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# Električna vozila za javni gradski prevoz

## -- koncepti javnog prevoza –

**B. Stanić**

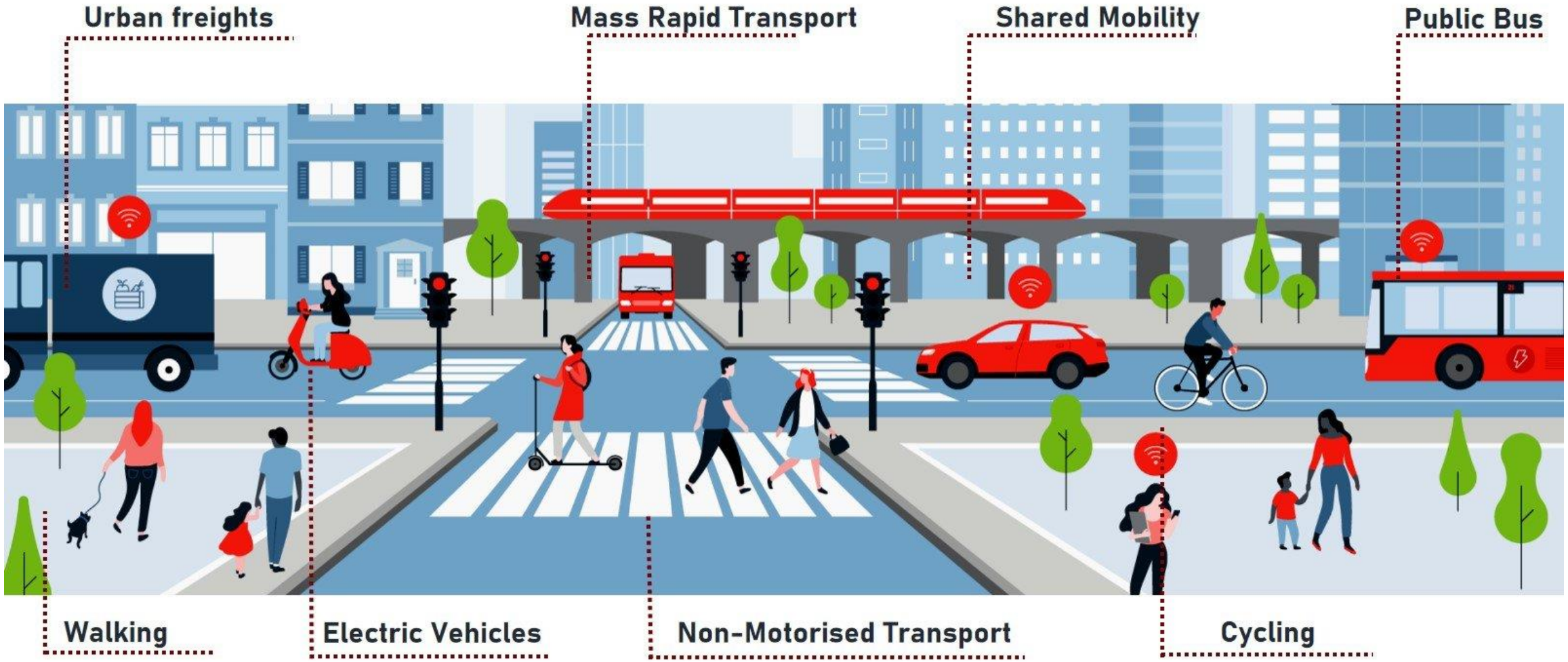
**Partnership for Promotion and Popularization of Electrical Mobility through Transformation and Modernization of WB HEIs Study Programs/PELMOB**

