacts section, we simply input search criteria for Johnson City and the State of Tennessee. At this point, we could have filtered the results, but we wanted the entire dataframe to come over to our notebook for analysis. So, we exported the entire file to csv and then read it into our notebook.

The data came with long feature names, null values, unusable characters, and string values with unusable characters. We dropped records with null values or unusable characters. We also replaced a variety of unusable string characters in the “numeric” data so that we could properly convert them to usable numeric data (floats).

We then decided on three data points that were most vital to our analysis and created a new dataframe including just those data points. We also changed their names. And since these were significant changes in the feature string labels, we have summarized the changes in the table below:

Original Feature Name	New Feature Name
Per capita income in past 12 months (in 2018 dollars), 2014-2018	income_per_cap
Total retail sales per capita, 2012	retail_per_cap
Median value of owner-occupied housing units, 2014-2018	avg_house_val

In addition to this dataframe, we also created a bar plot of the key indicators and how they compared between Johnson City and the State of Tennessee.

We will discuss our analysis of this data frame and bar plot in the Methodology section.