

5th Lecture

smart growth and transportation choices

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Definitions

➔ Transportation Choices

(also called Transportation option, Transportation Diversity) refers to the quantity and quality of accessibility options available to an individual or group, taking into account their specific needs and abilities. There are several.



transportation modes

A mode is a means of transport

- Each mode of transport has a fundamentally different technological solution for your transportation needs,
- Some require a separate environment.
- Each mode has its own infrastructure and operations,
- Often has unique regulations



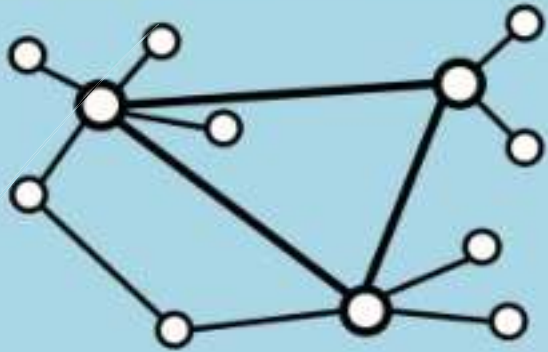
Modes Of Transport



Background

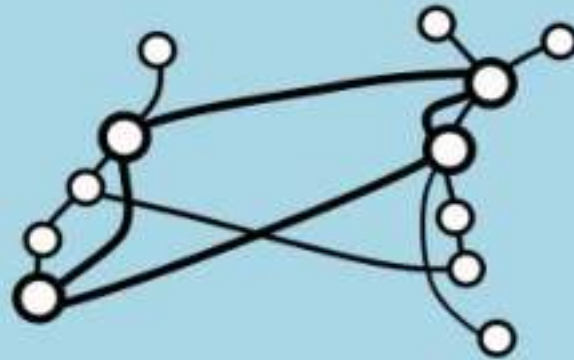
- **Transportation and land use patterns are inseparably linked. How?**
- **Transportation facilities and networks have the power to:**
 - **Shape development,**
 - **Influence property values,**
 - **Determine a neighborhood's character and quality of life.**

Air Networks



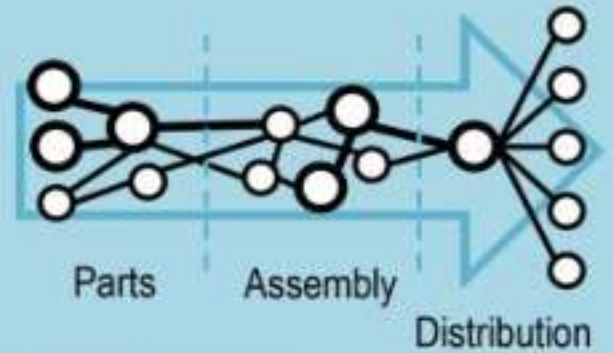
Nodal hierarchy (hub-and-spoke)

