

## **Boston Foreign Motors**

Expansion of Boston Foreign Motors to Worcester, MA

This Capstone Project is submitted in partial fulfillment of the requirements for the course MDA 720 during the Spring Semester of 2022.

While writing this Capstone Project, we have not witnessed any wrongdoing, nor have we personally violated any conditions of the LIU Honor Code.

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## Background

Boston Foreign Motor is proud to offer luxury used imported cars to the Boston area. We pride ourselves on serving our customer's needs and look forward to helping you purchase your dream car. We are located on 523 Cambridge St, Boston, MA 01234. In addition to serving our Boston clients, we are also expanding our reach to the Worcester, MA area. As general manager of the Boston location, I have been tasked with selecting the site of our new store in Worcester County. According to the 2020 US Census there are 2,003,373 cars registered in the state of Massachusetts. While not all of these are registered in Boston, Boston is the biggest city in Massachusetts which holds many daily drivers. We have had strong performance in past years serving our clients but want to expand our efforts outside the Boston area. We have set our sights on Worcester as our next location because it is the second largest city in Massachusetts and New England behind Boston. In Figure 1, Worcester County is shaded in green, West of Boston. Geographically speaking, it is one of the largest counties in the state of Massachusetts.

**Figure 1.** Map of Worcester County in Relation to Boston



## **Objective/Goals of the Project**

The objective of this project is to understand the current used car dealership environment in the Worcester area. When looking at the environment, it's important to understand where competitors are located but also the quality of those competitors and their clients. The information and analysis gained through this project will provide insight into where I should recommend to Boston Foreign Motor owners where to place their new store. My goal is to provide an area or zip code to the owners to narrow their search of where to buy property for our new location.

## **Data Extraction/Collection/Scraping**

Through using my API Yelp key, I was able to extract data from Yelp regarding 50 used car dealerships in the Worcester area. After gating the information, I then converted the data frame into an excel file where I was then able to run further analysis of my data. The only limitation of this project is there is a limit of 50 observations for data extraction using a Yelp API key. There may be more dealerships than that in the Worcester county but after analyzing the data I collected it is clear the 50 observations I have are a strong representation of the current used car dealership environment.

## **Data Exploration/Data Visualization**

The dealership information such as name, rating, address, and zip code are listed below. As mentioned before there are 50 dealers' location in the Worcester County area. In total there are 17 different area codes that have used car dealerships. The rating of each store is on a 0 – 5 scale, Yelp users are able to rate businesses which is where these ratings come from. If multiple ratings are submitted, Yelp will take the average. This also serves as a limitation as stores have

different amounts of ratings submitted so a store that only has one review but has 5 stars might not have the weight as a store with 50 reviews and an average rating of 4.5.

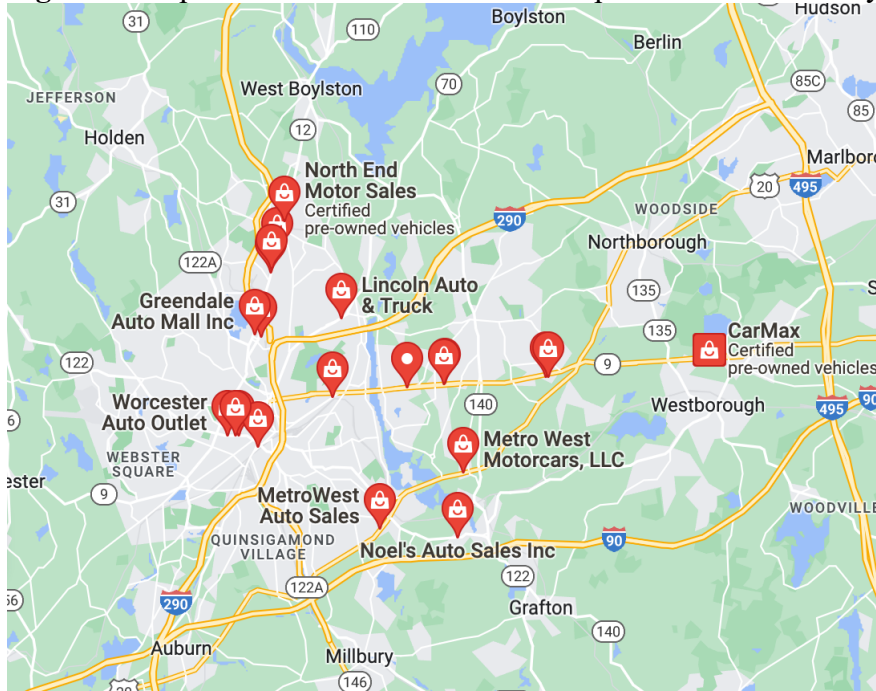
**Table 1.** List of Current Used Car Dealerships in Worcester County

