

Urban transport strategies

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A unit about urban transport issues and solutions

This unit focuses on ways in which transport problems of large urban areas can be managed. It explores the issues around transport management and urban growth in two contrasting large cities: Tokyo in Japan, and Lagos in Nigeria. People living in large cities have become wealthier and bought cars. So the number of people making journeys in urban areas has increased, especially journeys to work (commuting). This produces traffic jams and congestion. Reducing traffic congestion has become a major aim of urban planners around the world.

Key vocabulary

Commuting: making journeys from home to work and back again on a daily basis – usually in the early morning and late afternoon/early evening.

Emissions: gases e.g. carbon dioxide, and solid particulates e.g. sulphur, and other pollutants produced by various means of transport. These harm people and the natural and built environments.

Urban expressway: a motorway or dual carriageway with few junctions that allows traffic to move faster than normal through an urban area.

Congestion: too many road vehicles on a road system so that the capacity of the road is exceeded, slowing travel speeds, causing long delays due to traffic jams and creating lots of air and noise pollution.

Bus rapid transit (BRT) system: a fast, efficient bus system with dedicated bus lanes and stops, given priority at junctions and with good links to other transport networks.

Learning outcome

At the end of this unit you should have a better understanding of:

- how transport problems in urban areas are caused
- ways of managing transport issues in urban areas
- the benefits and issues of traffic management schemes
- examples of managing transport issues in Tokyo and Lagos.

Relevance to GCSE specifications

AQA	3.2.1 Section A Urban issues and challenges, pages 18–19 Click here
Edexcel A	Topic 8 Geographical investigations – UK challenges, page 30 Click here
Edexcel B	Topic 5 The UK's evolving human landscape, Key idea 5.1, page 23 Click here
OCR A	1.2 People of the UK, page 7 Click here
OCR B	Topic 5 Urban futures, 5.2 What are the challenges and opportunities for cities today?, page 12 Click here
Eduqas A	Key idea 2.3 Urban issues in contrasting global cities, page 11 Click here
Eduqas B	Key idea 1.2 Urban and rural processes and change in the UK, pages 8–9 Click here
Cambridge IGCSE	No subject-specific link
Edexcel IGCSE	Topic 6 Urban environments, Key idea 6.2, page 25 Click here

Urban transport strategies

Some cities face multiple road traffic movements, because more people want to use cars to go from their homes to the inner city for work (**commuting**). Cars are also commonly used for other daily journeys, such as shopping, recreation and 'school runs'.

Road traffic problems

- **People lose time** because they get stuck in traffic jams.
- **Air pollution is high**, both from solid particles and greenhouse gases (for example carbon dioxide), because car engines produce **emissions**. This creates health problems for people breathing in the pollutants.

- **Noise pollution increases** because there is constant noise from road vehicles.
- There is a **higher risk of accidents**, injuries and deaths because there are more vehicle movements.
- **Businesses lose time** because deliveries get delayed, and worker productivity is lower as they lose time travelling.

Many urban governments have tried to reduce road traffic and its problems. London (UK) built an outer ring road in 1986 (the M25) to reduce the number of road vehicles going through the capital city. In 2008 London introduced a 'low emissions' zone to reduce air pollution, which became the Ultra-Low Emissions Zone (ULEZ) in

2019 and applies every day. ULEZ aims to halve air pollution emissions from road vehicles in London by 2020, by charging a fee for polluting vehicles using inner city roads. ULEZ covers the same area as the London's Congestion Charge Zone (2003) which discourages commuting by car into central London. It is planned to make the ULEZ area bigger in 2021.

The European Union (EU) transport goals for 2050 include:

- banning petrol or diesel cars in cities
- reducing transport emissions (air pollution) by 60%.

