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PPD 631 Geographic Information Systems for Public Policy

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1 May 2016

Where should the City of Los Angeles set up a business supporting center for home-based workers?

1. Introduction

Communication technologies have changed the way we work in a rapid way. As the level of connection between people and people or people and things soars up, workers could get more and more opportunities to work at home without any need to commute to the workplace. According to the data of ACS (The American Community Survey) of Census, the percentage of workers who worked the majority of the workweek at home increased from 3.6 percent to 4.3 percent of the population between 2005 and 2010. Especially, home-based work in the computer, engineering, and science occupations increased by 69 percent between 2000 and 2010 (Mateyka, Rapino, & Landivar, 2012). Many experts expect that the trend of work at home will be likely to continue in the future. However, technologies themselves could not be panaceas for all home-based workers. Even though they work the majority of the week day at home, they need a specific place where they can meet some needs such as meeting room, high quality equipment, legal or tax consulting services, and collaborations with other home-based workers. With these enormous needs, there have been a lot of private co-working spaces such as 'WeWork' and 'NextSpace' throughout the United States. They argue that they can support independent workers (including home-based workers) by providing the infrastructure and the community connectivity so workers can do their best

work possible.[1] The problem is money. Their fees are not inexpensive. This means that a lot of home-based workers could not afford to get services for co-working space of private companies. That is why public sectors should consider this situation and arrange specific places where home-based workers could get services which could support them and increase their productivities.

Figure 1. High fees of using co-working spaces

Source: http://nextspace.us/about-us-2/

2. Purpose of Project

This project has two main purposes. One is to show the trend of work at home in California - how many workers in California do their work at home, how it changes over the ten years – by using GIS maps. The other purpose is to solve the given assumption policy problem regarding an employment issue with appropriate GIS tools.

2-1. Home-based workers in California

The first purpose of the project is to find out the present condition of home-based workers in California, the distribution, ratio, and change of home-based worker throughout the California during ten years.

2-2. Setting up a business supporting center at the best location

The second purpose of my project is to solve the practical policy problem based on a few assumptions. I made a few assumptions for my second purpose of my project as followings.

[1] http://nextspace.us/about-us-2/

- Assumption 1. As a GIS manager of the City of Los Angeles, I have to find an optimum location of a business supporting center for home-based workers.
- Assumption 2. A GIS manager should choose one location based on the number of home-based workers around 2 miles from a specific point.
- Assumption 3. A GIS manager should make the best use of existing University or College building in order to reduce the local government's budget for this project.

I narrowed it down to the level of city rather than a whole state. After showing the distribution of home-based workers across the City of Los Angeles as of 2014, I will choose the best location of the business supporting center in LA City based on the given three assumptions with GIS tools.

3. Method & Result

3-1. Home-based workers in California

1) Data sources

- Means of transportation to work from the American Community Survey (ACS) in 2005 and 2014.
- 2014 Tiger/ Line shapefiles: Counties (and equivalent) from Census

2) Method & Result

After getting the Excel files regarding means of transportation to work in 2005 and 2014, files are needed to be processed to make them usable for this project. Among a lot of variables, this project needs just one variable, the percentage of work at home in each County in California. After processing the Excel file, I joined each Excel data to a shapefile and created thematic maps which could show and compare the percentage of a home-based worker in California in 2005 and 2014 as following. (Appendix, map 1, map 2)

3-2. Setting up a business supporting center at the best location

1) Data sources:

- 'Commuting characteristics by sex' from 2014 ACS 5-year estimates (All Census Tracts within Los Angeles County, California)

- 2014 Tiger/ Line shapefiles: California Census Tracts map
- 'Community plan map' of the City of LA (shapefile) from Los Angeles County GIS data portal
- Locations / Point of interests (LMS Data) – January 2016 from Los Angeles County GIS data portal

2) Method & Result

I made two types of the map which show the distribution of home-based workers in the City of LA. One is a graduated color type and the other is a graduated symbol type based on the number of workers in each Census Tract. (Appendix-map 3, map 4) I joined the Excel spreadsheet of 'Commuting characteristics by sex' to '2014 Tiger / Line shapefiles: California Census Tract map (shapefile)'. And then, I intersected it with the 'Community plan map of the City of LA' in order to narrow it down to the level of LA city only. For the next step, I have to make a GIS map that indicates the location of Universities or Colleges in the City of LA. I found a shapefile (Geometry Type: point) that has a lot of locations of existing organizations in LA city at the 'LA County GIS portal'. After the work of "intersect", it still has 17,485 points of a variety of organizations in LA City. I could delete all the data except 'Colleges and Universities' in attribute table in ArcGIS. There are seventy-one colleges and universities left in LA City after deleting all other organization. Among them, I selected just thirty colleges and universities because some are overlapped or too adjacent each other. After the work with attribute table, I made a shapefile that has just thirty points of 'Colleges and Universities' within the City of LA. (Appendix-map 5) To choose the best location based on the number of workers in Census Tract, I used a buffer tool, 2-Miles from each point. (Appendix-map 6, map 7)