**Call: ERASMUS-EDU-2022-CBHE-STRAND-2**

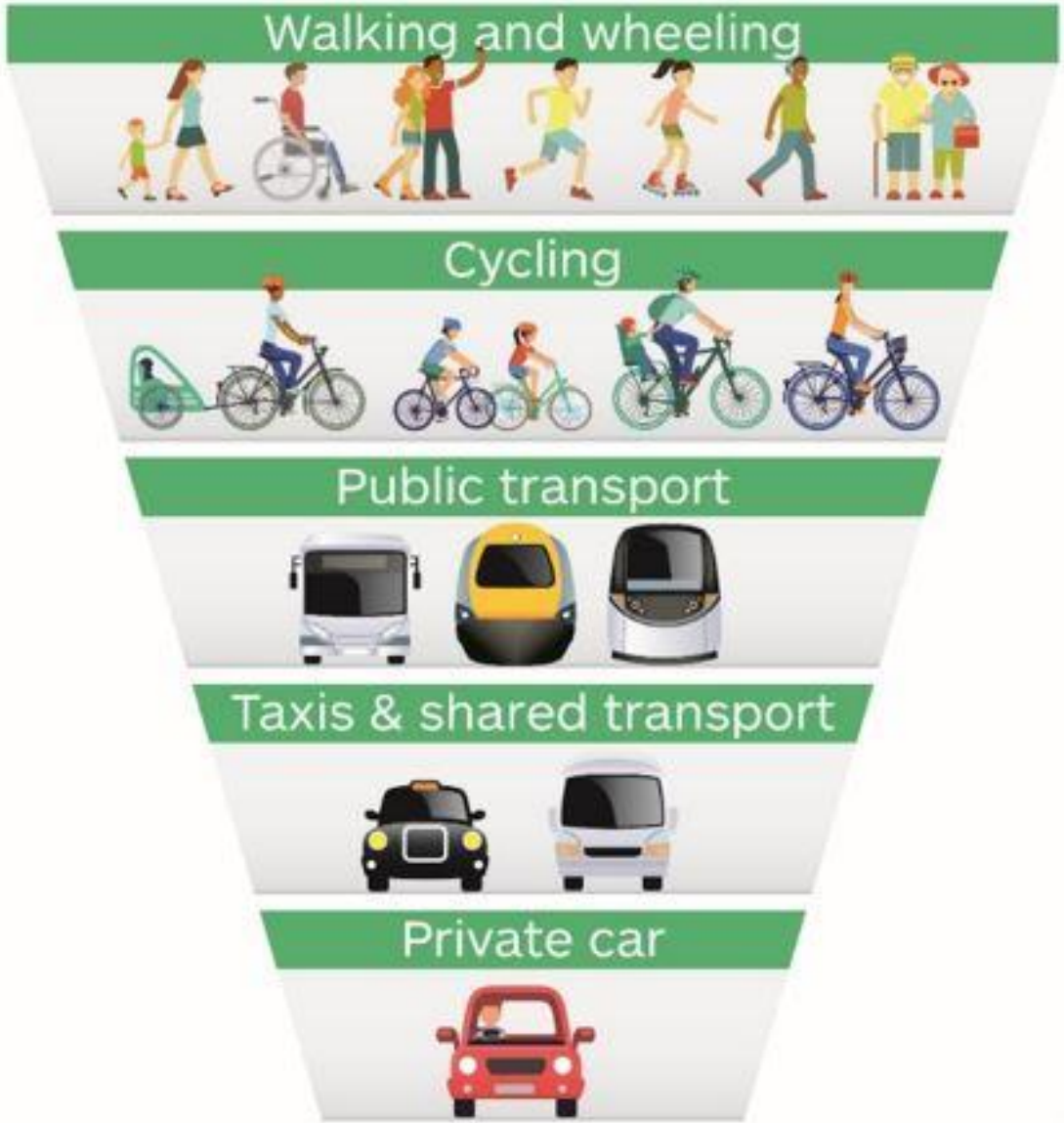
**Project Number: 101082860**

# ELEMENTS

## SUSTAINABLE URBAN MOBILITY



# Prioritising Sustainable Transport



# GEOG 80 Transport Geography

Professor: Dr. Jean-Paul Rodrigue

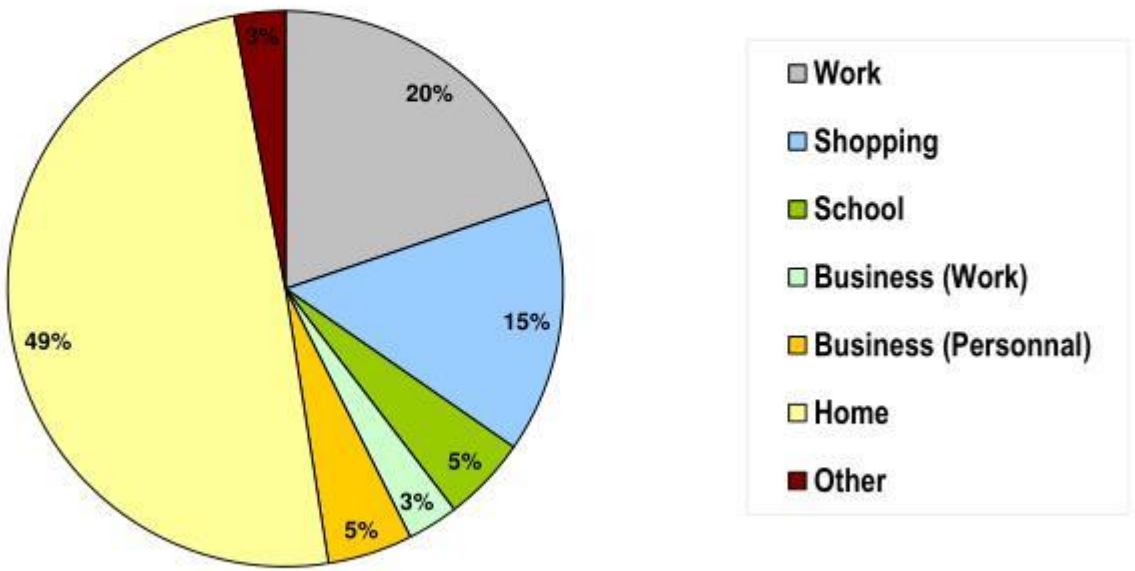
## Topic 6 – Urban Transportation

A. Transportation and Urban Form
B. Urban Land Use and Transportation
C. Urban Mobility
D. Urban Transport Problems

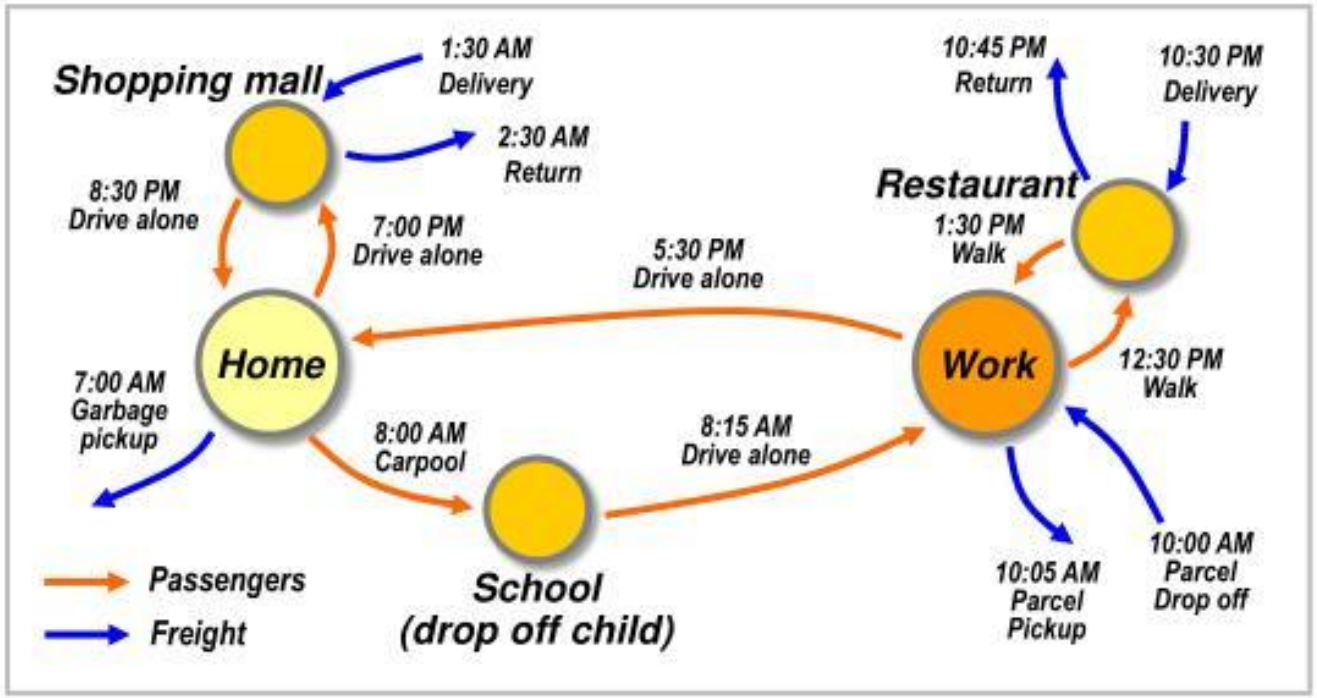
*Hofstra University, Department of Global Studies & Geography*

