

Cycling as commuting means in the mountainous Tbilisi, Georgia

G. Kankia¹ L. Zhvania²

1 - Urban & Regional Planning, Stockholm University, Sweden & University of Granada, Spain | Urban Geographer at Z.axis

giorgi@zaxis.ge

2 - Geoinformatics for Urbanised Society, University of Tartu, Estonia | Human Geography, Tbilisi State University, Georgia

lika@zaxis.ge

INTRODUCTION

Cycling as an important transportation mode has been gradually becoming a key topic of among planners. However, challenges with turning cycling into an attractive and vital modes of transportation system, differs drastically among and within nations and regions.

Governmental policies are crucial for making cycling a safe and essential part of the urban mobility system. To that end, policies need to integrate and deal with aspects of land-use, urban sprawl, housing, environment, taxation, and parking. Mixed land-use approach has become central in planning sustainable transportation system, as it provides a compact urban environment with short bike routes, creating a much pleasant opportunity for cycling.

Cycling has advantages over other types of transport means, including the reduction of noise and air pollution, next-to-zero consumption of non-renewable resources, less space for parking etc. On the other hand, factors such as history, social culture and attitudes, climate, and topography may also contribute to its development as a transport mode. The latter sometimes is used as a strong argument for advocating against cycling and depict it as a disadvantageous mode of mobility in mountainous cities. Though, nowadays as electronic bicycles are increasingly popular, physical barriers, such as steep relief is becoming less of a concern for policy-makers.

Cycling as a means of commuting is frequently integrated with public transport. Integration implies, for instance, installing bike parking at bus stops and railway/metro stations or adding racks on a public bus/train. Developing such infrastructure is vital for making cycling comfortable and safe. Safety does not necessarily refer to wearing helmets and other equipment types but to having separate bicycle paths and lanes, safe intersections, bike parks at stations and stops, etc.

In bike-friendly countries, fatality and injury rates while cycling are decreased due to prioritizing bicycles when developing transport infrastructure. Cycling in urban areas is optimal for short and medium distance rides, up to 10-15 km.

STUDY AREA



Figure 1. Administrative division of Tbilisi

Tbilisi is the capital and the largest city in Georgia, with a population of 1.12 mln (census, 2014), with additional flows of people from other parts of the country (students, job-seekers etc.).

The city's transportation system is primarily car-oriented, and public transport is congested, making everyday mobility uncomfortable.

There is also a widespread claim that the bicycle as an alternative transportation means has no perspective due to the topography. Such arguments hinder the development of bicycle infrastructure and serve as a foundation for wrong attitudes and beliefs.

DATA & METHODOLOGY

Official/Public data: Tbilisi City Hall (administrative units of Tbilisi); Tbilisi Transport Company, TTC (public transport); GeoStat (population distribution, census 2014).

Survey data: Tbilisi City Hall (transportation household survey in Tbilisi metropolitan area, 2016).

Open source data: OpenStreetMap Contributors (street and road network); OpenTopography (relief).

Crowdsourced data: Expat and Georgian cyclists & The Caucasus Cycling Network, CCN (safe cycling in Tbilisi).

