Data Profile – Public Transport Accessibility Indicators Data

Introduction

This dataset is not a new version of the original PTAI data. It is a completely new data product based on new methodology and source datasets. This is the first in a planned series of releases of this data product to reflect changes in transit schedules and location of services.

The Public Transport Accessibility Indicators 2022 dataset offers a series of accessibility indicators at the Lower Super Output Area(LSOA/) level covering the whole of Great Britain (GB) in the United Kingdom (UK). Indicators by public transport include a range of key amenities and services such as: employment; general practice (GP) surgery; hospital; grocery store; supermarket; primary school; secondary school; and urban centre.

Scale and Extent

Field	Value
Data Provider	Urban Big Data Centre
Analytical units	LSOA/DZ
Data format	CSV
Temporal extent	November 2021
Geographical extent	Great Britain (Scotland, England, Wales)

Citation Information

The following statement should be included when citing the use of this dataset:

Urban Big Data Centre. Economic and Social Research Council. Public Transport Accessibility Indicators, 2022 [data collection]. University of Glasgow - Urban Big Data Centre.

Data Access

The Public Transport Accessibility Indicators Data is classified as Open Data under the Open Government Licence v. 3.0 (https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/)

Audience

Data of interest to academic staff for non-commercial research.

PTAIs can be used to study how access by public transport varies across space and it is important for a wide variety of urban research topics. Researchers might be interested in analysing the relation between public transport and employment/unemployment or the effect of access to urban amenities on land prices and gentrification.

Content

Public transport accessibility indicators at aggregated by 2011 statistical geographies.

Method of collection

Origins

Accessibility indicators were estimated for all 41,729 LSOA/DZ in Great Britain. Origins are represented by LSOA/DZ population weighted centroids based on the boundaries defined for the 2011 Census.

LSOA's centroids for England and Wales were produced by the Office for National Statistics (ONS) and manually downloaded from the UK Government open data portal (https://data.gov.uk/) on the 2021-12-12 (version last updated on 2019-12-21). DZ centroids in Scotland are published by the Scottish Government and were manually downloaded from the UK Government's open data portal (https://data.gov.uk/) (version last updated on the 2021-03-26). 32,844 origins are located in England, 6,976 in Scotland, and 1,909 in Wales. The average number of inhabitants within LSOA/DZ for the year of reference 2020 is 1,562 and the mean surface area is 5.5 km^2. On average, zones in Wales and Scotland are larger than those in England.

Destinations

Potential destinations are represented by a range of amenities and services, namely: employment, general practitioner's (GPs) surgeries, hospitals, primary schools, secondary schools, city, greater city, and food stores (supermarkets). The location of destinations is represented by the population weighted centroid of the LSOA/DZ where these lie. The preferred source of information to identify the corresponding LSOA/DZ was the original source of information. If this was not available, the LSOA/DZ code was spatially joined to the services/amenities using the coordinates of destinations at the point

level. If this was not available, a spatial join was performed using the coordinates of destinations at the point level and the LSOA/DZ boundaries. The spatial definition of the LSOA/DZ areal units was obtained from the UK Data Service Census Support boundary dataset. When the coordinates of the destination were not available, the post code (6 digits) was used to match the information with that of ONS Postcode Directory (ONSPD, edition August 2021) accessed online via the Open Geography Portal on: https://geoportal.statistics.gov.uk/). The ONSPD includes the corresponding LSOA/DZ code for each post code defined for the 2011 Census.

Destination sources and selection criteria

The preferred edition of the data was the closest available to the 22nd of November 2021 (the date of departure used for the estimation of travel time).

Travel time estimates

The cost between origins and destinations in accessibility measures is represented by the estimated journey travel time. The software employed to model travel time is R5R, a package for R programming language. The calculations use information from the road and pedestrian network and public transport schedules as the main input. The source of road and pedestrian network data used is OpenStreetMap (OSM). The version employed is the latest as manually downloaded in .PBF format from the Geofabric web platform on the 2021-11-22 for Great Britain. The public transport

timetables were obtained from Bus Open Data Service and Rail Delivery Group.