| Mode | Limitations | Most Appropriate Uses |
|---|---|---|
| Walking | Requires physical ability.<br>Limited distance and carrying capacity.<br>Difficult or unsafe in some areas. | Short trips by physically able people. |
| Bicycle | Requires bicycle and physical ability.<br>Limited distance and carrying capacity. | Short to medium length trips by physically able people on suitable routes. |
| Taxi | Relatively high cost per mile. | Infrequent trips, short and medium distance trips. |
| Fixed Route Transit | Destinations and times limited. | Short to medium distance trips along busy corridors. |
| Paratransit | High cost and limited service. | Travel for disabled people. |
| Auto driver | Requires driving ability and automobile.<br>High fixed costs. | Travel by people who can drive and afford an automobile. |
| Ridesharing | Requires cooperative automobile driver.<br>Consumes driver's time if a special trip (chauffeuring). | Trips that the driver would take anyway (ridesharing). Occasional special trips (chauffeuring). |
| Car sharing (Vehicle Rentals) | Requires convenient and affordable vehicle rentals services. | Occasional use by drivers who do not own an automobile. |
| Motorcycle | Requires riding ability and motorcycle.<br>Average fixed costs. | Travel by people who can ride and afford a motorcycle. |
| Telecommute | Requires equipment and skill. | Alternative to some types of trips. |

