Influences of Social and Political Trends on Transportation Issues

The case of last 50 years in the US

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Problem solving

Science

Discovery of natural laws

Engineering (must have goals and products)

Creation of goods and services to improve the quality of life.
Human and society

Resource Limitations

(money, land manpower, time, material)

Decision making

(objectives and constraints)

Civil Engineering - public works for basic human needs

Protection from natural hazards - shelter
Protection of environment and health
Provision of mobility

Nature , People and Technology

Societal Value

Value changes with time

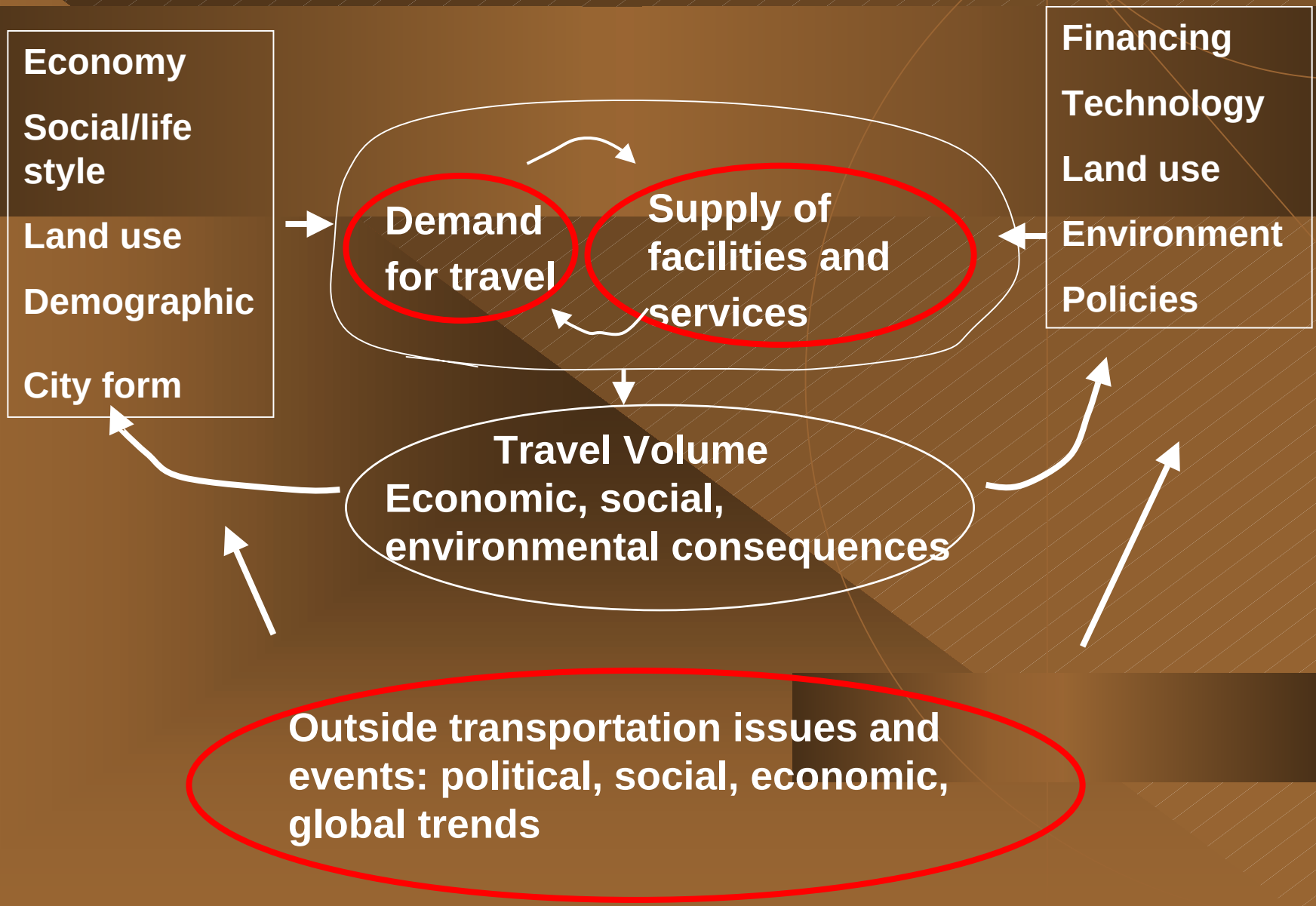
Traditional view of civil engineering: to build and maintain facilities

Today and future civil engineering:
To build and maintain facilities
To plan and manage facilities
To create an infrastructure **system** based on coordination with various engineering, political, economic and social subsystems.