Maritime Networks



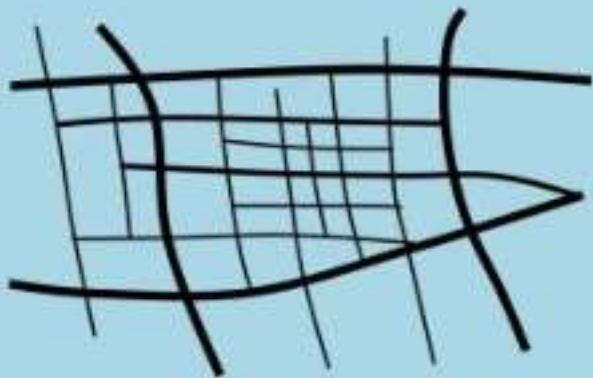
Circuitous nodal hierarchy

Logistical Networks



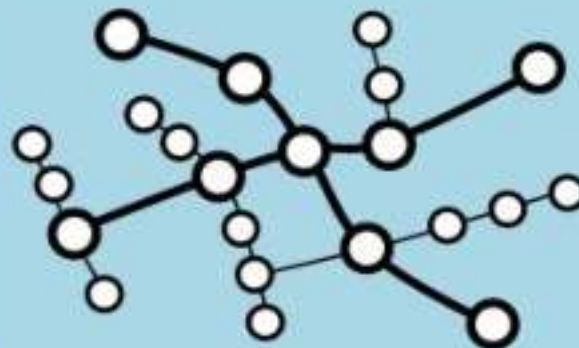
Sequential multi-nodal hierarchy

Road Networks



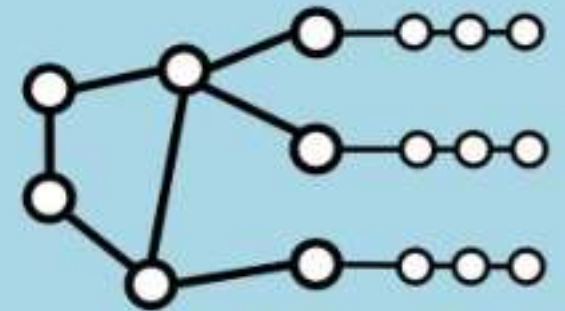
Hierarchical meshes

Rail Networks



Linear nodal hierarchy

Power Grids



Sequential linear hierarchy



transportation investments

- ▶ transportation investments have important outcomes for the environment, including:
 - ▶ **Air and water quality,**
 - ▶ **Climate change,**
 - ▶ **Open space preservation.**
- ▶ How communities develop also affects how **convenient and pleasant public transportation, bicycling, and walking are for their residents.**

Integrated transportation and land use planning

Urban planning consists of:

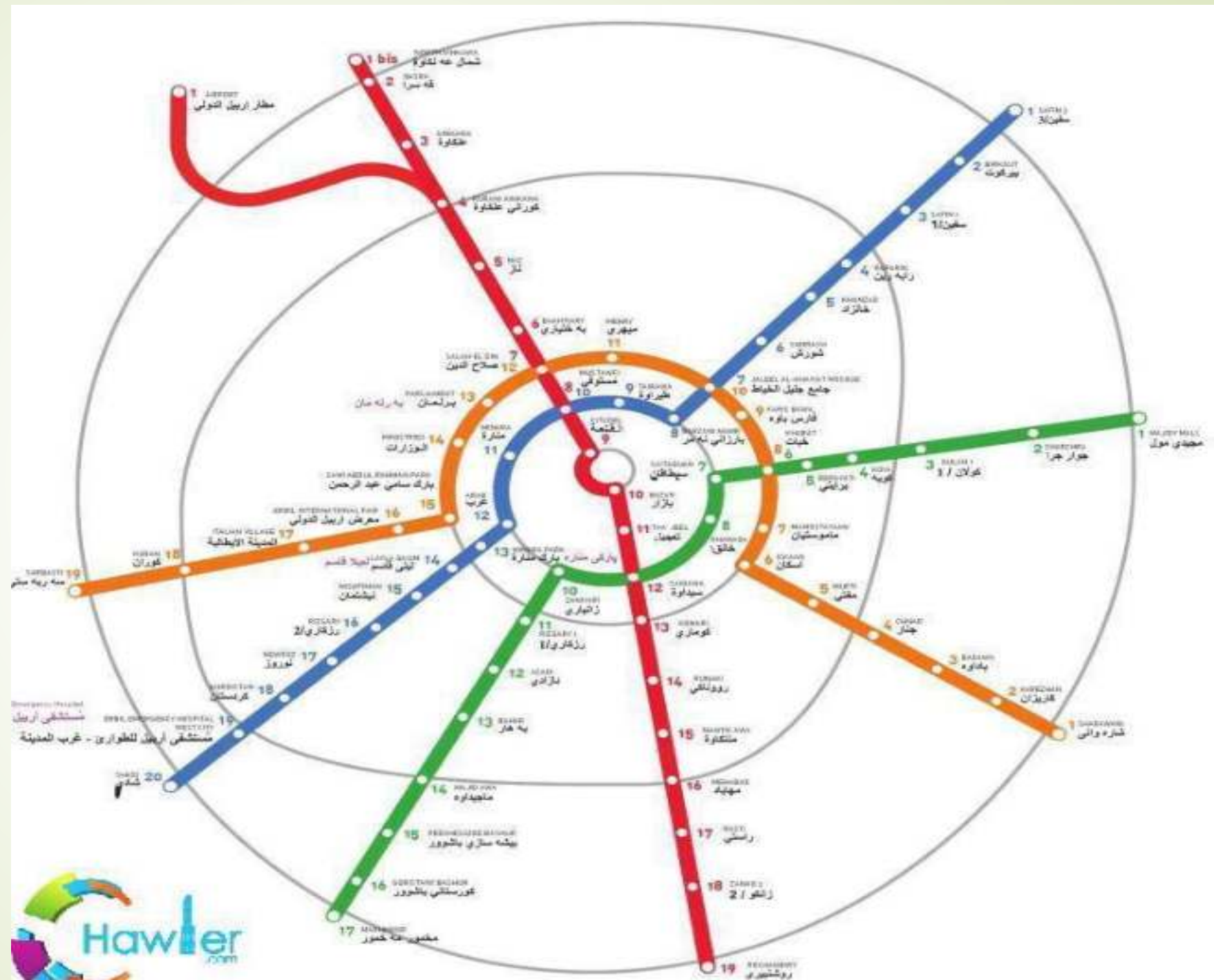
- 1. Land use planning.
- 2. Transportation planning.
- **Integrated transportation and land use planning** gives people more choices for getting around their town and their region.
- When homes, offices, stores, and civic buildings are near transit stations and close to each other, it is convenient to walk, bicycle, or take transit.