4. Conclusion

Although we generally know the new trend of work at home, it is difficult to understand the distribution and change of it. By making and using GIS maps, it is much easier to notice how home based workers are distributed across a specific region and how they have changed over the specific time period. For the first purpose, this report shows the percentage of home-based workers in California, county by county in 2005 and 2014. (There are a few hollow counties in the 2005 map because there is no ACS data at that time) Two thematic maps show the difference of the percentage of home-based workers between 2005 and 2014. Compared to the map of 2005, California map of 2014 has more counties that have a darker color than in 2005. Especially, the northern part of California had a higher percentage of home-based workers in the past and this trend has been getting stronger. These

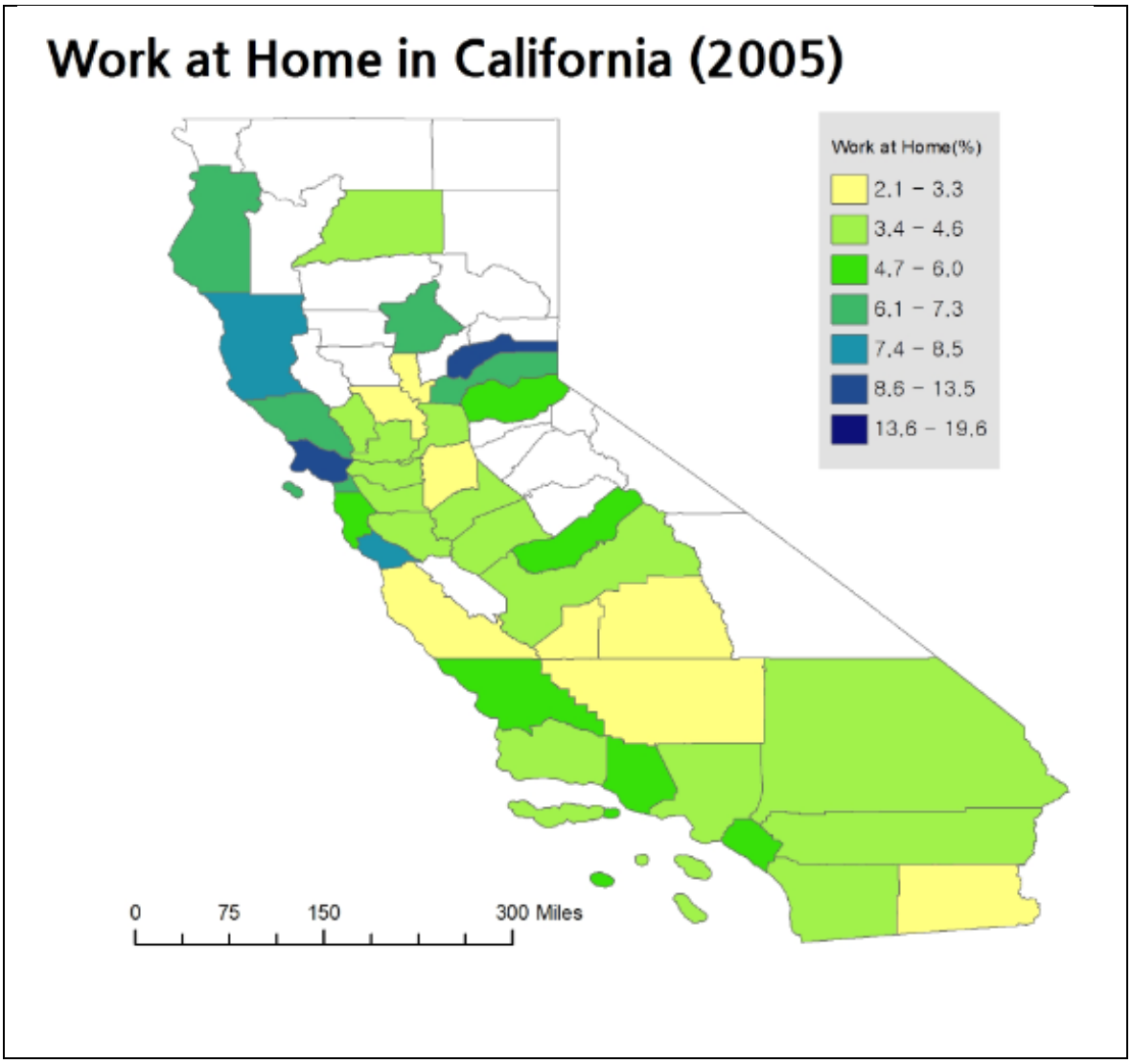
two maps reflect the trend of the rise of independent workers including working at home.