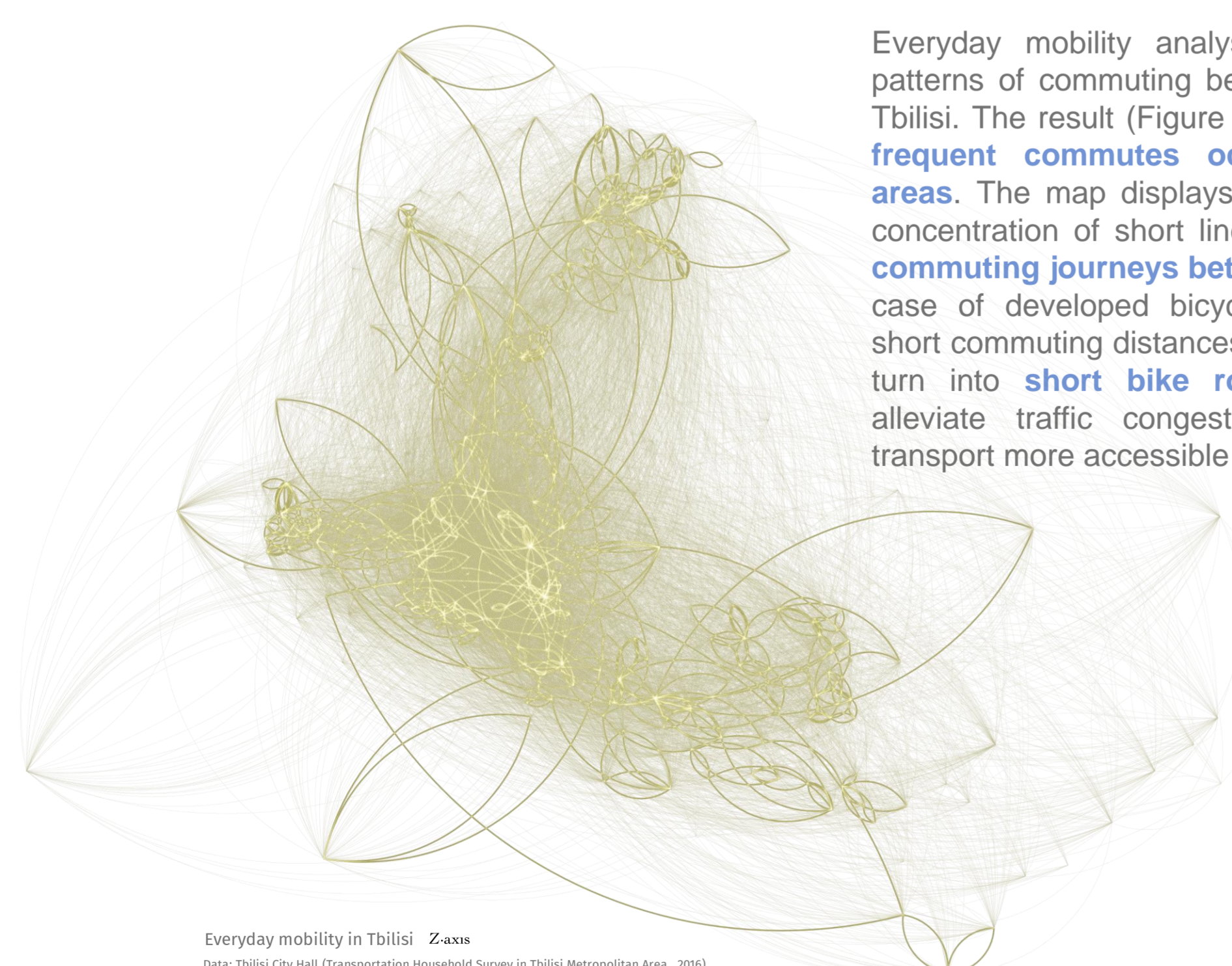
Mobility Analysis: Origin Destination (OD) Matrix Analysis is used to observe the spatial patterns of mobility between different parts of Tbilisi. OD Matrix is created based on neighbourhoods of micro zones (nearly 345).

Street Network and Slope Analysis: As cyclehighways.eu highlights, a road surface with a gradient of ≤6% can be regarded as acceptable for bicycle users to move around comfortably and without much effort. In Figure 3, streets coloured in green meet this criterion while streets highlighted in red colour ramp would be too hard to cycle on for average users.

Crowdsourced data analysis: Data Classification and Cartography Tools are used to analyse and visualise the reported data about cycling in Tbilisi. In Figure 4, along with crowdsourced data, the relief and population density (one dot is equal to one person) are also depicted.

GIS tools: Spatial Analysis and Cartography tools.

RESULTS



Everyday mobility in Tbilisi Z-axis
Data: Tbilisi City Hall (Transportation Household Survey in Tbilisi Metropolitan Area, 2016).

Figure 2. Mobility in Tbilisi

Everyday mobility analysis reveals the spatial patterns of commuting between different parts of Tbilisi. The result (Figure 2) shows that the most frequent commutes occur between nearby areas. The map displays various clusters with a concentration of short lines that indicate shorter commuting journeys between two points. In the case of developed bicycle infrastructure, these short commuting distances have the opportunity to turn into short bike routes that would help alleviate traffic congestion and make public transport more accessible and attractive.

The Tbilisi street network and slope analysis reveals that topography is not really a big issue for the development of adequate cycling infrastructure and that, in fact, cycling does really have a perspective.

According to the map (Figure 3), the city's central part and street network have convenient slope parameters for cycling. Except for a few particular areas (shown on a map in the red colour ramp), relief does not impact the development of bicycles as a means of transportation.

The analysis does not consider aspects of road width, speed limit, perceptions of safety, and weather that can be part of a further, more thorough analysis.