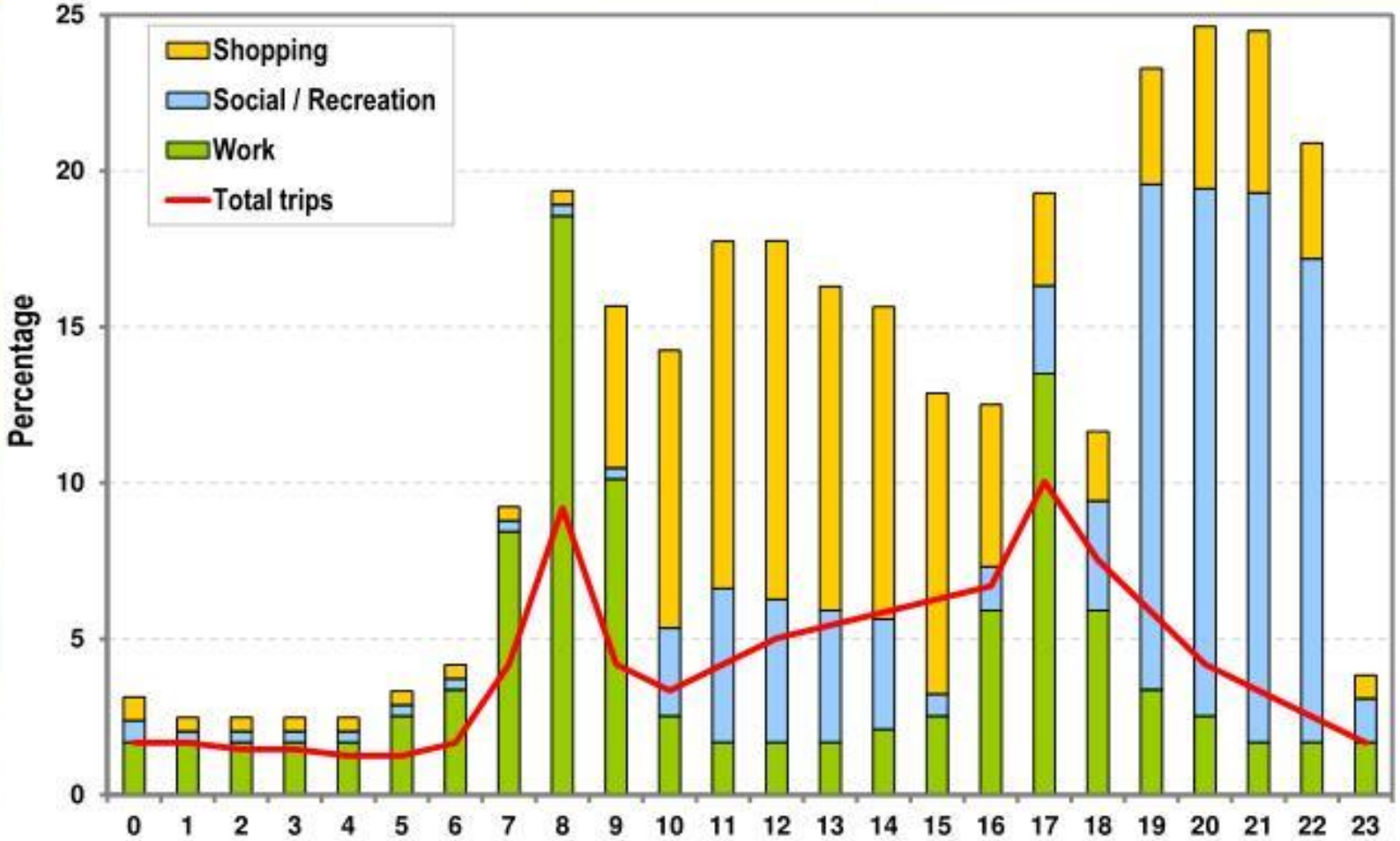
# Main Purposes of Urban Trips



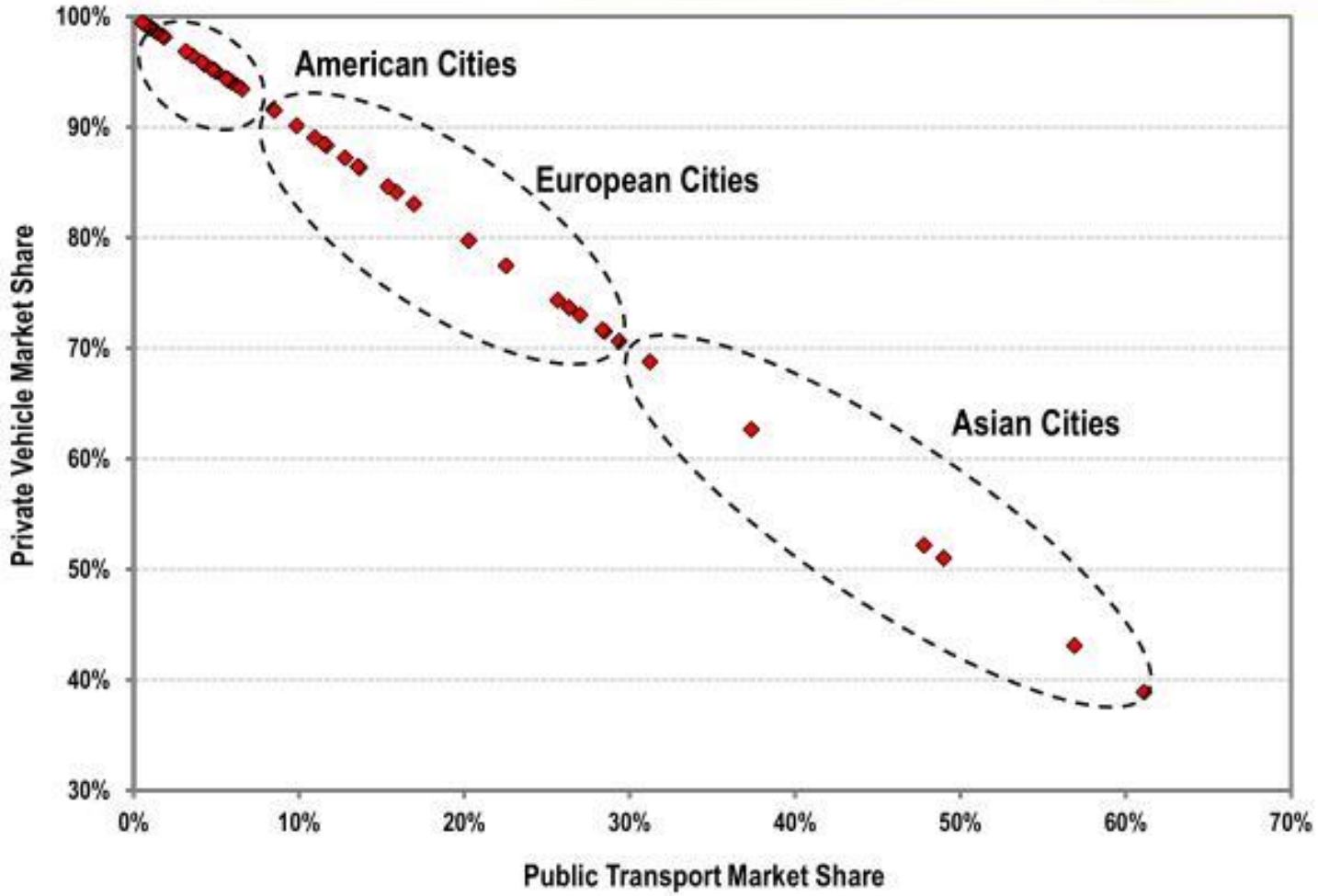
# Typical Urban Day Trips by Modes, Origins and Destinations



