CIVITAS
Sustainable and smart mobility for all
2030

CIVITAS indicators

Bike-reserved paths connectivity index – Version 1 (TRA_BK_CN1)

DOMAIN

Transport	Environment	Energy	Society	Economy

TOPIC	**Bicycle**	
IMPACT	**Connectivity of bike network** *Improving the connectivity of bike-reserved paths network*	**TRA_BK**

Category

Key indicator	Supplementary indicator	State indicator

CONTEXT AND RELEVANCE

Cycling is an environmentally and socially sustainable alternative to motorized private transport. Well-connected bike networks provide safe, direct routes that encourage more people to cycle, lowering carbon emissions associated to transportation. They support an efficient use of public space, as they reduce the need for extensive car parking infrastructure, and they foster public health by integrating physical activity and transportation. Bike networks can also bridge gaps in public transportation, improving access to transit hubs, workplaces and services. It is therefore desirable to develop well-connected urban bike networks to improve sustainability, accessibility, and health in urban environments.

This indicator provides a measure of the connectivity of the network of bike reserved paths. **It is a relevant indicator when the policy action is aimed at increasing the number of origin-destination pairs within a specific area of the city for which a bike route entirely on reserved paths exists. A successful action is reflected in a HIGHER value of the indicator.**

DESCRIPTION

This indicator is an index obtained as ratio between the **total length of bike-reserved paths in the experiment area** and the total length of roads within the experiment area. The indicator is **dimensionless**.

METHOD OF CALCULATION AND INPUTS

The indicator should be computed exogenously, by applying the method described and then coded in the supporting tool.

Method

Calculation of the index based on the map of bike reserved paths and the map of roads	Significance: **0.25** 

INPUTS

The following information is needed to compute the indicator:

a) A map of the roads on in the experiment area
b) A map of the bike reserved paths in the experiment area

The experiment would add new sections to the bike reserved network, resulting in a modification of the map of bike reserved lanes in the experiment area.

METHOD OF CALCULATION

The indicator should be computed exogenously according to the following steps:

- **Calculation of the total length of the road network within the experiment area**. This calculation can be obtained from the map of roads using a GIS application.
- **Calculation of the total length of the bike paths within the experiment area**. This calculation can be obtained from the map bike paths using a GIS application.
- **Estimation of the index** by computing the ratio between the length calculated in the second step and the length calculated in the first step.

EQUATIONS

The equation computing the index (last step of the method of calculation) is the following:

$$\boldsymbol{BkConnIndex = \frac{BkPLnght}{TotRoadLnght}}$$

Where:

$WBkPLnght$ = Length of bike paths in the experiment area

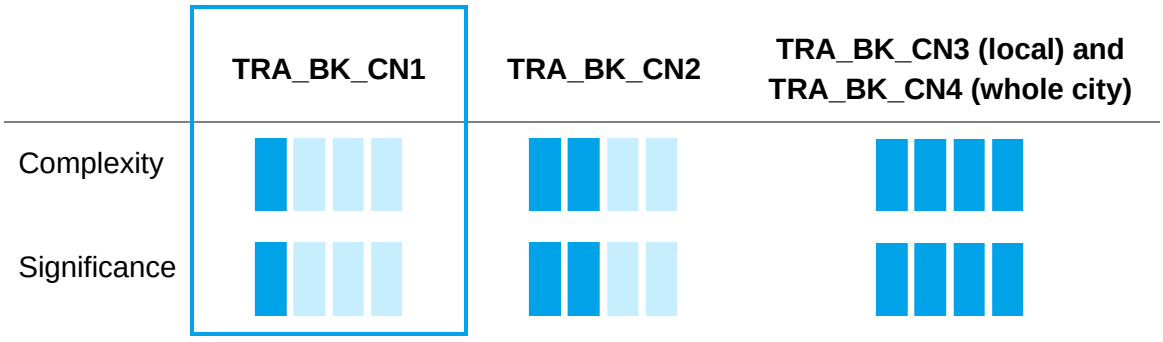
$TotRoadLnght$ = Total length of roads in the experiment area

ALTERNATIVE INDICATORS

This indicator assesses the connectivity of the bike-reserved network in an experiment area by measuring the share of length of bike paths out of total length of roads in the area.

A more complex and more significant version of this indicator is **TRA_BK_CN2**. It considers the length of bike paths in the area, with different path categories (e.g., painted bike lanes, segregated bike paths) being weighted differently, to reflect higher or lower quality of bike infrastructure. Both TRA_BK_CN1 and TRA_BK_CN2 can be used for local and whole city experiments.

TRA_BK_CN3 and **TRA_BK_CN4** measure the connectivity of bike-reserved networks accounting for the number of OD pairs that can be travelled cycling entirely on bike-reserved paths. They target local experiments and whole city experiments, respectively. These two indicators have higher significance since they reflect the actual usability of bike infrastructure for complete trips and capture network cohesion but require more complex input data.



It should also be noted that bike connectivity is one of the three components of **TRA_FC_AC1**. This indicator combines public transport connectivity, bike connectivity and road congestion to assess overall accessibility. The online tool automatically computes **TRA_FC_AC1** if the three sub-indicators have been calculated.