Unlike the first purpose – descriptive map making – of this project, the second purpose is to make an analytical map in order to solve the real policy problem. Based on the number of home-based workers in each Census Tract, I could make a thematic map of the City of Los Angeles. I can find out the distribution of home-based workers across the LA City. According to the map 3 and map 4, North and West of the LA City have much more home-based workers than other parts. As a policy maker regarding an employment issue, he or she could roughly think that there might be more need in the north and west part of LA City than south and east in terms of a business support center with these maps. There are almost 17,000 private or public organizations in the City of LA. I can make a GIS map based on conditions of what I would like to find out. In this project, I sorted out universities or colleges out of all organizations in LA City. After selecting thirty points (universities or colleges) out of seventy-one universities or colleges in LA City, I used a buffer tool in order to decide which point is the best for a business supporting center. It is much easier to select the best point if we label the number of home-based workers in each Census Tract. With these joined and intersected GIS maps, I can select the best point where the City of Los Angeles set up a business supporting center for home-based workers. In this case, 'Yeshiva Ohr Elchonon Chabad Seminary' was selected to be the best location for a business supporting center in LA City.

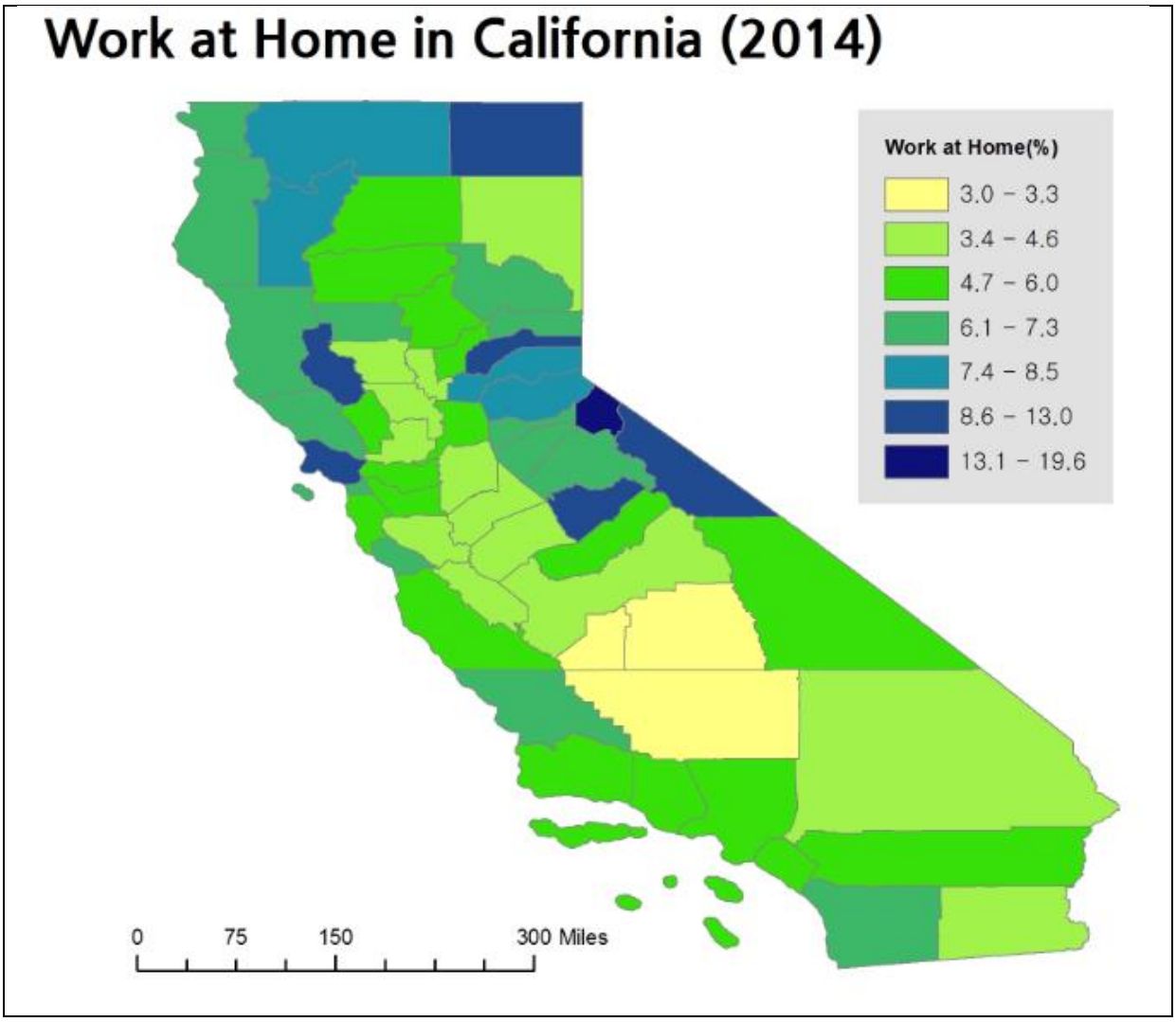
There is a limitation for this project. I gathered a Census Tract data regarding the number of home-based workers but this data does not have a specific location of each worker within the Census Tract. That means that buffer tool could not catch the exact number of workers in a specific area. However, I think that it is meaningful to make a thematic map and use GIS tools in order to grab the overall structure and problems of a certain policy issue.