# Urban Travel by Purpose and by Time of the Day in a North American Metropolis



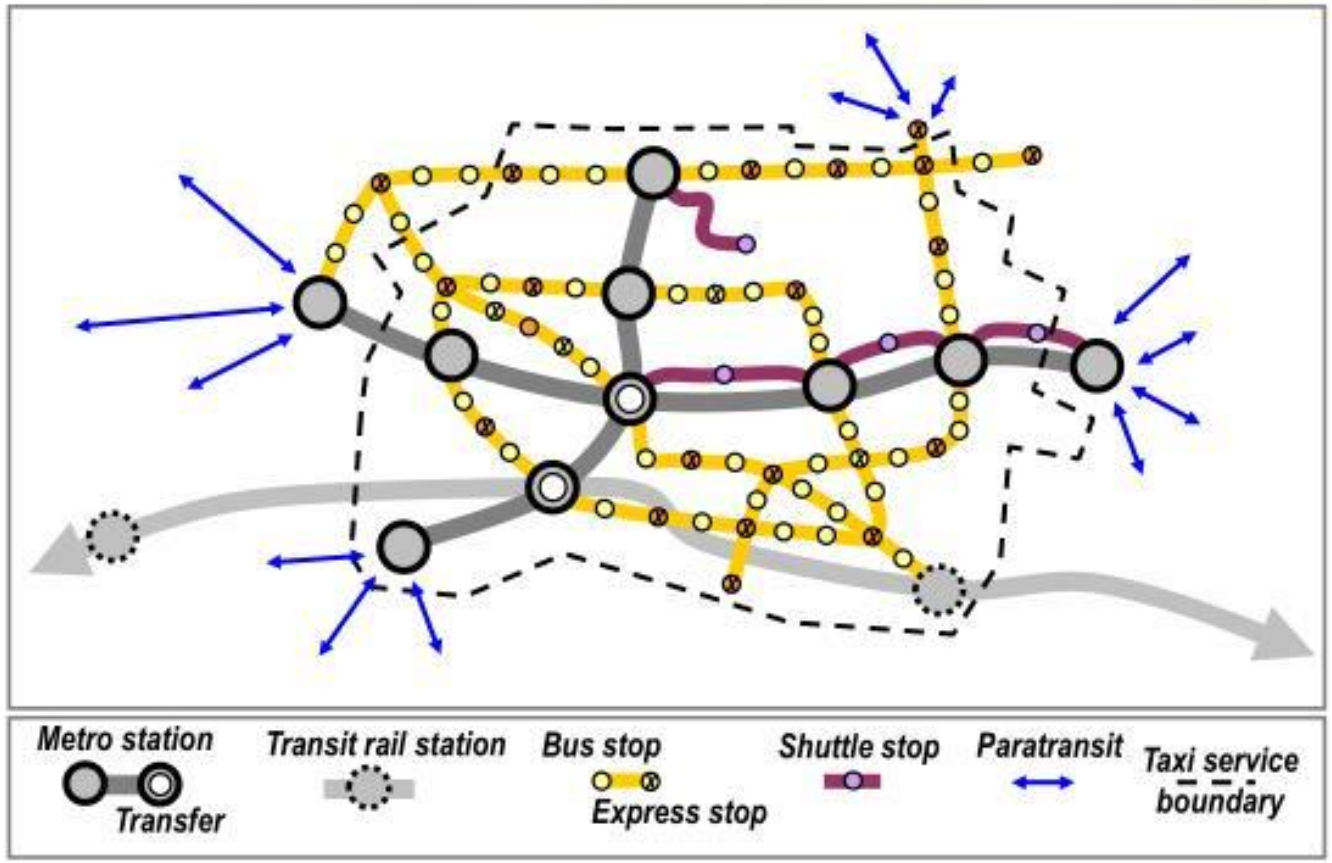
# Private Vehicle and Public Transport Market Share, 1990/91