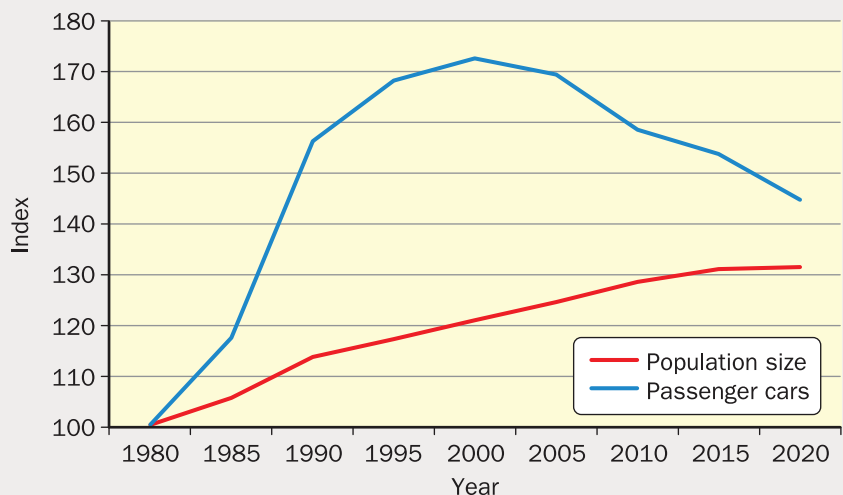
Tokyo, Japan

Tokyo is officially the world's largest city, with 35 million people. In 2017 the city had 3.16 million registered vehicles (Figure 1), and in 2010 the average speed on normal urban roads was just 15.7km/hour.

Tokyo has built urban motorways (expressways), tunnels and bridges (for example, Rainbow Bridge carrying the Shuto Expressway). Historical earthquake damage (1923) and bomb damage (1940s) allowed new road and subway systems to be created. Road vehicles use

wide streets at ground level, or elevated expressways

carrying vehicles between buildings in the city centre



Note: Graph lines are based on an index of 100 in 1980

Figure 1 Tokyo: change in population size and number of passenger cars, 1980–2020

Sources: United Nations, *World Urbanisation Prospects* (May 2018); Tokyo Statistical Yearbooks (1957 to present), www.toukei.metro.tokyo.jp/tnenkan/tn-eindex.htm

and above buildings in the suburbs (Figure 2). **Urban expressways** reduce traffic **congestion** and pollution at ground level, making the streets more cycle and pedestrian friendly.

Japan’s regulations discourage car ownership in Tokyo:

- Before buying a car people have to prove that they have a parking space for it.
- Land prices are high, so private parking spaces are rare and other car parking is expensive.
- Expressway toll roads are expensive to use.
- Diesel vehicle emissions regulations were introduced in 2003 and made stricter in 2006.

Tokyo’s car ownership rate is the lowest in Japan, with only 23.19 cars per 100 people (in 2017), and traffic-related fatalities are also the lowest in the country. This is because most people use the subway (underground) system, which has 13 lines, or a rail line connected to the circle JR Yamanote Line (Figure 3). Young adults do not have a car culture – which is surprising in a country known for its car manufacturing – so most Japanese prefer small cars (called *kei*) because they are more convenient (for example, easier to park). Businesses must have environmental plans to reduce air pollution, and vehicle engines must be stopped while parked, unloading or waiting at traffic



Figure 2 Outside Ueno Station, central Tokyo
Source: Photo by L.G. Frost

lights. There are fines, driving bans and public naming of those who break regulations.

The Tokyo plan for hosting the 2020 Olympic Games includes:



Figure 3 Tokyo: expressways, ring roads and other transport infrastructure, 2019
Source: Adapted from Tokyo subway map, Tokyo Metropolitan Government

- Building three **ring expressways** (half completed by 2019) (Figure 3). The outer ring road is designed to give through traffic a faster, easier route, so removing traffic from Tokyo's roads.
- Investigating the use of **electric/hybrid** and **autonomous** (driverless)

vehicles and building more railway lines, which could reduce car journeys and therefore air and noise pollution and accidents.

- More **monitoring of air pollution** and **stricter regulations** to control the use of diesel vehicles in Tokyo, to reduce emissions even more.

Tokyo has probably reached peak population size, and passenger car ownership is declining (see Figure 1). This is partly because of the Tokyo Metropolitan Government schemes, but also because of cultural change, such as young adults living without a car.

Lagos, Nigeria

Lagos is Nigeria's largest city with a population of 21 million. It also has rapid population growth (Figure 4), because jobs have been created by economic development and these have pulled people to the city. Car ownership in the city also rapidly increased, from 32 000 newly registered vehicles per year in 2000 to 305 000 in 2015. About 8 million people a day try to commute using public transport, but this has been

unreliable, uncomfortable and expensive.