Transit station means a rail or light-rail station, ferry terminal, Bus Hub, or Bus Transfer Station.

transit station



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transportation choices and Environment

- **Providing a range of transportation choices and the walkable neighborhoods that support them ,It means:**
- **Developing compactly (smart growth) and investing in public transit and other transportation options make it :**
- **easier for people to drive less,**
- **improve air quality**
- **reduce greenhouse gas emissions.**
- **reduce carbon monoxide, sulfur dioxide, particulate matter, and other pollutants produced by motor vehicles.**

Example: In USA

- in 2017, **the transportation sector** represented the largest source of **carbon dioxide emissions** from fuel combustion.
- Roughly 17 percent of U.S. greenhouse gas emissions comes from cars and light-duty trucks (including pickup trucks, SUVs, and minivans).

Reasons behind Transportation Choices

- ***Solving Transportation Problems.*** Improved Transportation Options can help reduce traffic congestion, facility costs, road risk, environmental impacts and consumer costs.
- ***Consumers benefits.*** Improved options allow consumers to save money, avoid stress, and reduce their need to chauffeur non-drivers.
- ***Efficiency.*** Consumer choice is necessary for economic efficiency (Market Principles), reflecting the principle of *consumer sovereignty*, which requires that markets respond to consumer Travel Demands. Improved transportation options allows consumers to choose the most effective option for each trip.

Reasons behind Transportation Choices

- ***Equity.*** Inadequate transport options often limits the personal and economic opportunities available to people who are physically, economically or socially disadvantaged. **Increasing transportation options** can help achieve **equity objectives.**
- Livability.***
 - Many people value living in or visiting a community where **walking and cycling are safe, pleasant and common.**
 - There are also public **Health** benefits from increased walking and cycling.
 - As a result, transportation options can help communities become more “livable,” resulting in **increased property values and commercial activity.**
- ***Security and Resilience.***
 - Improved transportation options results in a **more diverse and flexible transportation system** that can accommodate **variable and unpredictable conditions.** Even people who do not currently use a particular form of transport may value its availability as a form of **insurance to accommodate future needs.**

transportation and land use strategies

- Four transportation and land use strategies enhance quality of life and protect human health and the environment:
- **1. Smart and sustainable street design.**
- **2. Transit-oriented development.DOT**
- **3. Parking management.**
- **4. Sustainable transportation planning.**



1. Smart and Sustainable Street Design

- Historically, transportation planners have overlooked the **important role streets play in shaping neighborhoods.**
- For decades, decisions about street size and design in many communities have focused on **getting as many cars as possible through the streets as quickly as possible.**
- Street design determines whether an area will be safe and inviting for pedestrians, bicyclists, and transit users, **which**
 - **affects the viability of certain types of retail,**
 - **influences land values and tax receipts,**
 - **and shapes overall economic strength and resilience.**
 - **affects how quickly emergency response vehicles will be able to reach a fire, police, or medical emergency,**

1. Smart and Sustainable Street Design

- **Street design also has important environmental impacts.**
- It can determine the possibility of less-polluting modes of transportation,
- affecting air quality and climate change.
- Street design also influences the volume of stormwater runoff,
- the water quality of that runoff, and the magnitude of **the heat island effect.**
- Through approaches communities can create attractive streets that also improve **mobility and safety.**

Effects of heat island

Urban heat island (UHI), a phenomenon involving increased air temperature of a city compared to the surrounding rural area, results in increased energy use and increased health problems.