Name	Rating	Address	Zip Code
Variety Auto Sales	4.5	785 W Boylston St	01606
Linder's	4.5	211 Granite St	01607
Linder's Auto Repair	4.5	211-A Granite St	01607
North End Motors Sales	4.5	927 W Boylston St	01606
Pro Car Autos	5	1359 Grafton St	01604
Olsi Auto Sales & Service	5	487 Park Ave	01610
Clinton MotorCars	5	171 Hartford Turnpike	01545
Mass Auto Recycling	5	69 Webster Ct	01603
Andoni Auto Sales	4.5	1095 Main St	01603
Clearview Auto	4.5	618 Lincoln St	01653
CarMax	3.5	170 Turnpike Rd	01581
Henry's Used Cars	5	312 SW Cutoff	01532
Beacon Auto Sales	3.5	127 Chandler St	01609
Foley Motorsports	4	894 Boston Tpke	01545
Chris Goodnow Auto Sales	3.5	241 Grove St	01605
MacKoul's Cars	5	220 Worcester St	01536
Rocky's Auto Sales	4	1147 Main St	01603
Sam's Auto Sales	2.5	1275 Main St	01603
Enterprise Car Sales	4.5	126 SW Cutoff	01604
Greendale Auto Mall	1	88 W Boylston St	01606
Lundgren Honda Of Auburn	3	163 Washington St	01501
Arkan Auto Sales	5	495 Cambridge St	01610
Sonia's Auto Sales	2	160 Southbridge St	01608
Brook Motors Auto Sales	3.5	603 Southbridge St	01501
Sunnyside Ford	4	944 S Main St	01520
Mass Auto Outlet	1.5	556 Massasoit Rd	01604
Harr Chrysler Jeep Dodge Ram	2	110 Gold Star Blvd	01606
Patrick Subaru	2.5	247 Boston Turnpike	01545
Shabo's Garage & Sales	5	609 Park Ave	01603
Angelo's Auto Repair & Car Sales	4.5	823 Southbridge St	01501
Sara's Auto Sales	5	1122 Main St	01603
Mass Car-Auto Sales	1	56 Water St	01604
Lux Auto Plus	2	772 Southbridge St	01501
Harr Auto Body	2	29 Glennie St	01602
Inter Auto	2	421 Boston Tpke	01545
Rally Motorsports	3	1270 Grafton St	01604
Continental Auto Sales	4	338 Main St	01532
Haddad Auto Detail	4	466 Harding St	01602
Volvo Cars Auburn	5	70 Gold Star Blvd	01606
Gary Jackson Motors	4	451 Worcester Rd	01507
Choice Auto Center	2	429 Boston Tpke	01545
Harr Toyota	2.5	100 Gold Star Blvd	01606
Herb Chambers Honda of Westborough	2	350 Turnpike Rd	01581
Zam Zam Auto Sales And Repairs	5	415 Southbridge St	01610
Intercity Lines	4.5	552 Old W Brookfield Rd	01083
Metro West Motorcars	3.5	295 Hartford Turnpike	01545
A-Tech Automotive	4	433 Boston Tpke	01545
Dynasty Auto Group	1.5	1103C Main St	01603
Herb Chambers Toyota of Auburn	2	809 Washington St	01501
Mass Motors	2.5	245 SW Cutoff	01604

