Measuring the bikeability in Amsterdam across PC4 areas

Case Study - Final Presentation

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Introduction

Biking is gaining significance due to the rising interest in bicycle usage

Measuring the bikeability is crucial for assessing a city's cycling infrastructure

There are no one-size-fits-all equation

Research Question

What is the bikeability of Amsterdam across PC4 areas in terms of grenness, biking infrastructure, and parking facilities?

Literature Review

- Eye-level greenness significantly influences cycling frequency, with visible greenery within 500m to 1500m boosting cycling and integrating it with public transport - Wanga et al. (2020)
- Design features such as quick routes and dedicated bike lanes are crucial for encouraging cycling; wider and protected bike lanes increase active transportation, suggesting that infrastructure development is key for cyclist and pedestrian quality - Silva et al. (2011) and Aziz et al. (2018)
- Efficient bike parking management and integration into city planning are essential for improving the bikeability experience and supporting sustainable mobility - Van der Spek and Scheltema (2015) and Schmid-Querg et al. (2021)

Methodology

Data: Amsterdam.nl and CyclOSM

Geopandas : Data cleaning and spatial operations

QGIS: Visualisation

Folium: Visualisation in notebook

Methodology: Greenness

- Map algebra between PC4 and green areas
  - Map Algebra functions, Field Calculator
  - Polygon in Polygon overlay
- Aggregation by PC4 area
- Visualisation on QGIS

Methodology: Infrastructure Quality

- Biking Network from Amsterdam.nl
- Assigning quality scores to bike lane types (Schmid-Querg et al. (2021))
- Map overlay, interaction with PC4 areas
- Measured the weighted average of the quality score per PC4

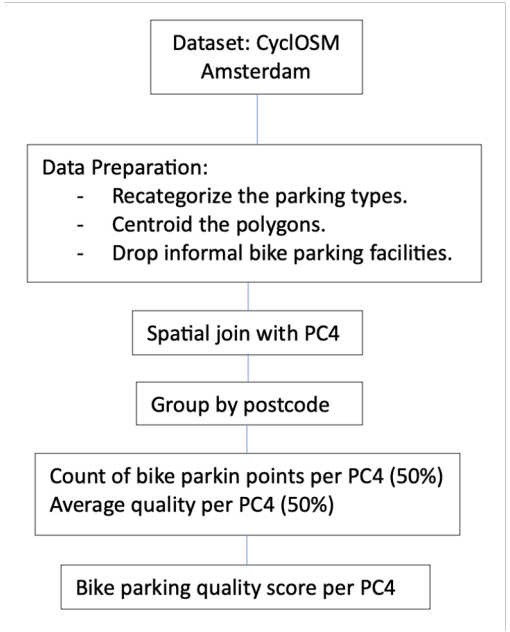
Table A1. Bicycle infrastructure.

Type of Street or Cycling Infrastructure	Abbreviation in Attribute Table	Value (1–10)
Broad bike path, both-sided	RWb	10
Broad and narrow bike path	RWb_RWs	9
Narrow bike path, both-sided	RWs	8
Cycling street	FS	7
Narrow bike path and bike lane	RWs_RS	7
Bike lane, both-sided	RS	6
Advisory bike lane, both-sided	SSt	5
Regular street	None	3
One-way street, open	EBo	3
One-way street with advisory bike lane	EB_RS	3

Methodology - Bike Parking Amenities

- OpenStreetMap
- Data cleaning and preparation
- Bike parking amenities categories and weights (Schmid-Querg et al. (2021))
- 72 out of 85 PC4 areas
- Spatial Join and group by PC4:
- Count of nike parking points per PC4 (50%)
- Average quality per PC4 (50%)

Type of Parking Facility	Value (1–10)
Bike Locker	10
Roofed bike rack	8
Regular bike rack	6
No bike rack	2