***Promote cycling through
dedicated bike paths and
traffic calming***



Before



After

Streets for cars, bikes and walking



2. Parking Management

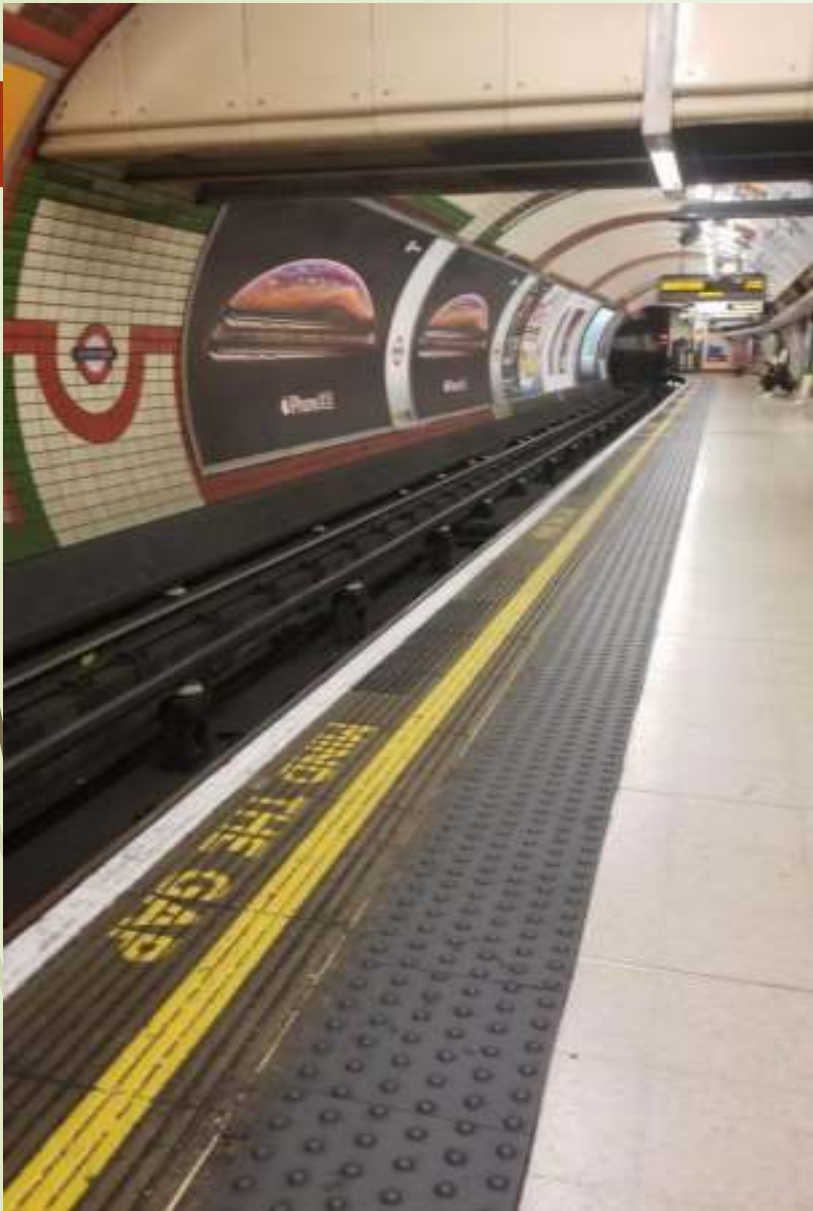
- ▶ **Parking requirements can be an obstacle to compact development.**
- ▶ **The parking requirements found in many conventional zoning codes often call for off-street parking based on generic standards, not on individual sites' needs and context, and require too much parking to be provided on the development site.**
- ▶ **With their high costs and space requirements, conventional parking regulations can discourage compact, mixed-use development and redevelopment in older neighborhoods.**
- ▶ **Large expanses of surface parking and stand-alone parking structures can discourage walking and make driving the only viable transportation between destinations.**
- ▶ **Better-managed parking can support lively, economically strong, mixed-use districts; encourage walking and transit use; and reduce the costs of redevelopment and infill projects.**

Bikes in Amsterdam



3. Transit-Oriented Development - TOD

- The United States is in the midst of a demographic shift that will have major effects on the nation's housing market and development patterns.
- Market surveys and research have consistently shown that **at least one-third of homebuyers prefer homes in smart growth neighborhoods**, and this share is growing.
- Transit-oriented development (TOD) creates **walkable communities for people of all ages and incomes and provides more transportation and housing choices.**
- • TOD is **compact development built around a transit station or within easy walking distance (typically a half-mile) of a station and containing a mix of land uses such as housing, offices, shops, restaurants, and entertainment.**
- • TOD can help **lower household transportation costs**, increase public transit ridership, reduce greenhouse gas emissions and air pollution, spur economic development, and make housing more affordable by **reducing developer expenditures on parking and allowing higher-density zoning.**



The metro/subway



The metro/subway

Biking



Double Decker bus

4. Sustainable Transportation

Planning

- **Transportation planning** will get the best results for communities when:
- it is part of a **comprehensive approach** that includes land use and environmental planning at the local and regional levels.
- **Transportation planning and design choices** have a direct influence on development patterns, travel mode choices, infrastructure costs, redevelopment potential, the health of natural resources, and other community concerns.



4. Sustainable Transportation Planning

- This **integrated approach** requires transportation and land use planners to:
- • Examine the effects of transportation projects on **future growth, development, and long-range economic goals.**
- • Assess each project's effects on **air and water quality and other environmental resources.**
- • Determine whether **transportation and other infrastructure** can be built on a **timetable dependable with development or redevelopment projects.**





Thank You

Any Questions?