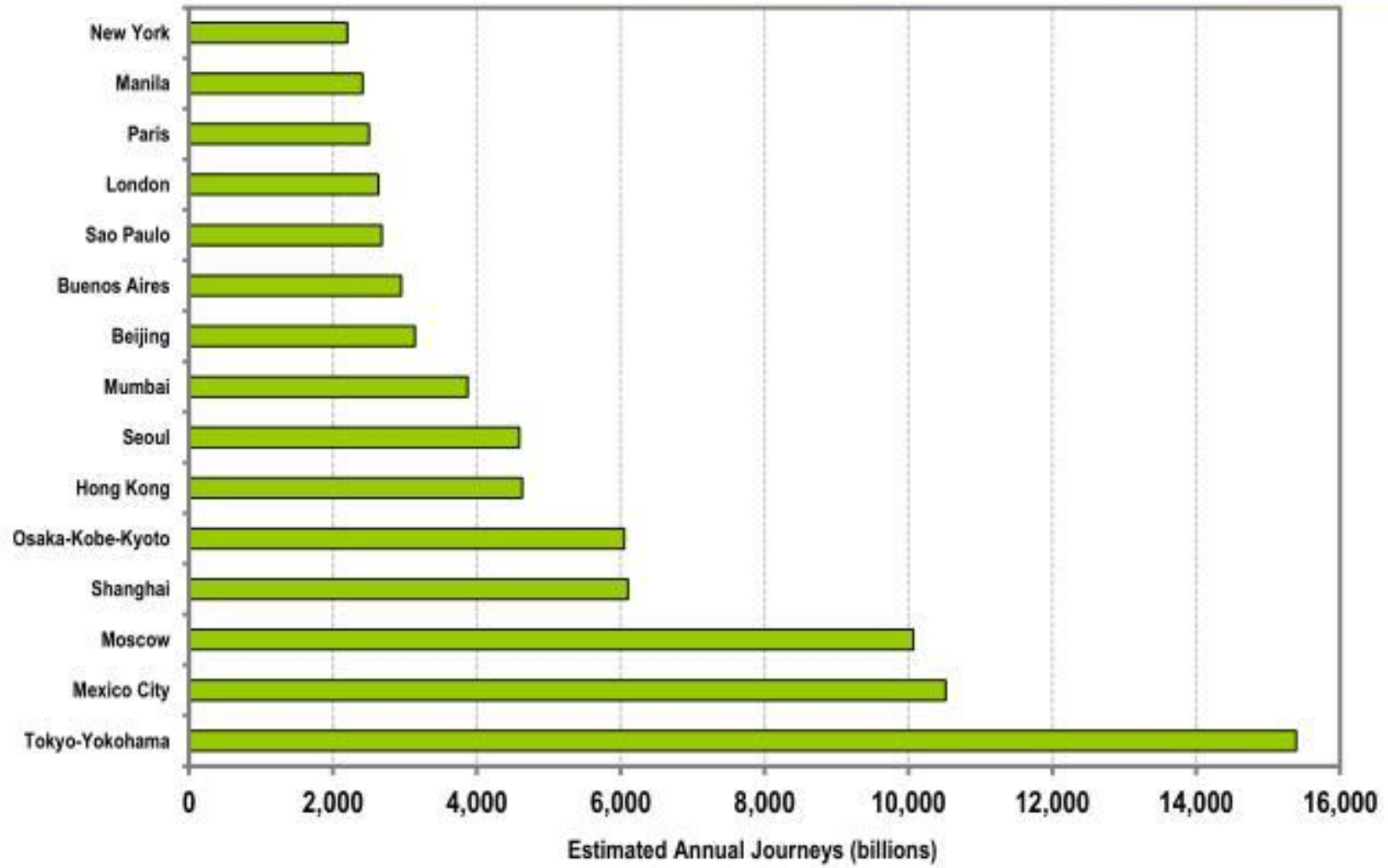
# 2. Urban Transit Systems

| | |
|---|---|
| **Subway system** | Heavy rail system, often underground in central areas, with fixed routes, services and stations. Uniform frequency of services (peak hours increase). Fares are commonly access driven and constant. |
| **Bus system** | Scheduled fixed routes and stops serviced by motorized multiple passengers vehicles (45 - 80 passengers). Services are often synchronized with other heavy systems (feeders). Express services (notably during peak hours). |
| **Transit rail system** | Fixed rail (tram rail system and commuter rail system). Frequency of services strongly linked with peak hours. Traffic tends to be imbalanced. Fares proportional to distance or service zones. |
| **Shuttle system** | Privately (dominantly) owned using small buses or vans. Expanding mobility along a corridor during peak hour. Linking a specific activity center (shopping mall, university campus, industrial zone, hotel, etc.). Servicing the elderly or people with disabilities. |
| **Paratransit system** | Flexible and privately owned demand-response system. Door-to-door service, less loading and unloading time, less stops and more maneuverability in traffic. |
| **Taxi system** | Privately owned vehicles offering an individual demand-response system. Fares commonly a function of a metered distance/time. When competition is not permitted, fares are set up by regulations. Servicing an area where a taxi company has the right (permit) to pickup customers. Rights are issued by a municipality. |

# Components of an Urban Transit System



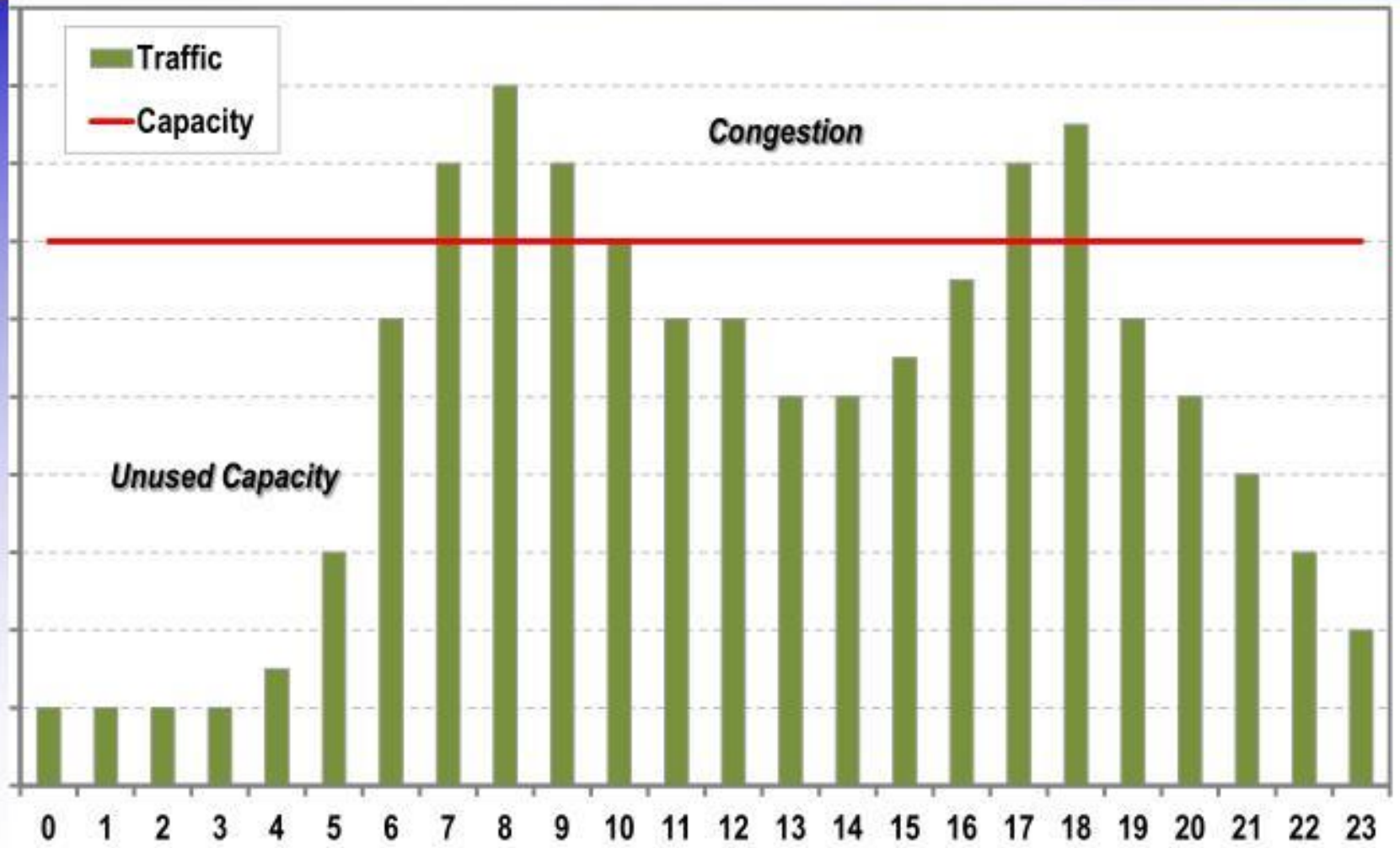
# Estimated Ridership of the World's Largest Public Transit Systems, 1998



