

# **Sustainability and Transportation**

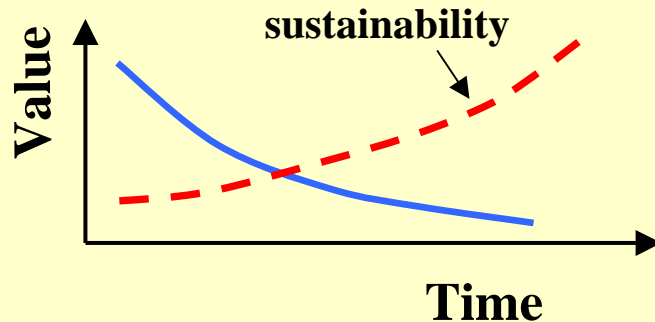
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# What is **Sustainability**?

**Sustain:** feed, *strengthen*, tolerate, buoy,  
*preserve, maintain, foster*, defend, *endure*,  
*experience*, protract, support, confirm,  
encourage, *uphold as valid*, nourish.

Aspect of *time*



**Increased value through**

**Economic activities**

**Job and wealth creation**

**Resource preservation**

**Better environment**

# Sustainability

***Compatibility*** between specific outcome and ecological principles.

Design a community in the context of physical, biological and social ***connectivity***.

Planning of ***accessibility*** rather than auto mobility.

Decision making and governance ***mechanism*** to promote the above.

# Sustainability

A living environment in which **human potential** can be maximally exerted on a continual basis.

Physical environment – land use

Political environment – government and decision making

Economic environment – demand and supply interaction

Social environment – humanity (parks, arts, sport, learning)

## Community and Land use

High density living

Neighborhood mix

Strong activity center

Street network



Smart growth

# Principles of Human Settlement

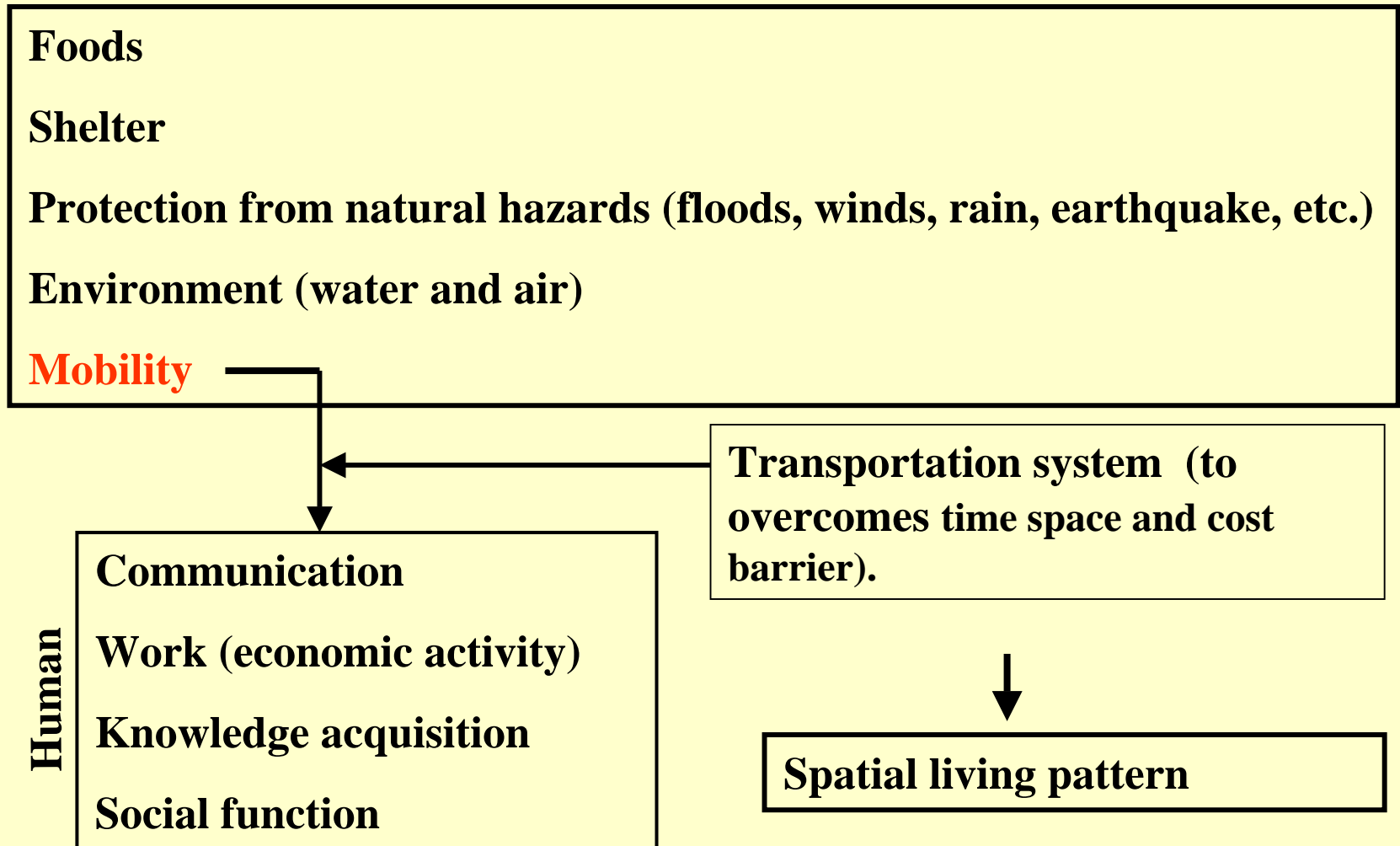
1. Try to **maximize contact and exploration** - desire to expand contact, desire to know and learn more.
2. Try to **minimize effort** - develop things that minimize effort - automobile, machines, transportation network, management.
3. Try to **protect** themselves from nature, other people –create walls, buildings, shells, defense mechanism.
4. Try to **enjoy contact with people and environment** - creation of art, music, parks, etc. - need for quality of life .
5. Try to **synthesize all these principles**.