In light of recent urban mobility reforms in Tbilisi, this analysis lays the foundation for further infrastructural improvements in cycling infrastructure and its integration with the rest of the mobility system, and primarily public transit network.

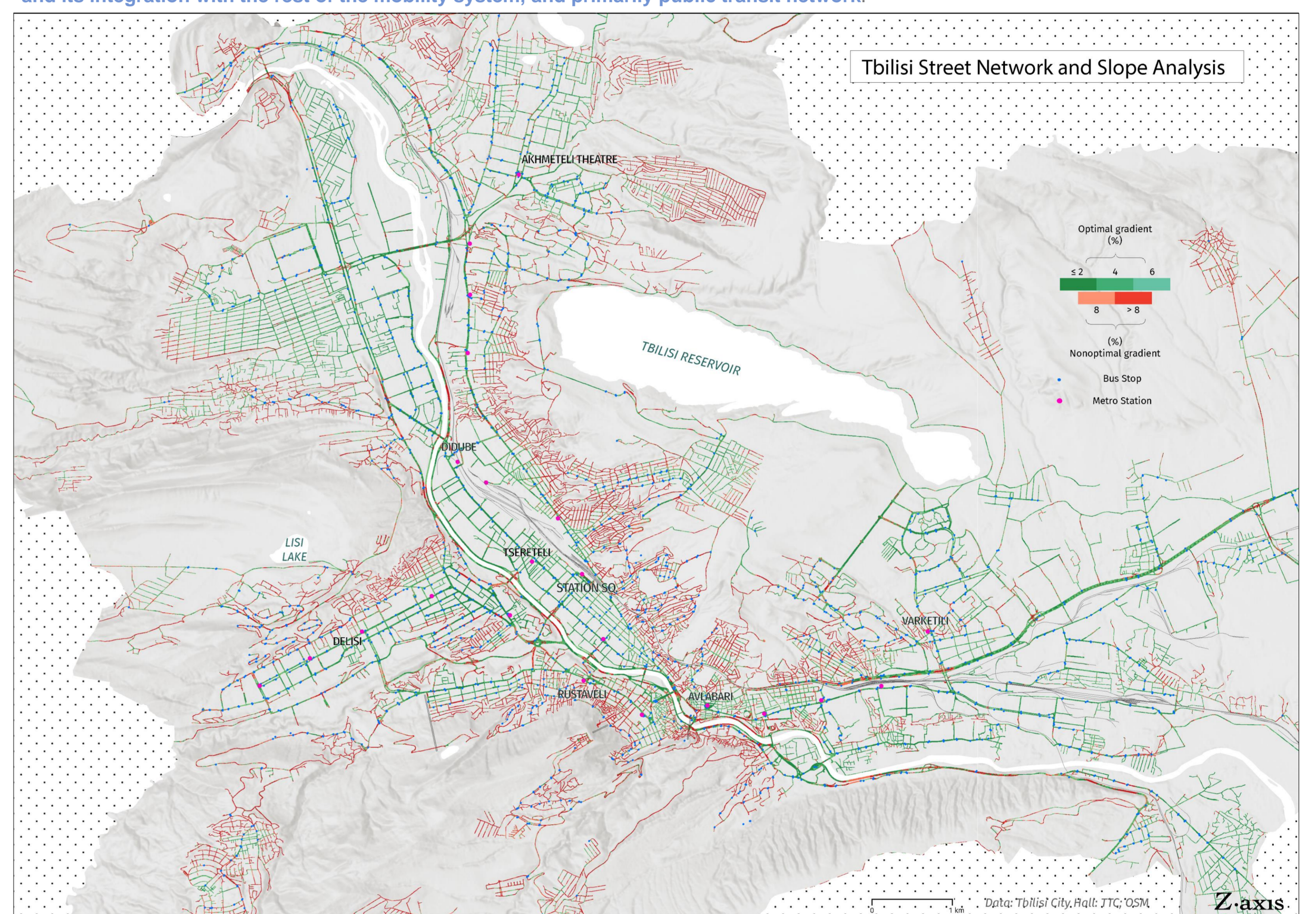


Figure 3. Street network and Slope Analysis - Tbilisi

Tbilisi's topography does not impede cycling. However, crowdsourced data analysis suggests that the inadequate bicycle infrastructure is an important obstacle.

According to the map (Figure 4), a dedicated bike path represents small segments with no links to each other. Cycling mainly takes place on the sidewalks or along the roads or streets.