Methodology: Final Equation

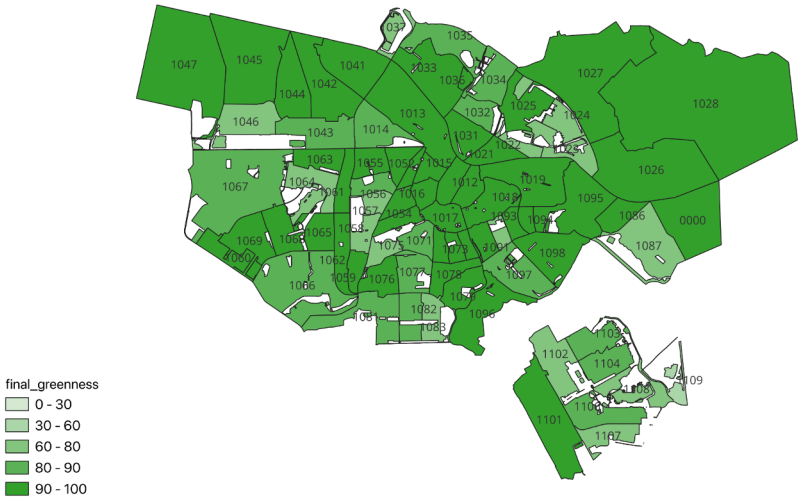
$I = \text{Infrastructure Quality}$
$P = \text{Parking Quality}$
$G = \text{Greenness}$

The weights for each feature are:
$\text{w}_I = \text{Weight for Infrastructure Quality} = 50\%$
$w_P = \text{Weight for Parking Quality} = 25\%$
$w_G = \text{Weight for Greenness} = 25\%$

The Bikeability Score is calculated as:
$$\text{NQS} = (\text{w}_I \times I) + (w_P \times P) + (w_G \times G)$$

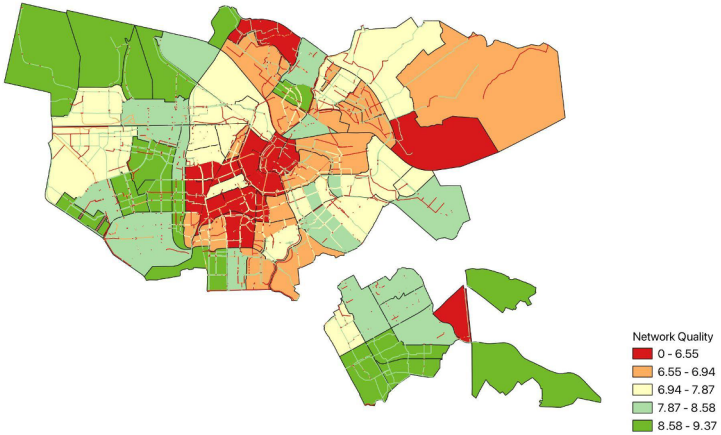
Ref: Schmid-Querg et al. (2021)