Model parameters

The modelling parameters follow those used in the Journey Time Statistics (JTS) (DfT 2019) developed by the Department of Transport (DfT) where possible.

Outputs

Travel time matrix

The product of estimating the travel time from each origin to every potential destination results in a so-called all-to-all travel time matrix (TTM). The estimated TTM is included as an output since this can be used as the main input to customise or estimate new accessibility indicators according the needs the users of the present data collection.

Accessibility indicators

The accessibility indicators include: (1) the directory of the output file; (2) the accessibility measure computed for the respective service/amenity, namely cumulative opportunities, relative cumulative, and/or minimum travel time, and; (3) a description of the measure computed.

Quality

The present collection comes with the following limitations:

- The transport model does not include intercity coaches (e.g.

services provided by companies as 'National Express' or 'Megabus'). This is due to the incompatibility in which timetables are published.

- The location of destinations is represented by the respective LSOA/DZ population weighted centroid where the service/amenity falls and not the exact location of it.

- The heterogeneity of sources and/or systems accounting for destination between nations poses challenges resulting from the variability in the criteria employed for collecting data or originating from the actual compatibility of schooling systems. This specially affects hospitals and education establishments. Therefore, caution is advised for making comparison between locations across countries for these type of indicators

- The locations included account only for major brands and do not make a clear-cut distinction between a supermarket and a grocery-shop. This is also related to the lack of official or standard definitions across nations in GB.

Related Datasets

[Glasgow CCTV Automated Object Detection Data](#)

Field Level Metadata – Safeguarded data

Description for Accessibility indicators

type_destination	measure	description
Employment	Cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of employment positions within N minutes by public transport
Employment	Relative cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of employment positions within N minutes by public transport divided by the total number in Great Britain
GPs	Cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of GPs within N minutes by public transport
GPs	Relative cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of GPs within N minutes by public transport divided by the total number in Great Britain
GPs	Minimum travel time	Closest LSOA/DZ that contains at least one GP
Hospitals	Cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of hospitals within N minutes by public transport
Hospitals	Relative cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of hospitals within N minutes by public transport divided by the total number in Great Britain
Hospitals	Minimum travel time	Closest LSOA/DZ that contains at least one hospital
Education: Primary schools	Cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of primary schools within N minutes by public transport
Education: Primary schools	Relative cumulative:	Number of primary schools within N minutes by public

	time cut 15, 30, 45, 60, 75, 90, 105, 120	transport divided by the total number in Great Britain
Education: Primary schools	Minimum travel time	Closest LSOA/DZ that contains at least one primary school
Education: Secondary schools	Cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of secondary schools within N minutes by public transport
Education: Secondary schools	Relative cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of secondary schools within N minutes by public transport divided by the total number in Great Britain
Education: Secondary schools	Minimum travel time	Closest LSOA/DZ that contains at least one secondary school
Urban centre: Main	Minimum travel time	Closest main subcentre.
Urban centre: Subcentre	Minimum travel time	Closest urban subcentre.
Supermarkets	Cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of supermarkets within N minutes by public transport
Supermarkets	Relative cumulative: time cut 15, 30, 45, 60, 75, 90, 105, 120	Number of supermarkets within N minutes by public transport divided by the total number in Great Britain
Supermarkets	Minimum travel time	Closest LSOA/DZ that contains at least one supermarket

Description for Travel Time matrix (TTM)

Variable	Type	Description
fromId	nominal	2011 LSOA/DZ geo-code of origin
toId	nominal	2011 LSOA/DZ geo-code of destination
travel_time_p025	numeric	25 travel time percentile by public transport in minutes
travel_time_p050	numeric	50 travel time percentile by public transport in minutes
travel_time_p075	numeric	75 travel time percentile by public transport in minutes