Infrastructure *system* as the product

Evaluation – what is good and what is not good for the society today and the future.

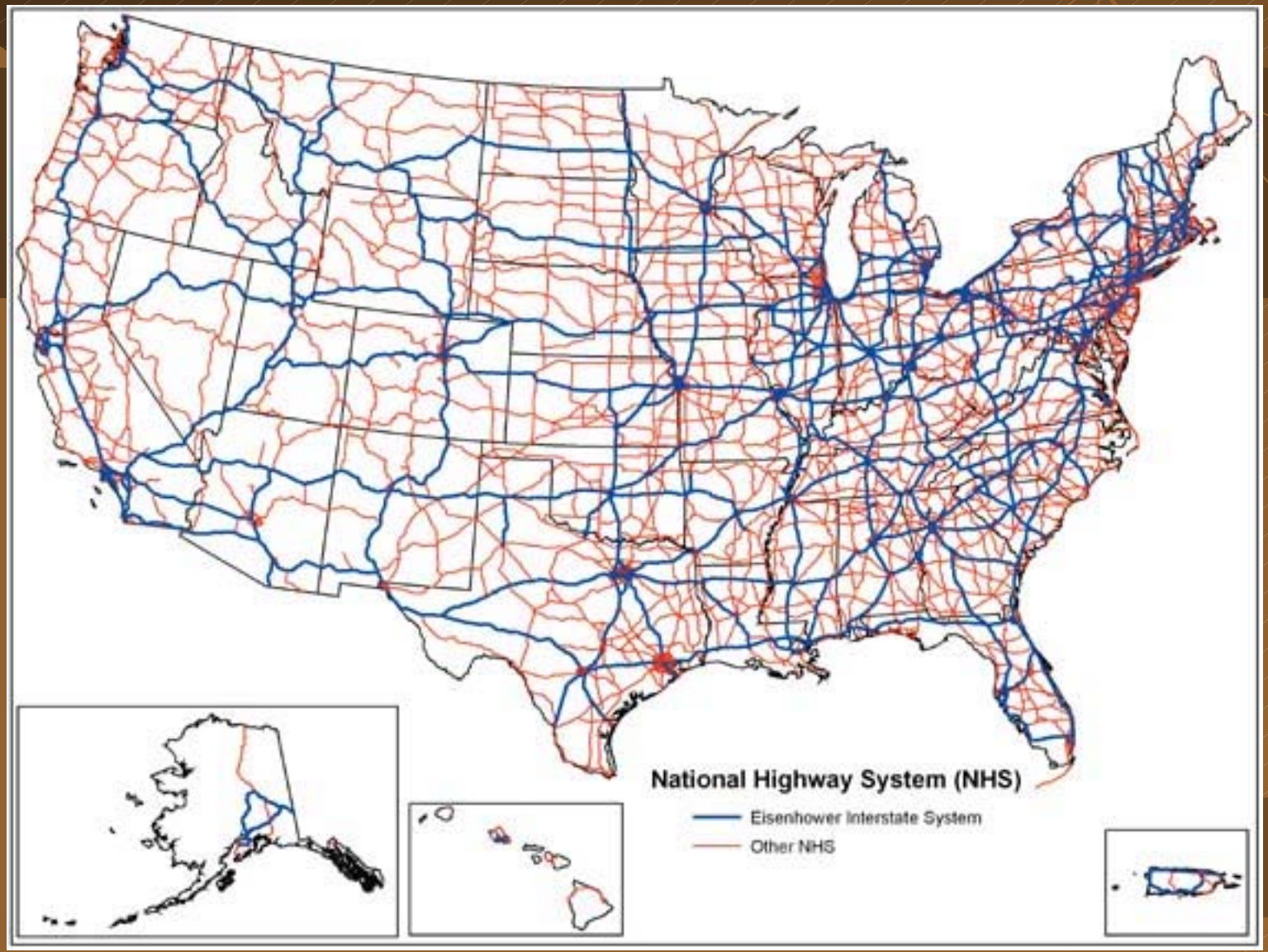