Results - Greenness



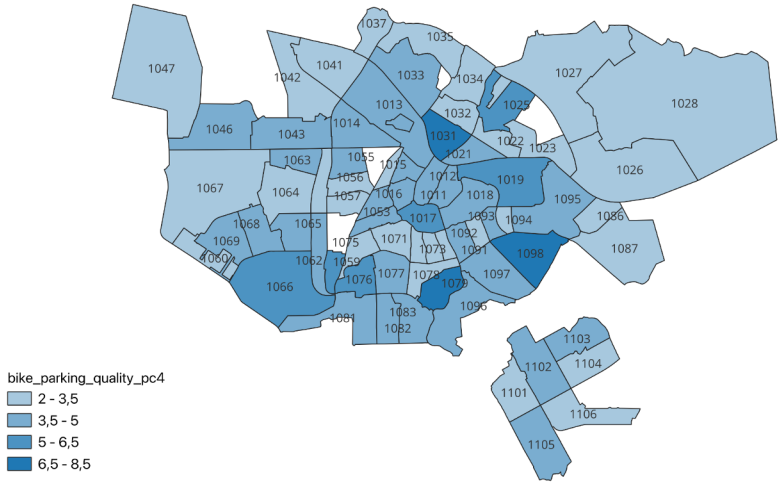
Results - Infrastructure Quality

Infrastructure Quality Grade per PC4 - Amsterdam

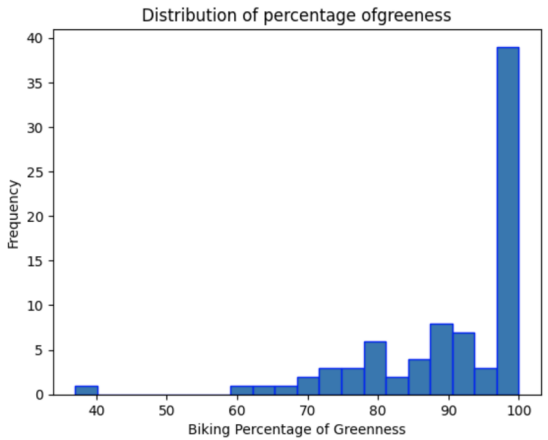


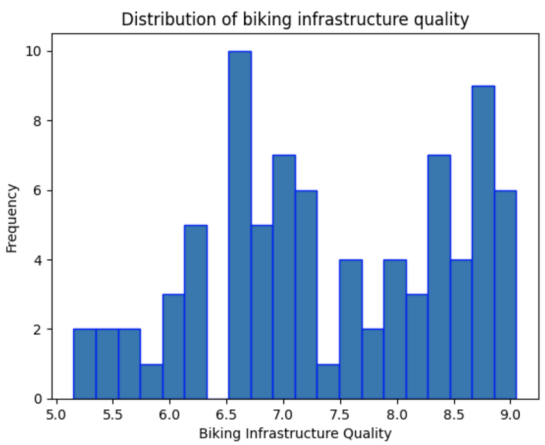
Amsterdam Biking Network Quality Grades

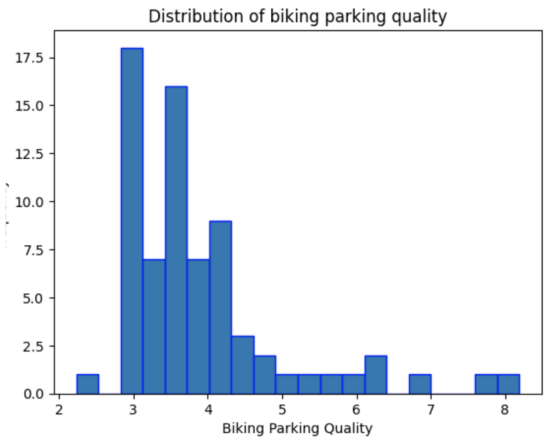
Results - Bike Parking Amenities



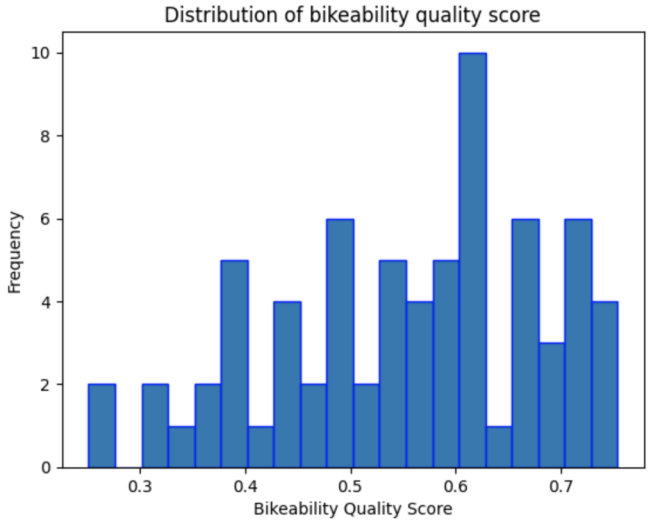
Results

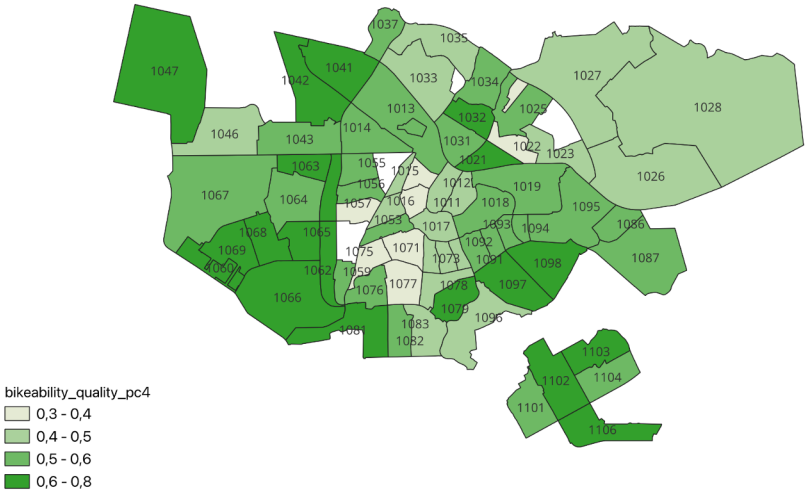

Distribution of percentage ofgreeness
Frequency
Biking Percentage of Greenness
0
5
10
15
20
25
30
35
40
40
50
60
70
80
90
100


Distribution of biking infrastructure quality
Frequency
Biking Infrastructure Quality
0
2
4
6
8
10
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0


Distribution of biking parking quality