The site of Lagos creates difficulties for developing an efficient urban transport system, mainly because the city centre is on an island and there are few road bridges connecting it to the rest of the city (Figure 5). 'Rush hour' journeys take a long time, with an average speed at peak times only 10 km/hour. In addition, air pollution in Lagos is five times above the recommended safe level.

As well as the large number of road vehicles, other factors cause congestion in Lagos:

- Poor road surfaces.
- Poor driving, which creates a high accident rate (the fatal accident rate is three times higher than in Europe).

It is estimated that the economy of Lagos loses about \$1 billion a year, and people lose 3 billion hours of time, because of traffic congestion. There are also

Year	Millions
1980	2.57
1985	3.50
1990	4.76
1995	5.98
2000	7.28
2005	8.86
2010	10.44
2015	12.24
2020	14.37*
2025	17.16*
2030	20.60*
2035	24.42*

*estimates

Figure 4 Lagos: urban growth
Source: United Nations, *World Urbanisation Prospects* (May 2018)

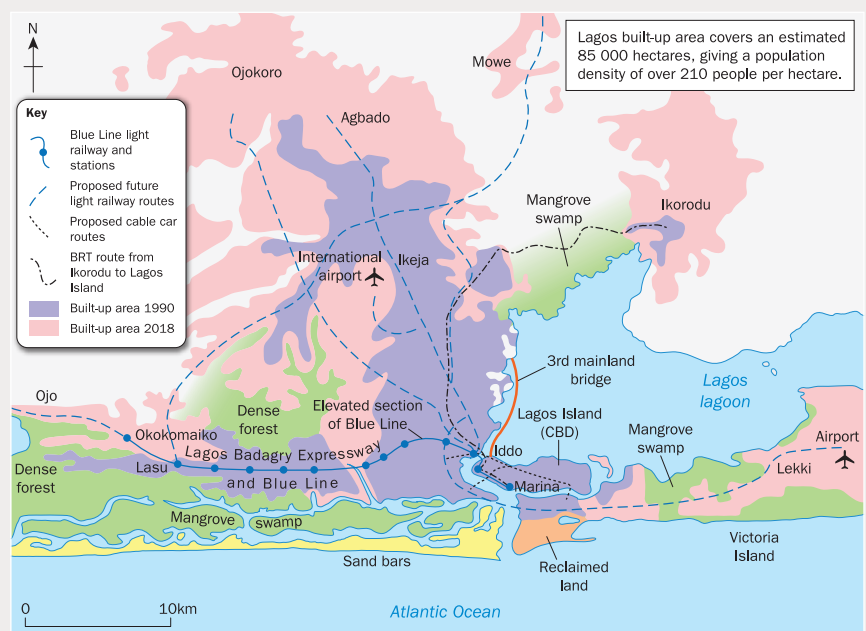


Figure 5 Lagos: urban transport schemes
Source: Google maps, Proshoreng.com, Primero Transport, Lagos

serious health issues due to people breathing in pollutants.

Transport solutions for Lagos

In 2003 the Lagos Metropolitan Area Transport Authority (LAMATA) was formed to plan transport improvements. The aim was to link road, rail and water transport.

1 A bus rapid transit (BRT) system, running in separate road lanes. The first route (Figure 5), which started in 2008, is jointly run by the city government and private companies. It carries about 180 000 passengers a day and is linked with minibus taxis (called *danfos*). Road traffic accidents along this BRT route have decreased. But there is still only one route, and in 2018 there were service delays, not enough buses, and poor communications with customers. Statistics showed an increase in buses at first, but then government targets were not met because of mismanagement (Figure 6).