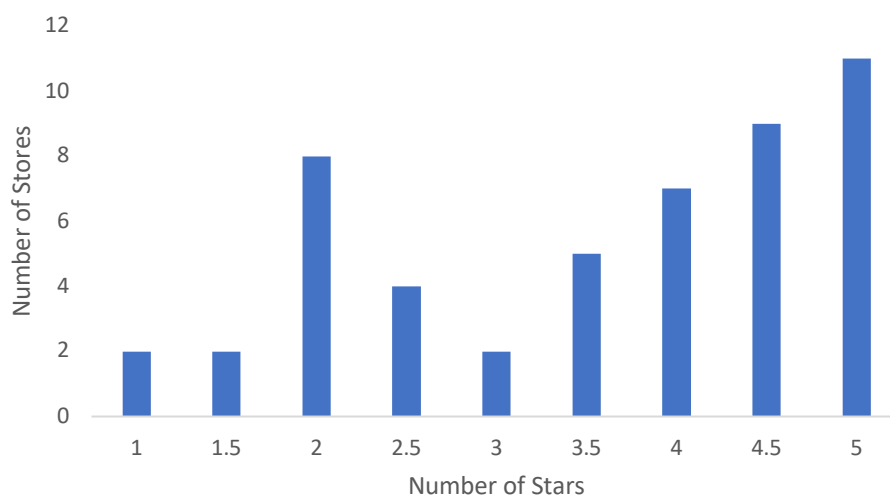
To visualize these dealerships in the Worcester Area on a map, please refer to Figure 2.

Figure 2 does not show all of the dealerships, but the most popular ones ranked by Google Maps. From this map, the density of dealerships in this area is high. Even with the number of locations, we are still confident there is a market not being served to the maximum potential.

**Figure 2.** Map of Current Used Car Dealership in Worcester County



I thought it was also important to visualize the number of businesses at each rating level. As mentioned before, businesses can be ranked on a 0 – 5 star scale. If multiple reviews are submitted, the average is taken. In Figure 3, there are 11 businesses have an average of 5 star reviews. The next most occurrences comes with the 4.5 rating which 9 stores has. Finally, there are 8 businesses with 2 stars. It is clear from this figure that some clients aren't receiving the service they are expecting with ratings in the 1 – 3 range. We. Believe we can fill this void by providing our stellar service.

**Figure 3. Number of Stores Based on Star Quality****Data Analysis/Data Mining/Text Mining**

When analyzing what area code would be the best place for our next store, it was important to understand the number of stores in each area code, the number of stars of total stars, and the population of each area code. From these statistics, I was then able to calculate the people per 1 star by dividing Population by Total Stars in each zip code. I was also able to calculate the people per 1 store by dividing the population by the number of stores in each zip code. See Table 2 for this information. I believe these statistics give great insight into the current landscape of used car dealerships in the area. When looking at the specific statistics I calculated, I wanted to find a zip code that has many people per 1 star and per 1 store. This would indicate that there are not many high rated stores servicing many people and it would also indicate there aren't many stores servicing a many people. The opposite is also true, if there are few people per 1 star and 1 store that means there are businesses that are doing well in that area. We would want to stay away from these zip codes because we could hypothesize that most people are receiving the service they require. We would want to focus on our efforts where we would stand out among the other used car dealerships.

**Table 2.** Statistics by Zip Code in Worcester County

Zip Code	Number of Stores	Total Stars	Population	People per 1 Star	People per 1 Store
01083	1	4.5	2701	600	2701
01501	5	15	16684	1112	3337
01507	1	4	13312	3328	13312
01520	1	4	16752	4188	16752
01532	2	9	15605	1734	7802
01536	1	5	7141	1428	7141
01545	7	23	38291	1665	5470
01581	2	5.5	21213	3857	10606
01602	2	6	26711	4452	13355
01603	7	27.5	20184	734	288
01604	6	17.5	40961	2341	6827
<b>01605</b>	<b>1</b>	<b>3.5</b>	<b>30353</b>	<b>8672</b>	<b>30353</b>
01606	6	19.5	22883	1173	3814
01607	2	9	8836	982	4418
01608	1	2.	4782	2391	4782
01609	1	3.5	23509	6717	23509
01610	3	15	26057	1737	8686

From Table 2, I find the zip code 01605 has a combination of a large population, many people per 1 star and 1 store. This means there are many people who might not have access to a quality used car dealership or have access to a store nearby them.

### **Conclusions/Recommendations**

From the results and my analysis, I can confidently suggest to the Boston Foreign Motor owners that they should look to purchase property in the zip code of 01605. This zip code represents the North Lincoln Street neighborhood of the city of Worcester. Based on my analysis, customers in this area do not have access to high rated used car dealerships. By placing a new location in this zip code, Boston Foreign Motors will be able to grow and expand their business successfully.



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