Constantinos A. Doxiadis (1913-1975)

*Ekistics, the Science of Human Settlement*

Science Magazine, Vol. 17, No. 3956, 1970

## Basic Human Needs



## Emphases in planning

**Large scale model and  
large scale highway investment**

**1960**

**Comprehensive planning; land use  
and highway/transit balance**

**1970**

**Environmental impacts and  
citizen participation**

**1980**

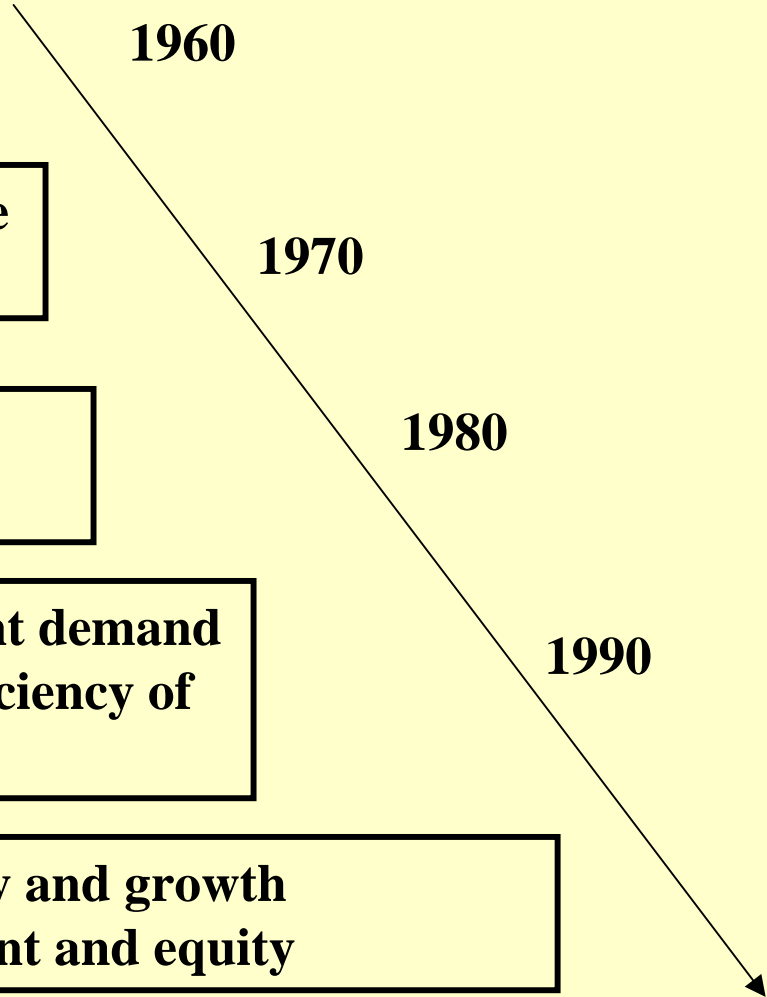
**System management demand  
and supply and efficiency of  
operation**

