

BIKE (Bicycle Integration Key Elements) Index: Benchmarking urban bikeability and cycling readiness. Evidences from European capitals

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Abstract-

This study introduces the BIKE Index, a multi-dimensional and reproducible framework for evaluating urban cycling conditions across cities, developed in response to the lack of standardized tools for assessing bikeability in urban areas. The index integrates four key dimensions into a composite score: Cycling Infrastructure, Cyclist Services, Environmental Constraints, and Safety and Street Quality. The dimensions are derived from open data sources, and consistent geospatial methods, including urban perimeters derived from Local Administrative Units and a standardized set of 210 cycling routes per city.

The methodology is applied to thirteen European capital cities using harmonized data from OpenStreetMap, OpenRouteService, Eurostat, Google maps, and E-OBS climate datasets. The results reveal significant disparities in cycling conditions, with scores ranging from Amsterdam (best) to Rome (worst). While infrastructure emerges as the primary differentiator, services, environmental factors, and safety also play critical roles. These findings suggest that creating cycling-friendly cities requires coordinated progress across all four dimensions. The BIKE Index offers a transparent and scalable methodology for benchmarking cycling conditions, enabling consistent comparisons and supporting evidence-based planning and policy making strategies.

Index Terms- Mobility; Bicycle; Composite indicator; Bikeability; Infrastructure; Sustainability; Urban planning; Bike sharing

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