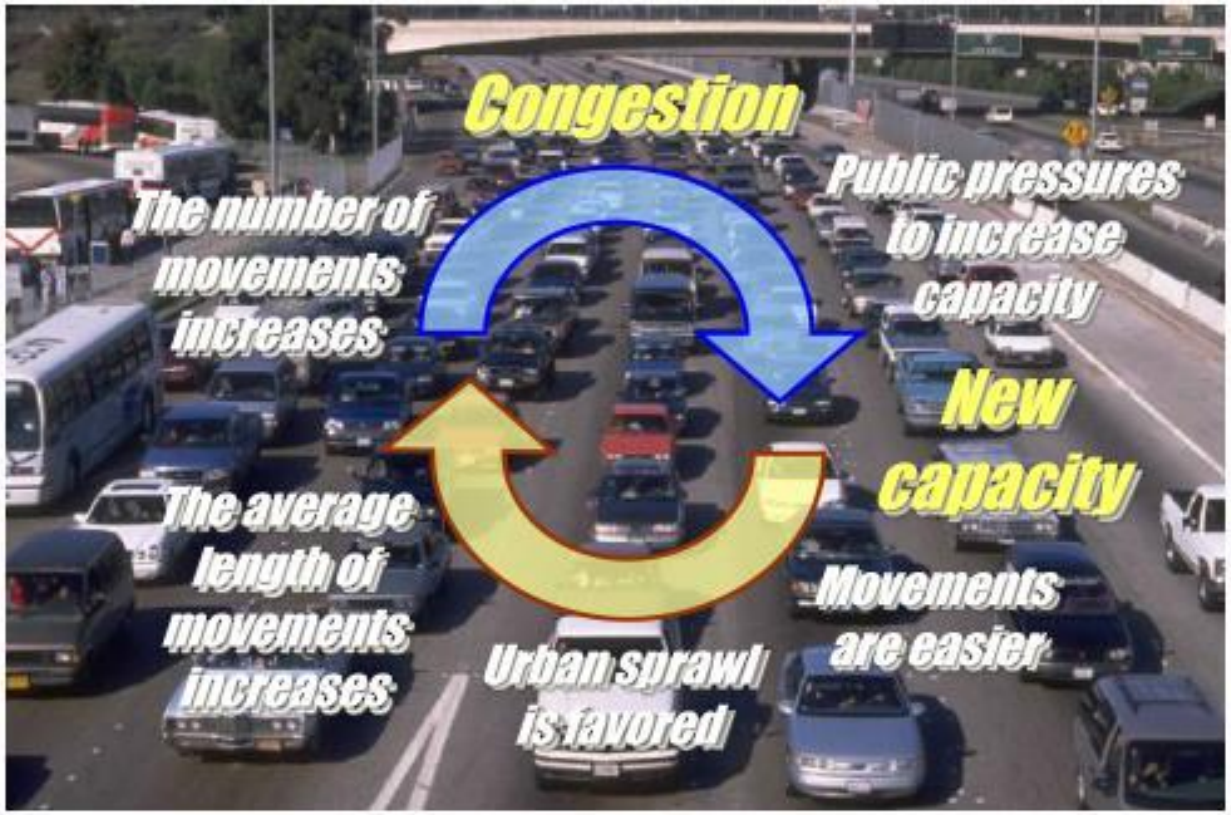
# 1. Geographical Challenges Facing Urban Transportation

| | |
|---|---|
| **Traffic congestion and parking difficulties** | Supply of infrastructures has not kept up with the growth of mobility. Vehicles spend the majority of the time parked; motorization has expanded the demand for parking space. |
| **Public transport inadequacy** | Over or under-usage of public transport systems. Inability of public transit systems to be financially sustainable. |
| **Difficulties for pedestrians** | Intense traffic, where the mobility of pedestrians and vehicles are impaired. Lack of consideration for pedestrians in the physical design of facilities. |
| **Environmental impacts and energy consumption** | Pollution (e.g. noise) generated by circulation has impediments. Dependency on petroleum. |
| **Accidents and safety** | Growing traffic linked with a growing number of accidents and fatalities. Accidents account for a significant share of recurring delays. |
| **Land consumption** | Significant territorial imprint. Between 30 and 60% of a metropolitan area may be devoted to transportation. |
| **Freight distribution** | Globalization resulted in growing quantities of freight moving in cities. Shares infrastructures with the circulation of passengers. City logistics. |