The crowdsourced data gathered by the local and expat bike users, together with CCN, is crucial for the improvements in bicycle infrastructure.

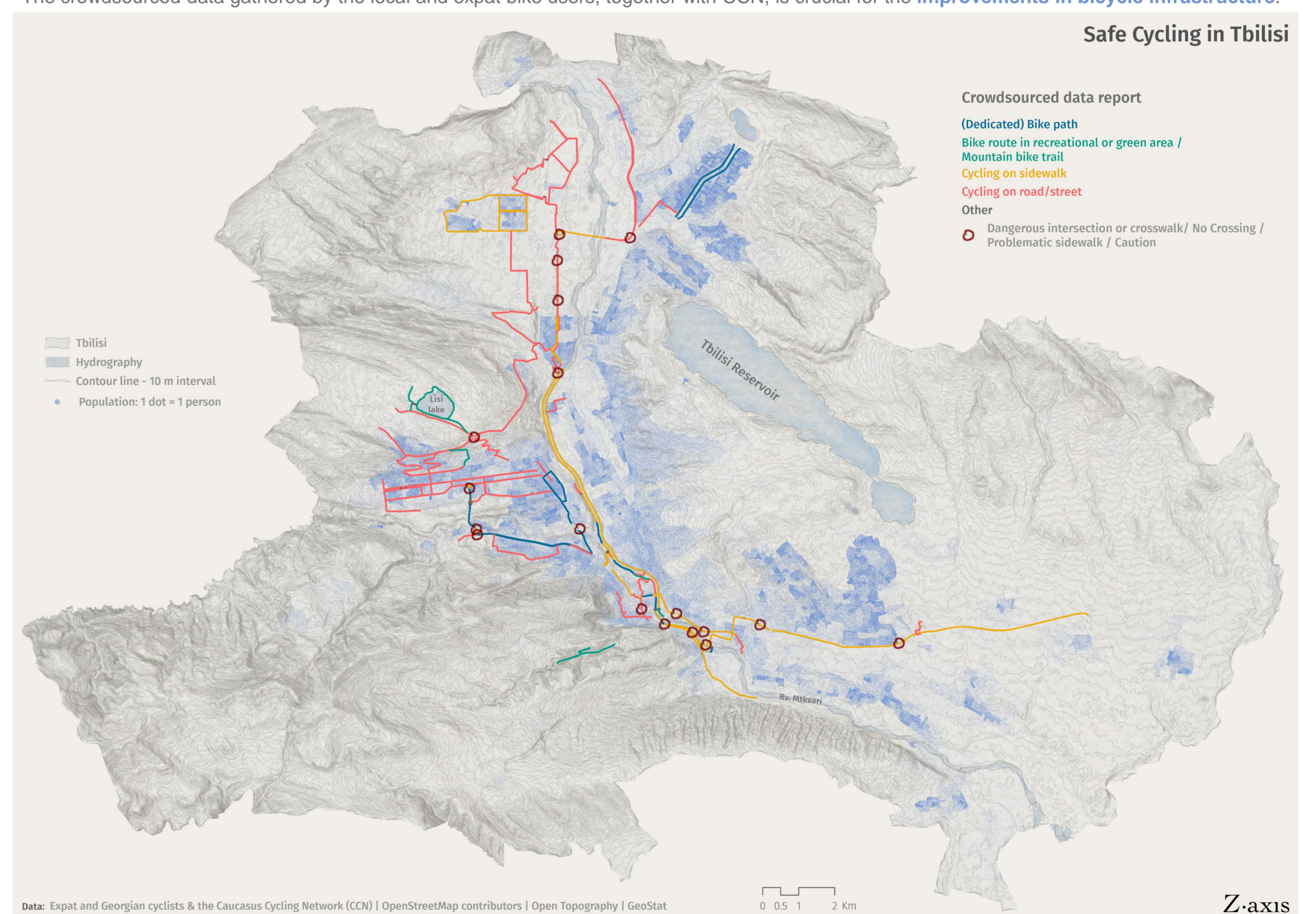


Figure 4. Crowdsourced data on cycling - Tbilisi

Referenzen

- Pucher, John., Buehler, Ralph., 2008. Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. Transport Reviews. A transnational Transdisciplinary Journal: 495-528. DOI: 10.1080/01441640701806612.

Kontakt

Irakli Kavtaradze

info@zaxis.ge

+995 555 30 06 71

<https://zaxis.ge/>