Dynamics of Transportation



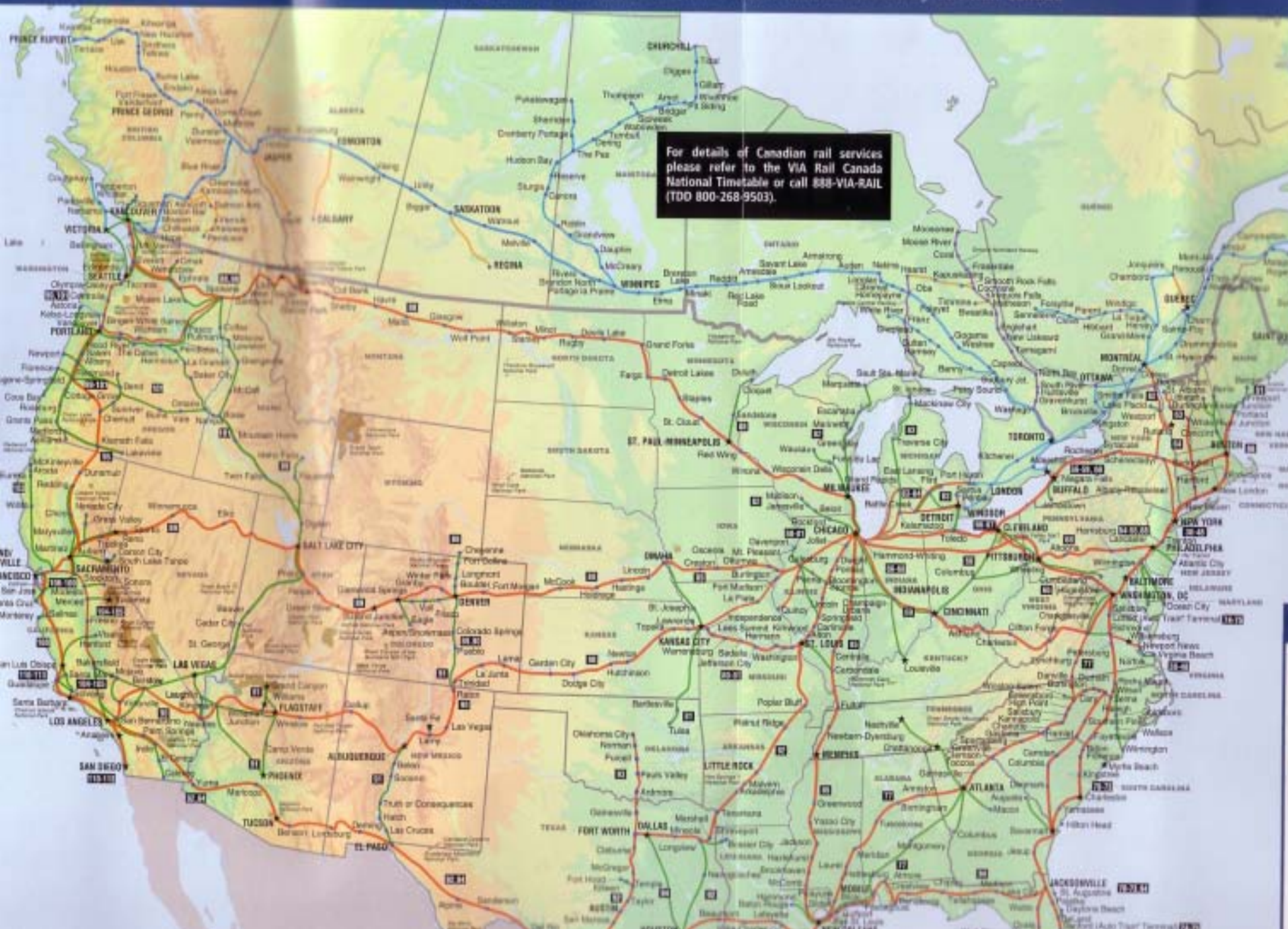
1950's

- Post war industrialization
- Korean war, Beginning of cold war
- Auto production and needs for highways