Year	Passengers per year	Government target
2011	42 028 188	–
2012	49 114 152	–
2013	55 664 417	–
2014	64 378 612	88 462 271
2015	62 387 434	100 541 441
2016	71 121 543	75 910 059

Figure 6 Lagos: BRT passengers, carried and targets 2011–16
 Source: Lagos State Government Transport Statistics Reports

2 The Lagos Urban Railway Network (LURN) has seven urban light railway routes planned. Construction of the first line (Blue) started in 2009: it is 27 km long, has 13 stations (Figure 5) and is located in the middle of the ten-lane Lagos to Badagry expressway road, with safe pedestrian access to each station. However, the Blue Line has yet to be completed. The China Civil Engineering Construction Company is building the line, Eko Rail (a Nigerian company) will be operating the line, and trains will be supplied by China. A 25 MW gas thermal power station will be built to provide electricity for the Blue Line, with electrification and control

systems provided by Alstom (France). However, funding has been a major problem for the Lagos State Government, with the Blue Line alone costing \$1.2 billion. The lack of funds has been the main reason for major delays. It is now predicted that the Blue Line will partially open in 2022 and carry 400 000 passengers a day, increasing to 700 000 when completed. Once complete the Blue Line will reduce travel times by up to 80%.

- 3 The Lagos Sky Bus** (see Figure 5) will be operated by Ropeway Transport Limited. This scheme includes three cable-car lines designed to reduce congestion at five points in central Lagos by carrying 240 000 commuters a day. However, there has been little progress with this scheme.
- 4 Penalties** for poor driving have been increased with stronger **enforcement** of traffic regulations. This has had mixed results – vehicle accidents were higher in 2016 than in 2008 but injuries and fatalities halved.

Conclusion

Transport issues in urban areas are serious and have got worse as cities have grown and car ownership rates increased. Solutions include charging drivers of road vehicles to use urban

roads (congestion and emissions charges), building roads to keep vehicles out of inner cities, and encouraging the use of public transport. Cities in developed countries, like Tokyo, have the finances available to build transport

infrastructure or enforce regulations. However, cities in developing countries, like Lagos, find it difficult to provide the infrastructure or impose regulations because of rapid urbanisation and high financial costs.

Activities

- 1 Describe two problems caused by road vehicles in urban areas. For each one suggest a solution that has been tried by London.
- 2 Study Figure 1. Describe how population size and passenger car ownership in Tokyo has changed between 1980 and 2020.
- 3 Study Figure 2. Describe what has been done in this inner urban area of Tokyo (Ueno) to try and reduce the city's transport-related problems.
- 4 Using information in the section on Tokyo and Figure 3, suggest:
 - a how the three ring roads could help relieve traffic congestion
 - b the role of the subway and train line system in making commuting more efficient
 - c how successful the city government plans for the 2020 Olympic Games may be in getting the city ready for the increase in journeys.
- 5 Study Figure 4.
 - a Describe the change in the population size of Lagos between 1980 and 2035.
 - b How many people will be living in Lagos in 2020, according to the UN estimate?
- 6 Using your ICT skills, find an image showing traffic congestion in Lagos, Nigeria. Label a copy of this image to point out all of the traffic-related problems visible in the image.
- 7 Using information in the section on Lagos and Figure 5, outline the difficulties caused for the city government transport schemes by:
 - a physical geography and
 - b human geography.
- 8 a Using the data in Figure 6, draw an appropriate graph to show the number of passengers carried by BRT and the Lagos city government targets.
 - b Suggest how successful the BRT scheme has been so far.
- 9 Working in pairs or groups, compare and contrast the transport issues and solutions in Tokyo with those in Lagos.

Learning checkpoint

- Urban areas have transport problems due to large numbers of road vehicles.
- Transport issues can be managed in different ways, for example by discouraging car use or providing public transport.
- Traffic management schemes have benefits, such as reducing deaths from accidents, and problems, such as high financial costs.
- Different traffic management schemes are possible, including emission zones (London), urban expressways (Tokyo) or public transport systems (Lagos).

Glossary task

Write glossary definitions for these terms:

- | | |
|---------------------------------------|-------------------------|
| bus rapid transit (BRT) system | congestion |
| commuting | emissions |
| | urban expressway |

Remember this unit

To help you remember this unit, make notes under the following headings:

Concerns about road traffic in urban areas

Ways in which traffic problems in urban areas can be reduced

Challenges facing the urban transport schemes of city governments

Differences between the approaches of city governments in London and Tokyo or Lagos

Try to make your notes fit a single sheet of A4 (remember that diagrams can be useful).