Appendix

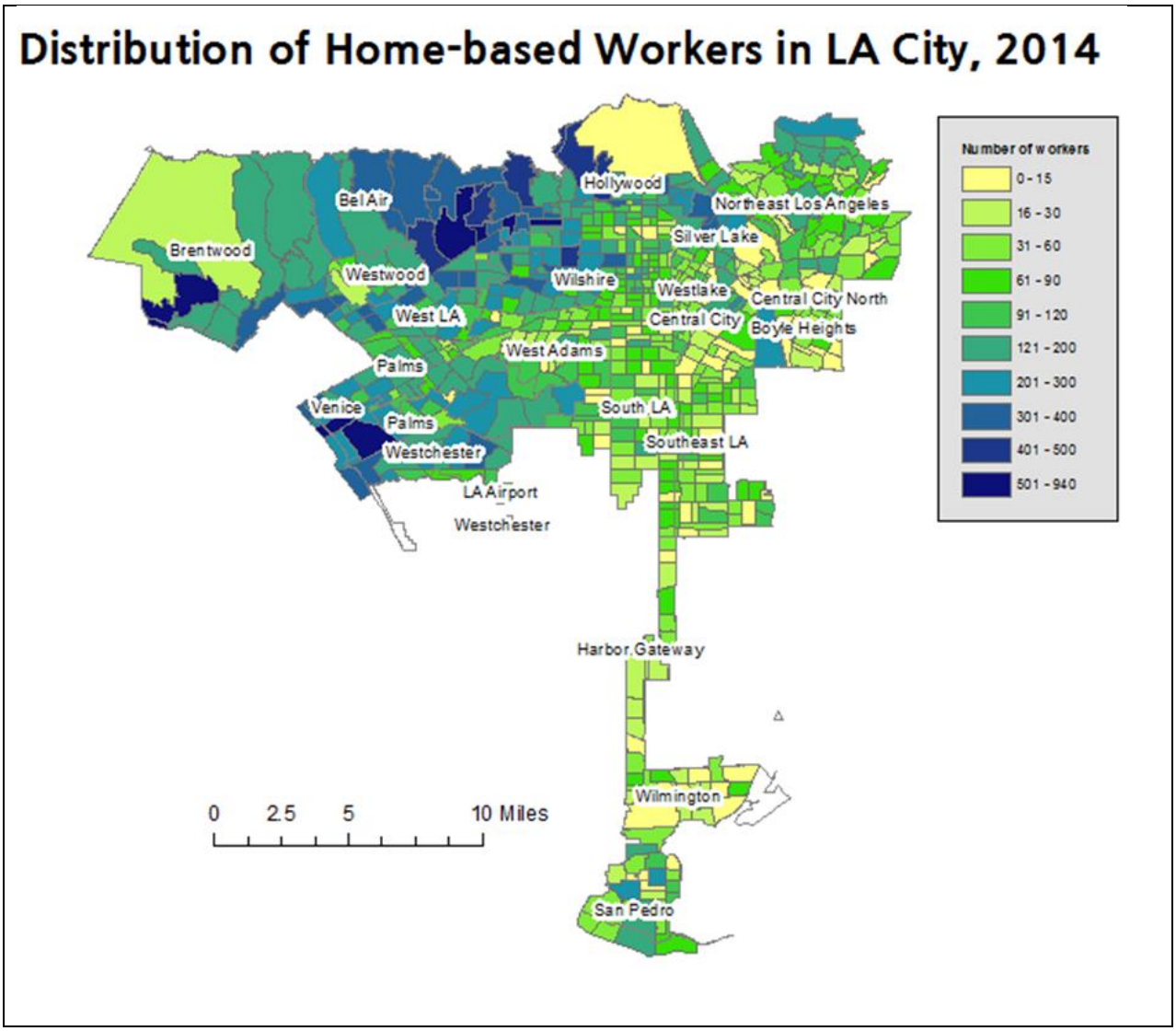
Map 1



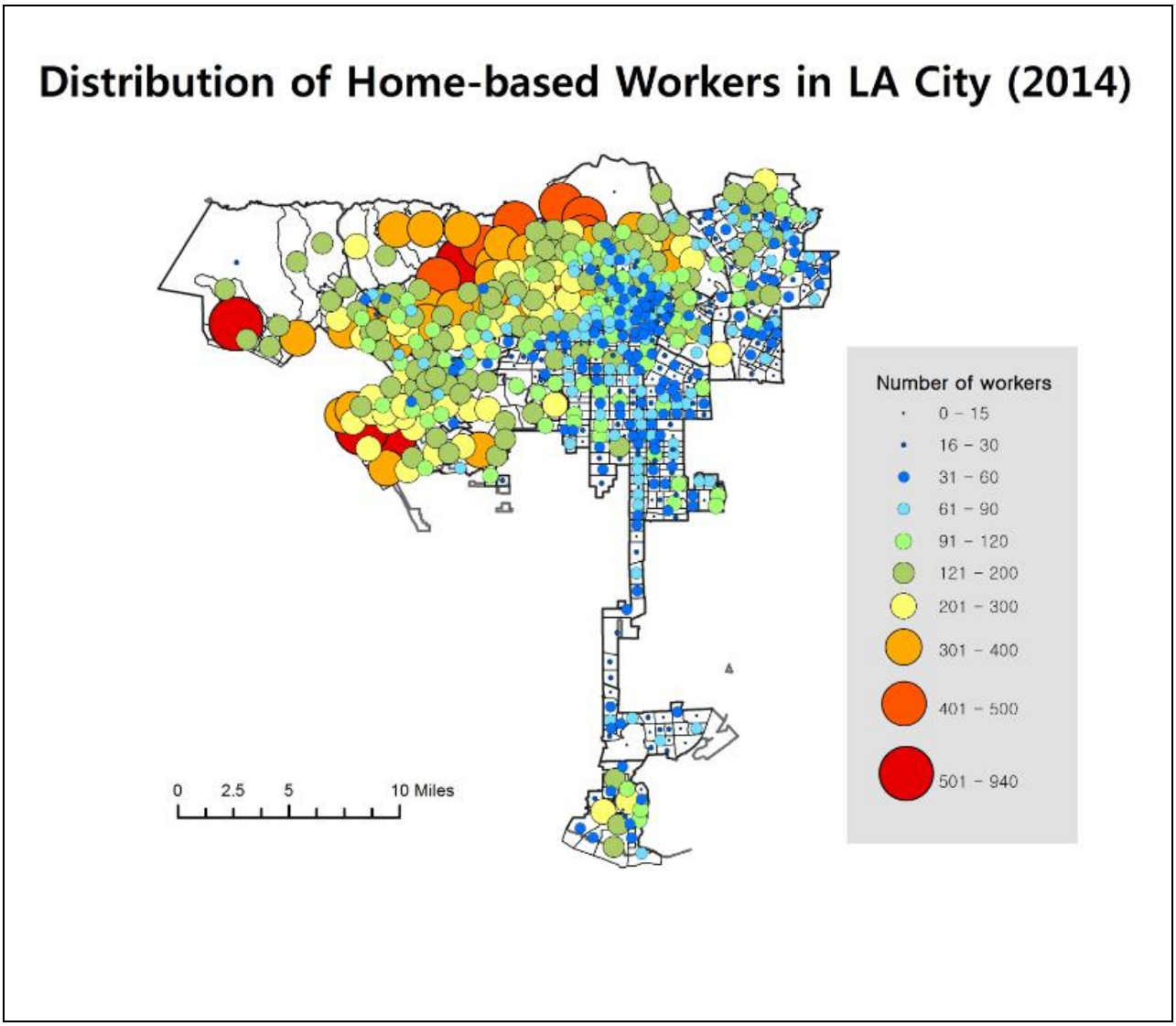
Map 2


Work at Home in California (2014)
Work at Home(%)
3.0 – 3.3
3.4 – 4.6
4.7 – 6.0
6.1 – 7.3
7.4 – 8.5
8.6 – 13.0
13.1 – 19.6
0
75
150
300 Miles