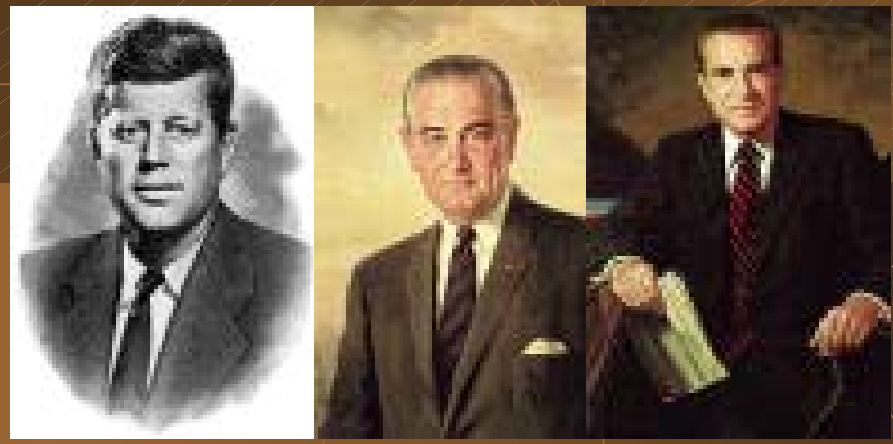
- Interstate Highway Building began (74,000km) (1955-)
- Federal gasoline tax to build the highway (4c/gallon)
- Beginning of suburbanization, and auto based mobility and culture (e.g. "drive-in" culture, fast food, etc.)


National Highway System (NHS)
Eisenhower Interstate System
Other NHS

serving over 500 destinations ➤ plus 400 destinations served by VIA Rail Canada



1960's



- Urban riots - dissatisfaction of the poor in the city.
- Civil rights movements (voting rights, equal opportunity)-1964 Civil Rights Act.
- Vietnam war. Anti-war movement. Anti-establishment value.
- Environmental movement. (1969 National Env. Policy Act)

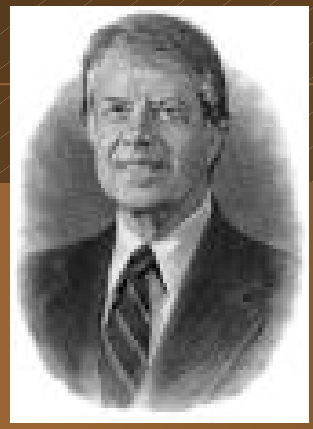
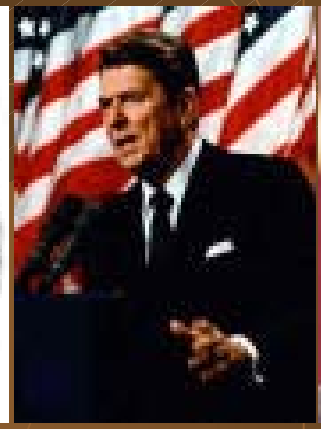
- Transportation planning requirements - urban transportation needs recognized. 3C Planning(1962), DOT established (1967)
- Importance of city problems.
- Traffic congestion - suburbanization - highway building (traffic engineering).
- **Serious decline of public transport use**

1970’s

- Watergate (tested the system of government) .
- Oil crisis.
- Increased federal deficits.
- Growing uncertainty about the future.

- Public transportation technology development (e.g.,APM, Transbus)
- importance of planning emphasized - longer decision time, comprehensive planning (transport is a part of bigger infrastructure).
- Integration of transit and highway planning processes.
- A brief period of transit favored atmosphere.

1980's


- Strong defense spending - cold war peak.
- Privatization, deregulation trends.
- Decision power from central to local governments.
- Expanded scope of civil-rights movement - women, elderly, disabled persons, and Title (XI).
- Information and computer technologies.

- Continued suburbanization, more congestion, more auto dominant society
- Emphasis in local decision on planning issues.
- Introduction of communications/computer technologies

1990's

- Cold war ended.
- Domestic problems (healthcare, welfare, education, city, crimes, drugs)
- Economic prosperity.
- IT - internet, information.
- Service industry, women in labor force.
- Civil right issues expanded (fairness, equity, public hearings).
- Environmental concerns (Clean air act).
- ADA (American Disabilities Act) disabled persons treatment.

