CIVITAS
Sustainable and smart mobility for all
2030

CIVITAS indicators

Share of public transport on commuting trips (TRA_CC_MSC)

DOMAIN

Transport	Environment	Energy	Society	Economy

TOPIC	**Car centrality**	
IMPACT	**Modal shares** *Increasing the modal share of public transport for commuting trips*	**TRA_CC**

Category

Key indicator	**Supplementary indicator**	State indicator

CONTEXT AND RELEVANCE

Modal shares refer to the adoption of different transportation modes within an area, such as private cars, public transport, cycling, and walking. This indicator helps assess the effectiveness of policies promoting public transport for commuting trips. Public transport is an environmentally and socially sustainable mode because it can carry a large number of passengers in a single vehicle, thereby reducing energy consumption, emissions per person and road space usage compared to individual private vehicles. Increasing the adoption of public transport in urban areas is crucial for reducing car trips and addressing urban challenges like congestion, pollution, road safety, and inefficient use of public space.

This indicator provides a measure of the share of commuting trips in the experiment area made by public transport. **It is a relevant indicator when the policy action is aimed at shifting commuting trips from private cars to public transport. A successful action is reflected in a HIGHER modal share of public transport compared to the BAU case.**

DESCRIPTION

This indicator consists of the modal share of public transport for commuting trips in the experiment area **based on the number of trips**. The indicator is based on trips rather than on passengers-km for two reasons. First, for sake of simplicity as measuring trips is easier than measuring passengers-km. Second, because passengers-km can be affected by spurious effects; for example, passengers-kilometres can increase because existing public transport users start commuting longer distance, such as when they change jobs to locations further from home, rather than because more people are choosing to use public transport.

The indicator is expressed as a ratio and is therefore **dimensionless**.

METHOD OF CALCULATION AND INPUTS

There are two alternative methods available to calculate this indicator, differing in the sources used to determine the public transport modal share. The two approaches vary in both complexity and significance. In both cases, the calculation is performed **exogenously**, and the resulting value is then entered into the tool.

The methods of calculation refer especially to the after-experiment and the BAU conditions. The modal share in the before-experiment condition can be already known from some existing study (e.g. an urban plan). **If so, it should not be calculated using one of the available methods, but just reported in the supporting tool**. Nevertheless, if the before-experiment modal share is unknown, one of the methods can be applied.

METHOD 1	METHOD 2
Modal share extracted from an urban transport model	**Modal share estimated from a sample survey**
Based on a theoretical calculation rather than on observation	Based on self-declared behaviour
Complexity 	Complexity 
Significance 	Significance 

Method 1

Modal share extracted from an urban transport model	Significance: **0.50** 

INPUTS

The input needed to compute this indicator is:

a) An urban transport model representing all relevant modes and distinguishing between trip purposes.

The experiment would be reflected in the modification of some exogenous variables of the urban transport model. The modification would be the translation in terms of modelling inputs of one or more interventions included in the experiment.

METHOD OF CALCULATION

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

- **Identification of model inputs that can be used to simulate the experiment**. Given the structure of the model, there will be elements that can be changed exogenously to interpret the content of measures included in the experiment. For instance, the definition of a pedestrian area can be modelled by closing some network links to motorised modes. Most likely, not all measures can be handled within a transport model. For instance, the provision of parking space for bicycles is probably not in the scope of a transport network model. In some cases, measures can be handled indirectly, by assuming the modification induced on model variables. For instance, the introduction of tradable mobility permits could be modelled in terms of modification of transport costs.

- **Quantification of model inputs**. Definition of the size of the changes applied to the exogenous model inputs (e.g. modification of travel costs).

- **Simulation of the experiment**. Application of the transport model with the inputs defined in the previous steps.

