Key Factors Of Public Transportation Usage In The MBTA Area

Introduction

As Robert Bullard said, “Transportation touches almost every aspect of our lives and plays a pivotal role in shaping human interaction, economic mobility, and sustainability. Transportation provides access to opportunity and serves as a key component in addressing poverty, unemployment, and equal opportunity goals.”

Different transportation systems can affect cities in different ways. As a result of the unaffordable effect of increased car use and resulting severe traffic congestion, rapid transit becomes the most important non-vehicle transportation mode in modern cities. Among some big cities in the US, Boston has a relatively well-developed rapid transit network, and a considerable amount of people are willing to take the public transportation instead of driving a car. However, it is impossible for the Massachusetts Bay Transportation Authority (MBTA) to serve every resident with the limited lines. Therefore, the rapid transit usage should be different in each town of the Great Boston Area. In addition, usage of rapid transit also can be influenced by many other factors, such as income status, accessibility and location of living places. With this in mind, the purpose of this project is to analyze the transit usage condition of a certain group of towns, while figuring out how some key factors could affect people’s transportation mode.

Methodology

The first step of this analysis is creating the study area. I selected 13 cities which are passed through by the MBTA transit Lines, together with Chelsea and Everett which are located between the Blue Line and the Orange Line from the town’s census boundary layer. Thus, my study area roughly covers all the Downtown Boston and the near suburb area.

I seek to find whether the MBTA provides rapid transit to the high-density communities in my study. I overlapped each line with the population density to show whether the high density communities are reached by MBTA Lines.

After that, I created a series of maps based on the data from the 2013 American Community Survey (5-years estimate), which include several significant factors such as household income level and availability of vehicles. Meanwhile, the map of public transportation usage was also created based on the same dataset. I joined each demographic data with my study area by using a spatial join, and then got the average condition of each cities by summarizing the demographic data based on the town group of each census tract.

Finally, I produced the map showing the distance between every census tract and the nearest T station. To begin with, I calculated the distance by using the Euclidean distance tool and made it become the raster layer. Then, I chose the zonal statistics as table to get mean distance from the nearest T station for each census tract and town. Last, I put all the results into a excel table, and we were able to analyze the relationship or interaction between each two factors.

Limitation

For sure, this study has some limitation because of the inaccurate data and incomplete analysis. For example, the demographic data of public transportation contains not only the usage of rapid transit, but also the buses and commuter rails, which can make our results more or less imprecise. Moreover, people’s transportation mode could definitely be influenced by some other factors, such as season and weather, or whether they have children.