**1990**

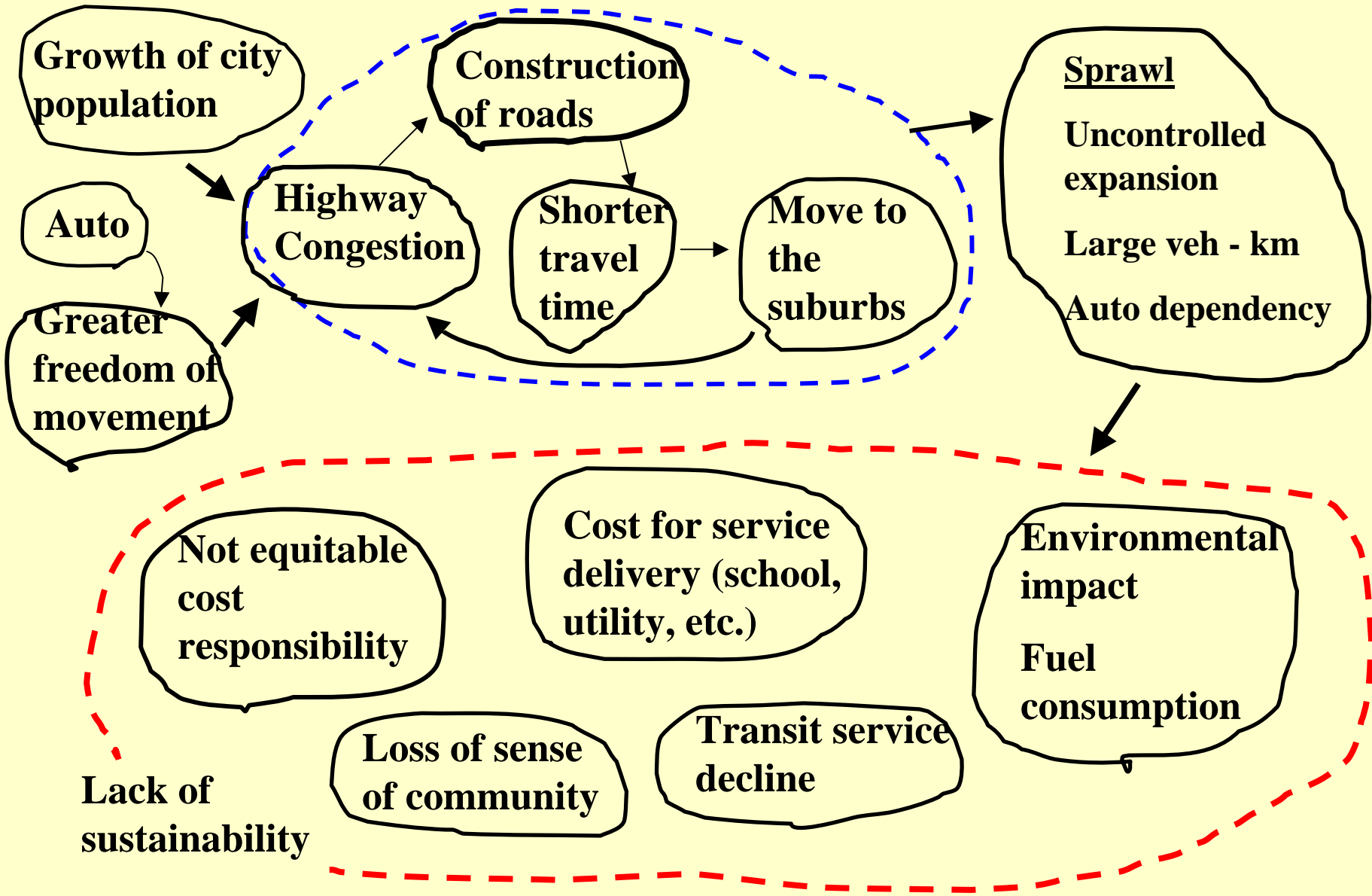
**Technology and growth  
management and equity**

