Sustainable Transportation through a 20-Minute City: Adelaide, Australia

UNIVERSITY OF UTAH

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I. Introduction

Background

- The City of Adelaide's goal to be carbon neutral by 2025.
- Data indicate highest rate of people commuting to work 79.9% (Australian Bureau Statistics, 2017).
- Carbon emissions related to transportation has gone up by 27% in the last decade (Adelaide Carbon Emissions, n.d.).

20-Min City Framework

This framework propose that services are easily accessible - within 20- minute distance to from amenities (i.e., shopping, services, hospitals, education, community facilities, recreation, jobs, and more). This framework aligns with sustainability practices since it allows people to use other modes of transportation as they reduce emissions.

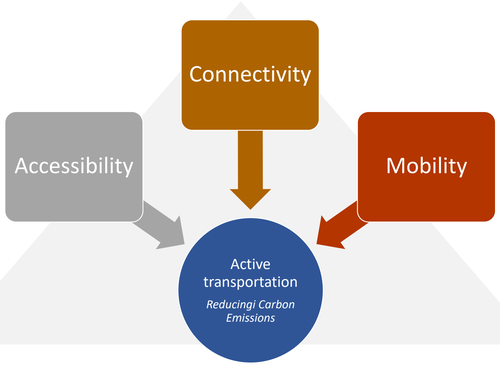
This approach aims to reduce external costs of car use such as greenhouse gas emissions; focusing as well on trip lengths (20-minutes) and mode of travel rather than the number of trips, as trips or activities are important for inclusion and wellbeing (Stanley and Hensher, 2011). Therefore, we explored mobility, connectivity, and accessibility to address these trip lengths gaps within the City.

Research Gap

The need to have the proper infrastructure to support walking, biking and public transportation to meet daily needs to live a healthy, social, and sustainable life within a 20-minute trip from home.

Research Question

By evaluating Adelaide's commute conditions, what amenities are within 20 minutes walking & biking? As well as how is Adelaide's amenities impacted by distance? What categories are most salient in connectivity or lack thereof?



II. Methods

We analyzed both the city of Adelaide, Australia and its greater metropolitan area to measure their functionalities as 20-minute cities using geospatial data.

Our research focuses on analyzing how much of each statistical area is within a twenty-minute distance either by walking or biking to specific types of amenities. These categories of amenities include supermarkets, schools, cultural centers, parks, healthcare, frequently utilized services, and civic institutions. *Table 1* shows the variables we want to explore.

We use data from the Australian Bureau of Statistics for average commute-to-work distances reported for residents living within each statistical area. Using the main seven amenities, we were able to conduct an analysis of over 3,630 data points to examine whether average commutes are reasonably completed via walking or biking, and how those commuting distances compare with amenity distributions.

Table 1: Categories and Datasets

Food	Schools	Culture	Healthcare	Parks	Services	Civil Institutions
Supermarket	Kindergartens	Community Centers	Hospitals	Parks	Banks	Library
	Schools	Cinemas	Doctors	Playground	Post Office	Government Office
	Colleges	Theaters	Dentist	Sports Pitch	Beauty/ Hairdresser	Police Station
	Universities	Art Gallery/ Center	Clinic	Track	Dry Cleaning/ Laundry	Fire Station
		Museums				

III. Results

Figure 1: *Amenities in relationship to walkability and bikeability.*

These maps show the areas around every identified instance of amenity in which a person could travel to the amenity location by either a 20-minute walk or bike ride. This map also indicate the deficiency areas.

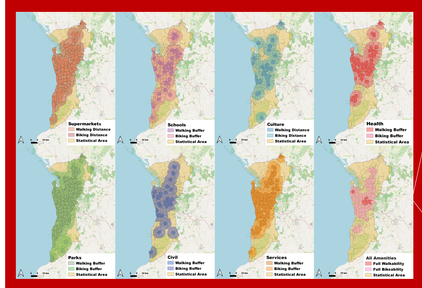
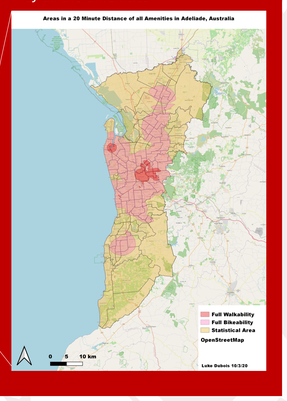


Figure 2: *Area in 20-minute distance of all the amenities*



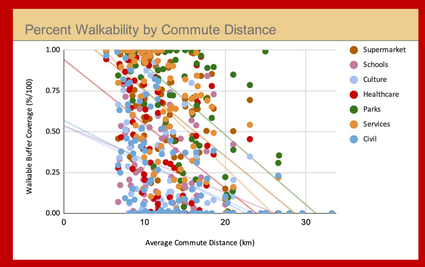
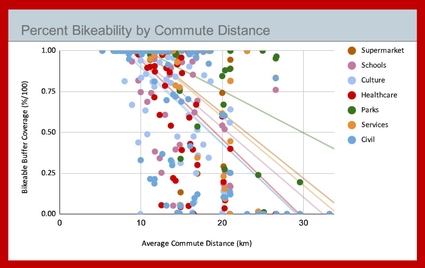


Figure 3:
The slope in the trend line plotted along with the scatter plot shows a negative correlation between the percentage of area covered by walkable distances and the average commuting distance, meaning that the longer a person commutes to work the less likely they are to live near these amenities.

Figure 4:
Commuting distances by bike should be within the same 3-mile (4.8 km) distance that amenities were constrained to in order to comply with a 20-minute travel time.



IV. Conclusions

Adelaide's carbon emission related to transportation have increased drastically in the last decades, this posses a dichotomy and a unique challenge to the City sustainable goals. Cities like Adelaide should consider investing in other modes of transportation to meet sustainable goals, as well as, to address connectivity, mobility and accessibly gaps. Cities should aim to provide alternatives to car use by providing anything a person might need within a 20-minute walk or bike ride. Therefore, by utilizing a twenty-minute city framework, municipalities have another tool in creating more lively, healthy, and sustainable cities. Future research should consider street design elements to approach connectivity to these amenities and other modes of transportation.

Sources

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