

Develop a Fair Accessibility Framework through Green (Non-Auto) Transportation Modes for Fresno, California

Project 1871
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This study aims to examine whether transportation inequality in terms of accessibility exists in Fresno, which aligns with the SB 1 Objective 4 that “everyone should share the same opportunities for learning, living, labor, and leisure.”

Study Methods

A GIS-based cumulative opportunity approach was developed to measure the accessibility to a variety of urban opportunities (jobs, physical activities and dining, social interactions, and public facilities) by two non-auto (green) transportation modes (public transit and cycling).

The service area for each block group in the city was defined, using the OpenStreetData (OSM) and GTFS transit data, in a 10-, 20-, 30-, 45-, and 60-minute travel time by transit or cycling.

The defined service area was then used to count the number of each type of urban opportunities (jobs, restaurants, parks, multi-use paths, schools, libraries, and schools). The calculated accessibilities were then geographically mapped to show the spatial distribution patterns.

The two sample t-test approach was used to compare accessibility between better- and worse-off neighborhoods, using the 25th, 50th, and 75th percentile as thresholds for a set of socioeconomic factors (income, property value, school enrollment, vehicle ownerships, race, and age).

The built environment of a city does shape the outcome of accessibility to urban opportunities and therefore can be seen as the determinant of transportation equality.

Findings

The mapping of the accessibility by public transit shows that a resident could not reach out for many urban opportunities with a 30-minute bus ride in Fresno.

Taking a bus in Fresno need to double the travel time to access to the same number of urban opportunities by cycling.

The comparison results suggest that the current green (non-auto) transportation network do help with the accessibility for economically disadvantaged neighborhoods.

Northwestern Fresno has better accessibility to parks while northeastern Fresno has better accessibility to multi-use paths by both green transportation modes due to the existing setting of physical facilities.

We consider that the developed analytical approach in this project is an innovation because it creates a comprehensive platform to flexibly group neighborhoods into two for comparison.

Policy Recommendations

This study suggests targeting on students for further study to better understand their needs because the calculated accessibility for them did not show a consistent pattern.

The results also suggest that there is a need to put more efforts on providing multi-use paths to improve the accessibility by cycling for neighborhoods with a high share of non-white and adolescents.

About the Authors

Dr. Chih-Hao Wang is an associate professor of the Department of Geography and City & Regional Planning at California State University, Fresno. His research interest is to apply spatial statistics to analyze spatial or social interactions in earthquake process, water management, transportation planning, and community development.

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To Learn More

For more details about the study, download the full report at transweb.sjsu.edu/research/1871



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