**2000**

**Sustainability, community  
and value**



# What has happened to many American cities































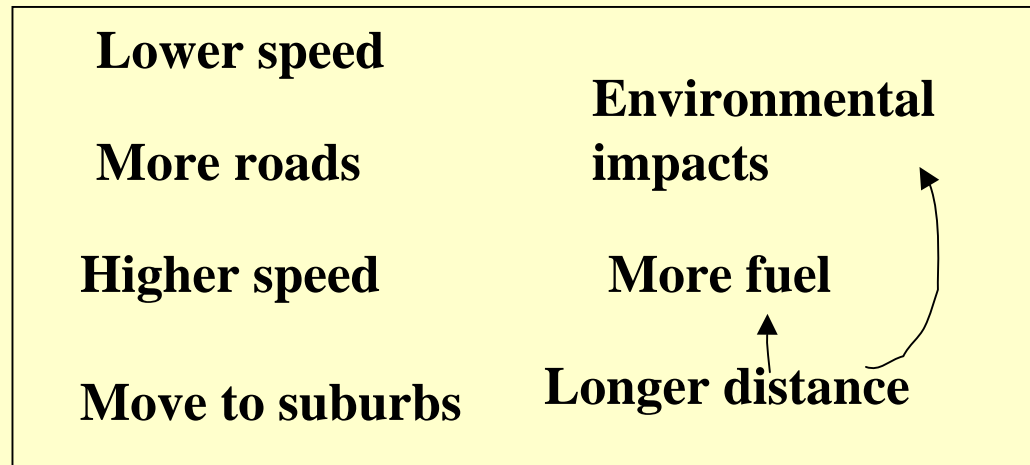
# Smart Growth

## Genesis

Suburban sprawl, environment, vicious circle of road building and congestion, societal consciousness re: equity, responsibility, community, resource limitation, uncertainty about destiny.

## Accessible community congestion

### Compact neighborhood



# Differences

## **Traditional auto based planning**

**Supply side planning- road  
construction and expansion**

**Transportation systems  
management for auto  
movement efficiency (ITS)**

**Large scale capital  
investment in rail transit,  
busways.**

## **Accessibility based planning**

**Land use management (compact  
development, mixed use,  
walking, community formation)**

**Telecommunication**

**Demand management**

**Community scale public  
involvement and local decision  
making**

# **Smart Growth**

**Integrated land use and transport planning**

**Road user charge to account or externalities**

**Private public partnership to public transport**

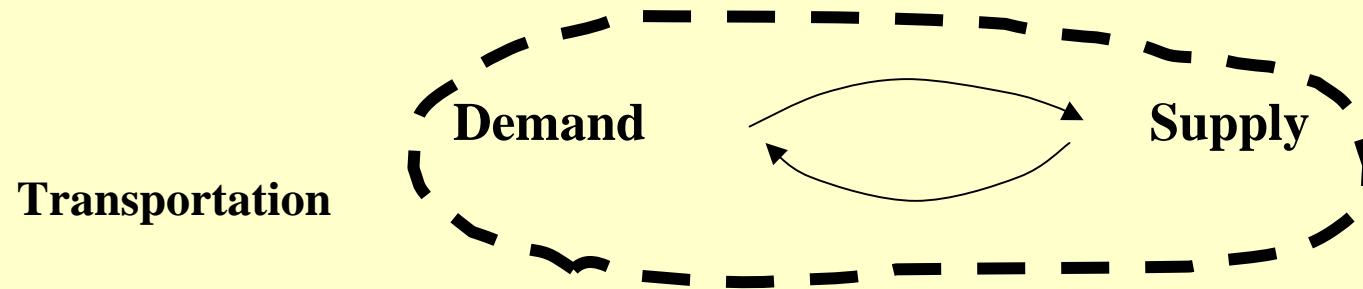
**Priorities to transit, pedestrians and bicycles**