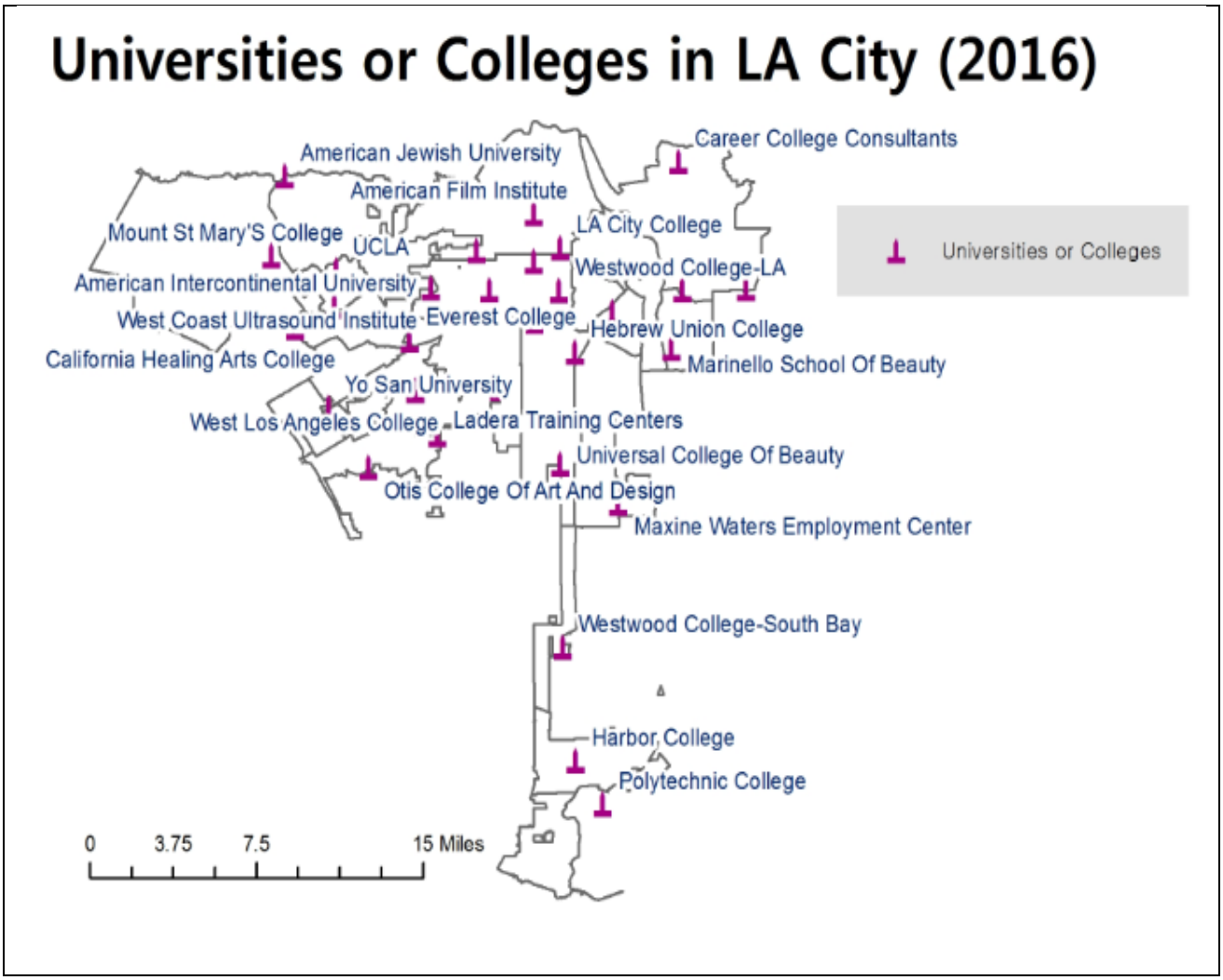
Map 3


Distribution of Home-based Workers in LA City, 2014
Number of workers
0 - 15
16 - 30
31 - 60
61 - 90
91 - 120
121 - 200
201 - 300
301 - 400
401 - 500
501 - 940
Hollywood
Bel Air
Northeast Los Angeles
Silver Lake
Brentwood
Westwood
Wilshire
Westlake
Central City North
West LA
Central City
Boyle Heights
West Adams
Palms
Venice
Palms
South LA
Southeast LA
Westchester
LA Airport
Westchester
Harbor Gateway
Wilmington
0 2.5 5 10 Miles
San Pedro