Biking Parking Quality
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
2
3
4
5
6
7
8

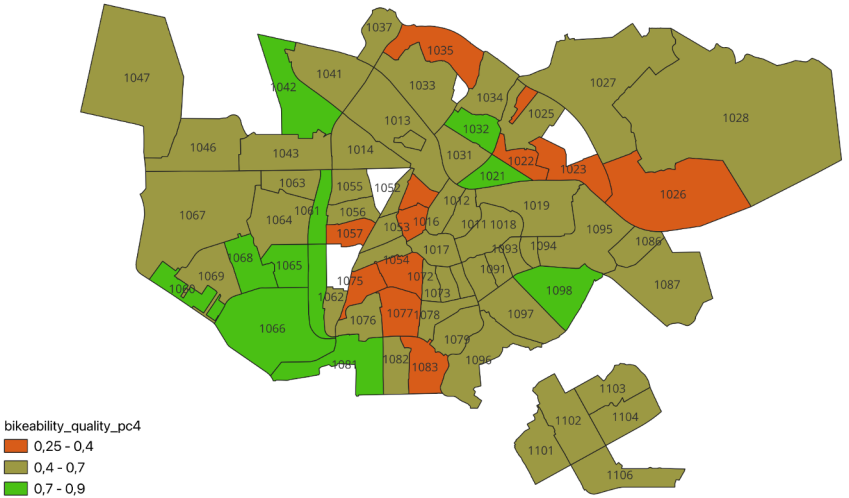
Results - Overall Quality





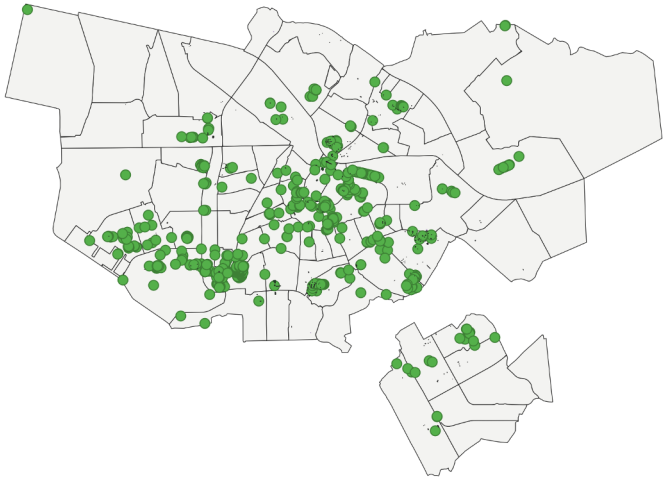
Results

Highest Quality	Score	Lowest Quality	Score
1066	0.75	1071	0.25
1060	0.75	1075	0.26
1032	0.73	1057	0.31



Conclusion & Discussion

- Overall overview the quality of greenness, biking infrastructure, and bike parking facilities
- Calculated bikeability quality score for 71 out of 85 PC areas
- Most PC4 areas show high greenness
- Biking infrastructure quality is generally high
- Bike parking amenities have low quality
- **Data Source Limitation:** CyclOSM




Q&A

References

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