**Promote walking and bicycling**

**Efficient non-polluting vehicles**

**Introduce schemes for demand reduction**

# Framework for Developing Sustainable Transportation



## Necessary settings to achieve sustainable transportation

**Individuals understand the responsibility to achieve social goods**

**Decision making frame – participatory decision making**

**Equity consideration among population groups**

**Technology development**

**Cost accounting mechanism**













◀ Pedestrian treatment  
in Cardiff, UK.

Pedestrian  
crossing in  
London.













# Smart Growth vs. Sprawl

## Smart growth

## Sprawl growth

<b>Density</b>	<b>High density</b>	<b>Low density</b>
<b>Growth pattern</b>	<b>Brown field (Infill)</b>	<b>Greenfield (farm and forest)</b>
<b>Land use</b>	<b>Mixed</b>	<b>Homogeneous</b>
<b>Scale</b>	<b>Human scale</b>	<b>Large scale large residential dev.</b>
<b>Service</b>	<b>Local</b>	<b>Regional level distribution</b>
<b>Transport</b>	<b>Transit/walk</b>	<b>Auto</b>
<b>Connectivity</b>	<b>Connected</b>	<b>Hierarchical road/ loops and dead ends</b>
<b>Street</b>	<b>Traffic calming</b>	<b>Efficient flow of auto</b>
<b>Planning</b>	<b>Community</b>	<b>Little coordination</b>
<b>Public space</b>	<b>Emphasized (walk, interaction)</b>	<b>Emphasis on private realm (gated community, private club, mall)</b>



# **Performance Indicator of Sustainability**

## **Transportation systems performance**

**accessibility**

**costs**

**resiliency**

**adaptability under technological changes**

## **Environmental performance**

**Land consumption**

**Air and water pollution**

**Energy use**

**Loss of farm land and fragile land**

## **Social performance**

**Safety and public health**

**Equitable distribution of benefits and costs**

**Diversity and citizen participation, sense of community**

## **Accounting of cost**

**Individual cost responsibilities**

**Short term and long term cost**

**Planning : professional practice that specifically seeks to connect forms of knowledge with forms of actions in the public domain.**

**Friedman**

## **Reference**

**Michael Meyer , *Refocusing Transportation Planning for the 21<sup>st</sup> Century*, Conference Proceedings 20, Transportation Research Board, 2000**

**Thank you for your attention**

**Any questions?**



# Sustainable transportation perspective

Reduced *human* travel distance

Reduced vehicle use (vehicle-km)



**Compact neighborhood**

**Walkable access**

## Necessary elements for sustainable community

**Safe pedestrian space**

**Safe bicycle space**

**Traffic control and management that favors public transport and efficient vehicle usage (travel distance, vehicle usage)**

**Proper cost accounting of individual users of transport facilities and services**

**Technology development**

**Participatory decision making**

## Principles for sustainable transportation must ensure

1. **Access:** people are entitled to access and communicate with other people, places and goods and services
2. **Equity:** diverse social, regional, generational, ethnic population groups are treated fairly for the benefits and costs of transportation services.
3. **Health and safety:** all citizens must be not only protected but also the transportation system promotes safety and health.
4. **Pollution prevention:** global climate, ecological balance, and biodiversity must be preserved.
5. **Land and resource use:** preserve natural resources for bio-diversity, and vital habitat and long term human activity.
6. **Cost accounting:** the full accountability of cost of the use of transportation facilities and services – each pay equitable share.
7. **Individual responsibility:** all individuals show responsible behavior in personal movement and consumption.