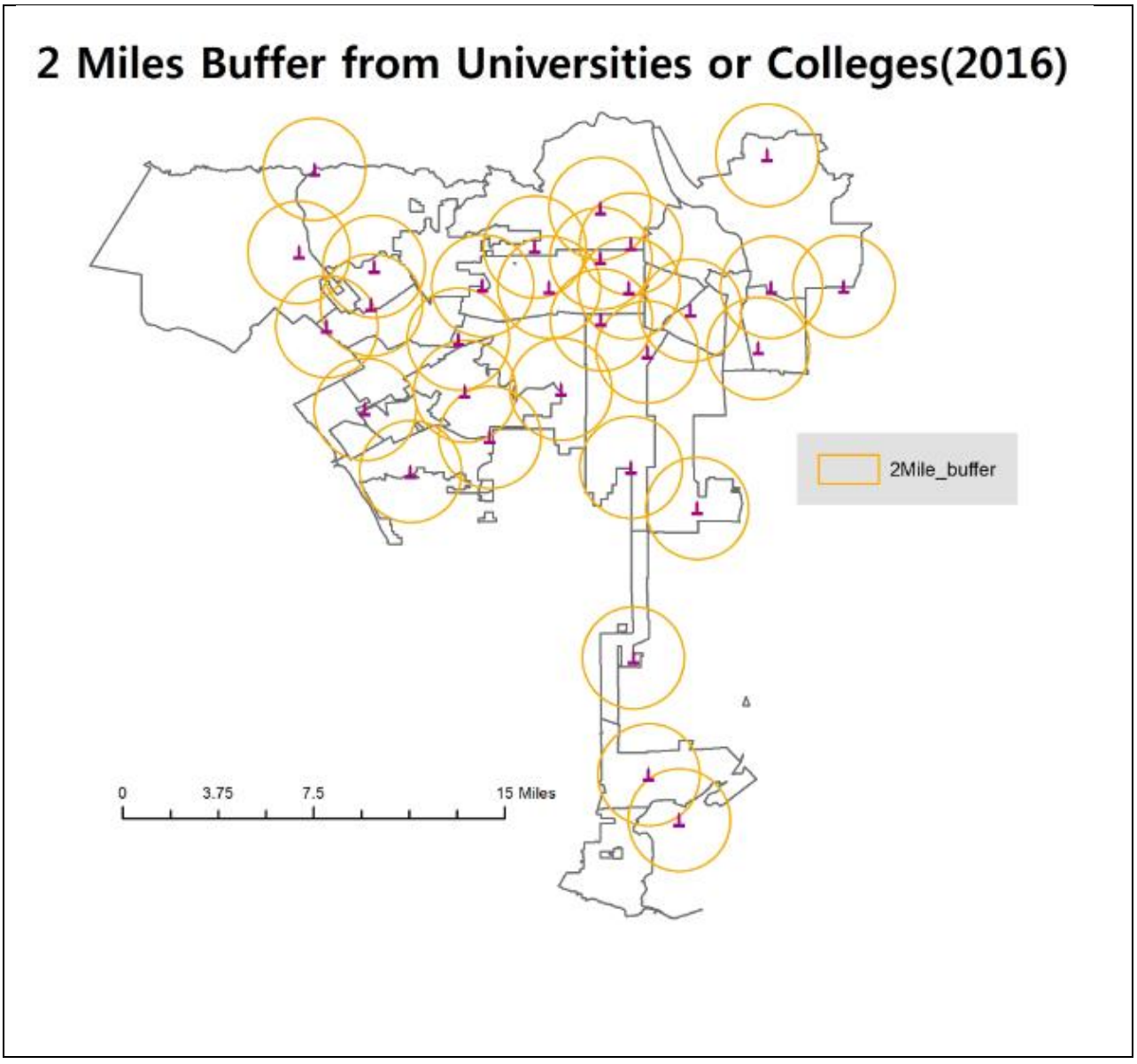
Map 4


Distribution of Home-based Workers in LA City (2014)
Number of workers
0 – 15
16 – 30
31 – 60
61 – 90
91 – 120
121 – 200
201 – 300
301 – 400
401 – 500
501 – 940
0
2.5
5
10 Miles

