CIVITAS
Sustainable and smart mobility for all
2030

CIVITAS indicators

Car ownership index: average number of cars per household (TRA_CC_CO1)

DOMAIN

Transport	Environment	Energy	Society	Economy

TOPIC	**Car Centrality**	
IMPACT	**Car ownership** *Reducing private car ownership*	**TRA_CC**

Category

Key indicator	Supplementary indicator	State indicator

CONTEXT AND RELEVANCE

Car ownership refers to the possession of private vehicles for transportation needs. A high rate of car ownership leads to increased car usage in urban areas, contributing to challenges such as air and noise pollution and sedentarism. Car use in cities also impacts urban planning, as roads and parking take up valuable space that could otherwise be used for public amenities, green spaces, or pedestrian-friendly infrastructure.

This indicator provides a measure of car ownership in the experiment area. **It is a relevant indicator when the policy action is aimed at decreasing car ownership. A successful action is reflected in a LOWER value of the indicator.**

DESCRIPTION

This indicator measures the **average number of cars owned per household** in the experiment area.

The unit of measurement is **cars per household**.

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 responses to a sample survey	Significance: **0.75** 

INPUTS

The following information should be collected by means of **sample survey** for each respondent:

a) **The number of cars available in the household**. This includes vehicles under both *legal ownership* by a household member and *functional ownership*, e.g., long-term leased cars, company-provided cars for private use, etc.

See the document **"Suggestions and recommendations for sample surveys"** for general indications on how a survey should be organised (sample selection, sample size, administration, etc.).

The experiment would result in a modification of the number of cars available to households in the experiment area.

METHOD OF CALCULATION

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

- Calculation of the total number of cars available to households in the sample (see equations below).
- Estimation of the indicator (see equation below).

EQUATIONS

The equation computing the total number of cars available to sample households is:

$$\boldsymbol{TotCar} = \sum_{\boldsymbol{h}} \boldsymbol{Cars_h}$$

Where:

h = set of sample households

$Cars_h$ = cars available to household *h*

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

$$\boldsymbol{CarOwnIndex} = \frac{\boldsymbol{TotCar}}{\boldsymbol{HH}}$$

Where:

$TotCar$ = Total number of cars available to the households in the sample

HH = Number of households in the sample

ALTERNATIVE INDICATORS

This indicator assesses car ownership in the experiment area through data collected via a sample survey. Alternative indicator **TRA_CC_CO2** relies instead on data from vehicle registrations and census. This makes TRA_CC_CO2 more significant, since it uses whole population data rather than considering a sample. In addition, TRA_CC_CO2 may be less complex to calculate, since no survey needs to be administered; instead, the required inputs are collected from governmental registers. It should be however noted that TRA_CC_CO2 only allows to assess whole city experiments, since data on registered cars is oftentimes published only at a level of spatial aggregation coarser than sub-city areas. Meanwhile, TRA_CC_CO1 can be used for **both local and whole city experiments**, as sample respondents may be selected as needed. Furthermore, the two indicators **differ slightly in meaning and scope**: TRA_CC_CO1 assesses cars available to households for personal use, while TRA_CC_CO2 considers all registered cars, including, for example, fleets for business use. As such, the former indicator is the most appropriate if the intention is to evaluate motorization rates for personal uses, while the latter is a more accurate representation of the global presence of vehicles in an urban area, regardless of their use type.

The sample survey required to compute this indicator may also allow to estimate other indicators concerning cars in urban areas, provided that respondents are asked to specify the engine type of their cars. These include **ENV_DC_APV2** (share of Electric/hydrogen vehicles in the passenger road vehicles fleet), **ENV_DC_EF2** (average CO2 emission per vkm of road vehicles in the fleet) and **ENV_PL_PF2** (average polluting emission per vkm of road vehicles in the fleet).