- **Extractions of the modal share of public transport on commuting**. Modal shares based on trips can be a pre-defined output provided by the model or can be computed by extracting model outputs (e.g. modal origin-destination matrices)

EQUATIONS

If the transport model does not directly provide modal shares but only trips by mode for different demand segments and purposes, the modal share of public transport for commuting trips should be computed according to the equation:

$$\boldsymbol{CommModShr_{PT}} = \frac{\sum_d {}^d\boldsymbol{CommTrips_m}}{\sum_m \sum_d {}^d\boldsymbol{CommTrips_m}}$$

Where:

${}^dCommTrips_m$ = Number of modelled commuting trips by transport mode *m* for demand segment *d*

In case the model output is the number of trips by mode and by origin-destination, the equation above applies to the summation of trips across all origin-destination pairs between urban zones.

Method 2

Modal share estimated from a sample survey

Significance: **1.00**

INPUTS

The input needed to compute this indicator is:

a) Answers from a sample of individuals to questions about the transport mode used for their commuting trips.

The experiment would be reflected in the modification of the transport mode chosen by citizens for commuting trips and in the consequent modification of their answer.

METHOD OF CALCULATION

The indicator should be computed **exogenously** taking **results from a sample survey**. 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.). As regard of the estimation of modal shares, the following specific methodological aspects apply:

- The transport modes used for urban trips should be requested referring to one specific day (e.g., the day before, the last working day if the day before was a holiday).

- The transport modes used for all urban trips made in the reference day should be requested.

- The format of the questions made to collect the transport modes used can change depending on the scope of the survey (which can be used to collect other information) and on the platform used to administer the questionnaire. To compute this indicator, the survey should at least collect data on the main transport mode used by the respondent for commuting trips. However, collecting a broader set of information adds minimal burden on respondents while allowing multiple indicators to be calculated from a single data collection. See *Alternative indicators*. It is therefore recommended that the survey formulation asks the respondent to provide both the main transport mode and other transport modes for each trip made in the reference day, as summarised in the table below.

Trip purpose	**Main transport mode**	**Other transport mode(s)**
Commuting	Walk	Bike (private or shared)
Optional:	Bike (private or shared)	Scooter (private or shared)
Other working	Scooter (private or shared)	Motorbike/Moped (private or shared)
Education	Motorbike/Moped (private or shared)	Car (private or shared) as passenger
Escorting	Car (private or shared) as driver	Bus
Visit to parents/relatives	Car (private or shared) as passenger	Tram/Metro/Train
Shopping	Bus	
Personal business	Tram/Metro/Train	
Leisure		
Other		

- Main transport mode should be explained as the mode used for the longest (in distance terms) part of the trip.

- Other transport mode(s) should be explained as mode(s) used to reach the main transport mode from the origin of the trip (e.g., to reach the metro station) and/or to reach the final destination. Walking or car as driver are not considered among “other transport modes” as some walk is almost always required while car is hardly driven to reach other modes of urban trips. Other transport modes **are not used** to estimate modal shares but provide information on intermodality, if relevant.

- It is preferable to pre-define the lists of trip purposes and transport modes to make the elaboration easier.

- For estimating modal shares, it is preferable not to distinguish between private and shared transport means. However, in case the survey is used to estimate other indicators related to shared mobility, the distinction should be introduced in the pre-defined list.

The answers to the survey would provide the number of trips by mode based on which modal shares can be easily computed (see *Equations*).

EQUATIONS

Using the survey answers, the modal share of public transport for commuting trips should be computed according to the equation:

$$\boldsymbol{CommModShr_{PT}} = \frac{\boldsymbol{CommTrips_{PT}}}{\sum_m \boldsymbol{CommTrips_m}}$$

Where:

$\boldsymbol{CommTrips_m}$ = Number of commuting trips by **main** transport mode *m*

ALTERNATIVE INDICATORS

This indicator describes the modal share of public transport for commuting trips in the experiment area using traffic modelling or surveys. Meanwhile, indicators **TRA_CC_MS1** and **TRA_CC_MS2** estimate modal shares across all trip purposes, using traffic models, surveys, and traffic and on-board public transport counts. The sample survey data collected to compute the indicator described in this factsheet (TRA_CC_MSC) using Method 2 can be also used to compute TRA_CC_MS1, provided that the data collection accounted for trips by all purposes, rather than just commuting trips.