# Recurring Congestion

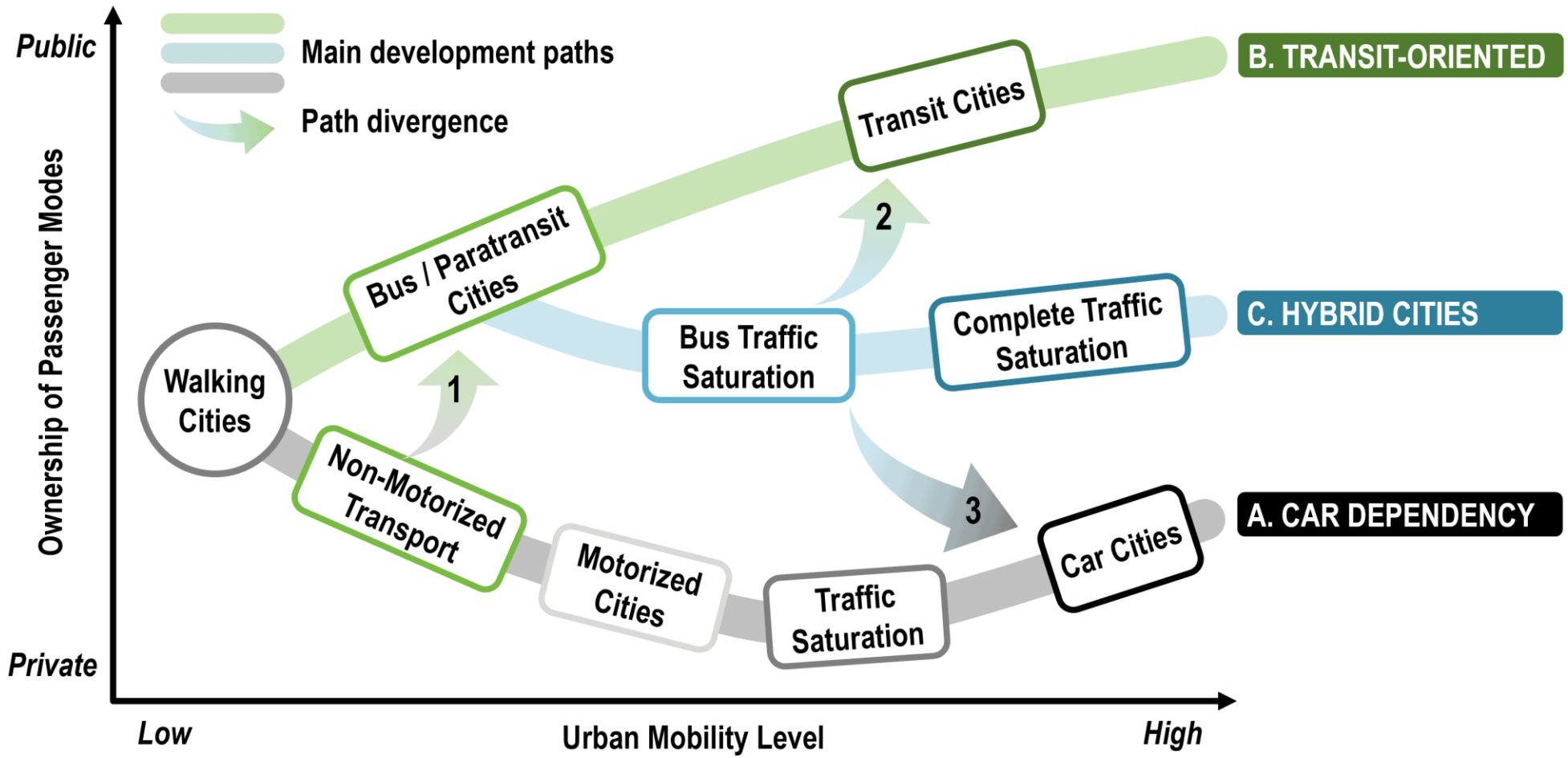


# The Vicious Circle of Congestion



# 3. Congestion: Some Mitigation Measures

| | |
|---|---|
| **Ramp metering** | Controlling access to a congested highway by letting automobiles in one at a time instead of in groups. |
| **Traffic signal synchronization** | Tuning the traffic signals to the time and direction of traffic flows. |
| **Incident management** | Making sure that vehicles involved in accidents or mechanical failures are removed as quickly as possible from the road. |
| **Carpooling** | Individual providing ridership to people having a similar origin, destination and commuting time. Two or more vehicle trips combined into one. Vehicle pools. |
| **HOV (High Occupancy Vehicle) lanes** | Vehicles with 2 or more passengers (buses, vans, carpool, etc.) have exclusive access to a less congested lane. |
| **Public transit** | Offering alternatives to driving. |


Public
Private
Ownership of Passenger Modes
Low
Urban Mobility Level
High
Main development paths
Path divergence
Walking Cities
Bus / Paratransit Cities
Non-Motorized Transport
Motorized Cities
Transit Cities
Bus Traffic Saturation
Traffic Saturation
Complete Traffic Saturation
Car Cities
1
2
3
B. TRANSIT-ORIENTED
C. HYBRID CITIES
A. CAR DEPENDENCY

A) Zavisnost od automobila. Ovaj razvojni put vodi ka uspostavljanju gradova zavisnih od automobila sa kontinuiranim ulaganjima u motorizaciju i razvoj sistema puteva i autoputeva. Prvi korak obično uključuje širenje nemotorizovanih oblika prevoza, posebno bicikla. To je bio slučaj u gradovima u razvijenim ekonomijama krajem 19. i početkom 20. veka i u azijskim gradovima (posebno u Kini) 1970-ih. U ovoj fazi, verovatno će doći do divergencije putanje (1) ka uspostavljanju usluga javnog prevoza. Međutim, put koji se prati u nekoliko ekonomija u razvoju tiče se motorizacije sa motociklom kao posrednim oblikom, koji vodi do gradova zasićenih motociklima, autobusima i nekim automobilima. Kako se ulaganja u putnu infrastrukturu nastavljaju i sa ekonomskim razvojem, rezultat je grad orijentisan na automobile u kome automobil čini većinu mobilnosti putnika. Takav ishod mogu postići i gradovi koji su u početku započeli razvoj tranzita, ali su putem divergencije (3) krenuli ka zavisnosti od automobila kroz napuštanje nekoliko tranzitnih usluga ili nedostatak daljeg razvoja kako bi se nosili sa potražnjom za mobilnošću.

(B) Razvoj orijentisan na tranzit. Ovaj razvojni put podrazumeva spore nivoe motorizacije i umerenu izgradnju puteva. Kroz ogromna ulaganja u javni tranzit i strategije razvoja korišćenja zemljišta orijentisane na tranzit, ovaj put vodi ka uspostavljanju tranzitnih gradova u kojima većina stanovništva koristi javni prevoz da bi zadovoljila svoje potrebe za mobilnošću. Takvi gradovi, međutim, nisu toliko česti, jer kako su mnogi gradovi krenuli u razvoj, išlo se dodatnim putem koji je doveo do razvoja hibridnih gradova.

(C) Hibridni gradovi. Ovaj razvojni put je rezultat dalje motorizacije, ali tempo razvoja puteva dolazi brže od tempa razvoja gradskog tranzita. To na kraju dovodi do zasićenja transportnog sistema autobusima i automobilima. Ovakva situacija je karakterisala mnoge gradove u razvijenim privredama u drugoj polovini 20. veka. Moguća divergencija putanje uključuje brzu motorizaciju i kretanje ka zavisnosti od automobila (3). Alternativno, kroz ograničenja upotrebe i vlasništva automobila i razvoj alternativnih vidova transporta, može se postići divergencija puteva (2), što vodi ka oblicima koji su više orijentisani na tranzit.