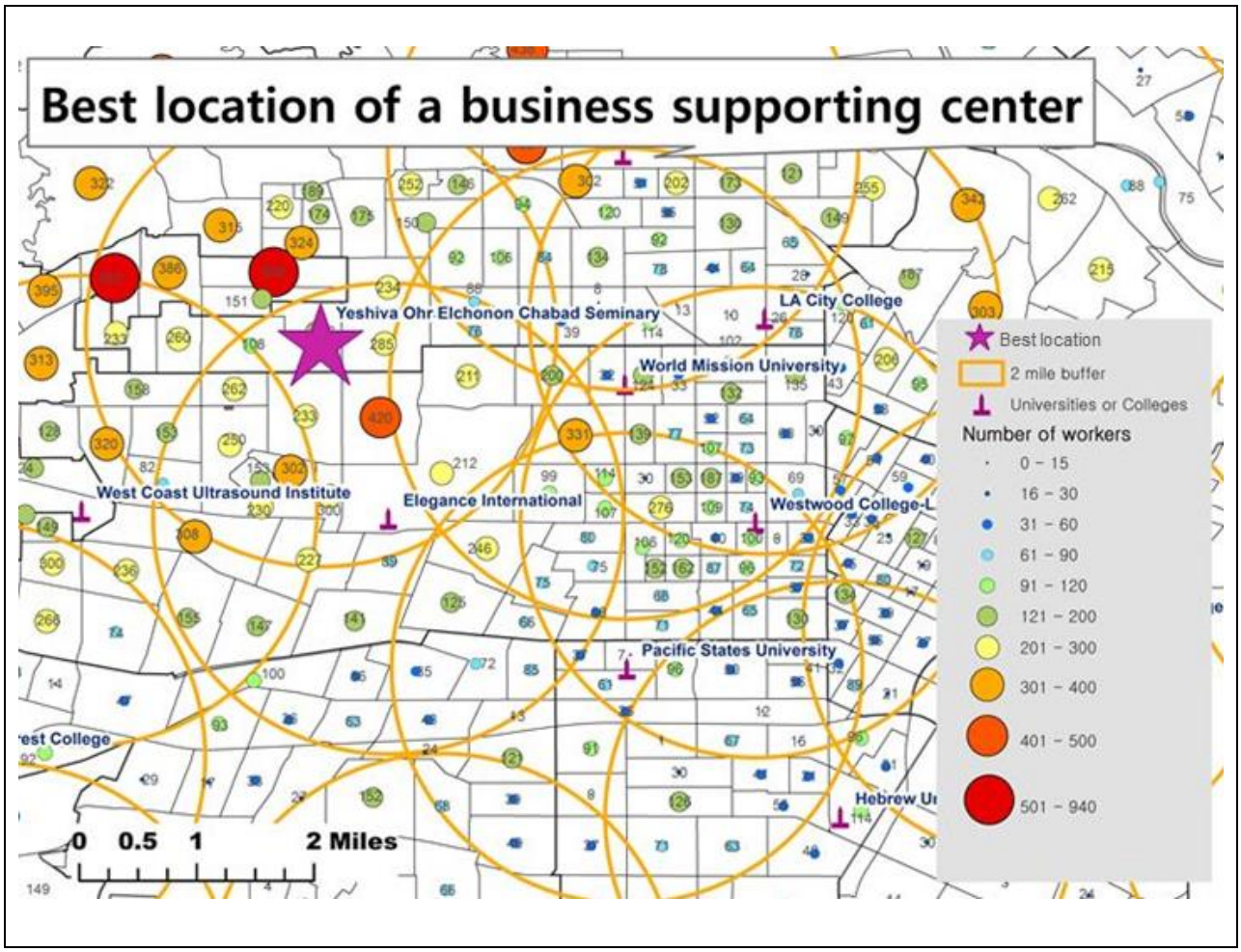
Map 5


Universities or Colleges in LA City (2016)
American Jewish University
Career College Consultants
American Film Institute
Mount St Mary'S College
UCLA
LA City College
Westwood College-LA
American Intercontinental University
West Coast Ultrasound Institute
Everest College
Hebrew Union College
California Healing Arts College
Marinello School Of Beauty
Yo San University
West Los Angeles College
Ladera Training Centers
Universal College Of Beauty
Otis College Of Art And Design
Maxine Waters Employment Center
Westwood College-South Bay
Harbor College
Polytechnic College
Universities or Colleges
0
3.75
7.5
15 Miles

Map 6


2 Miles Buffer from Universities or Colleges(2016)
2Mile_buffer
0
3.75
7.5
15 Miles

Map 7 Magnified part of the 2-mile buffer map



References

Mateyka, P. J., Rapino, M., & Landivar, L. C. (2012). *Home-based workers in the United States: 2010*. US Department of Commerce, Economics and Statistics Administration, US Census Bureau.