- Inter-modal transportation emphasized.
- Flexible funding (local decisions).
- Intelligent Transportation Systems.

2000's

(2001-4)

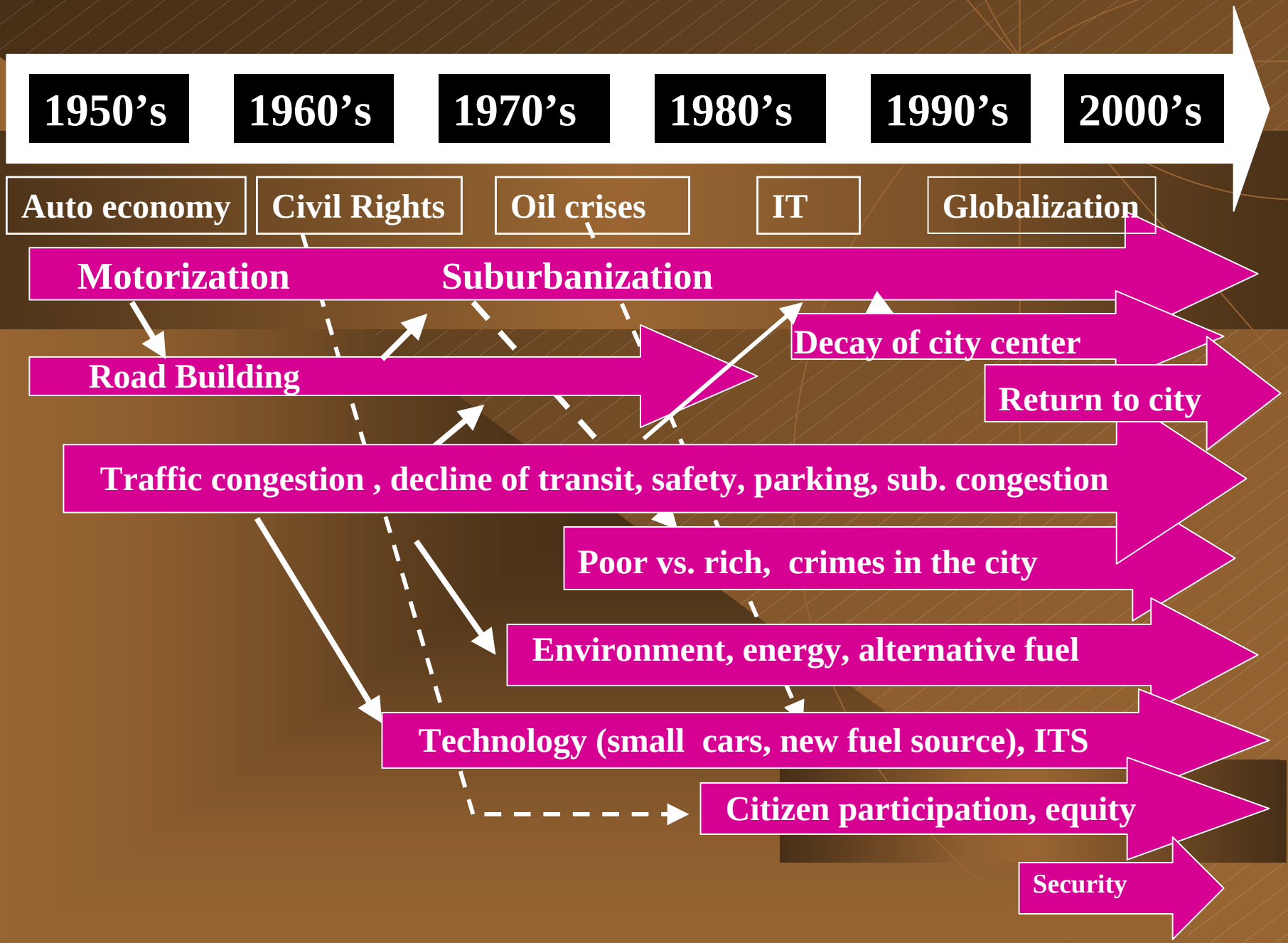
?

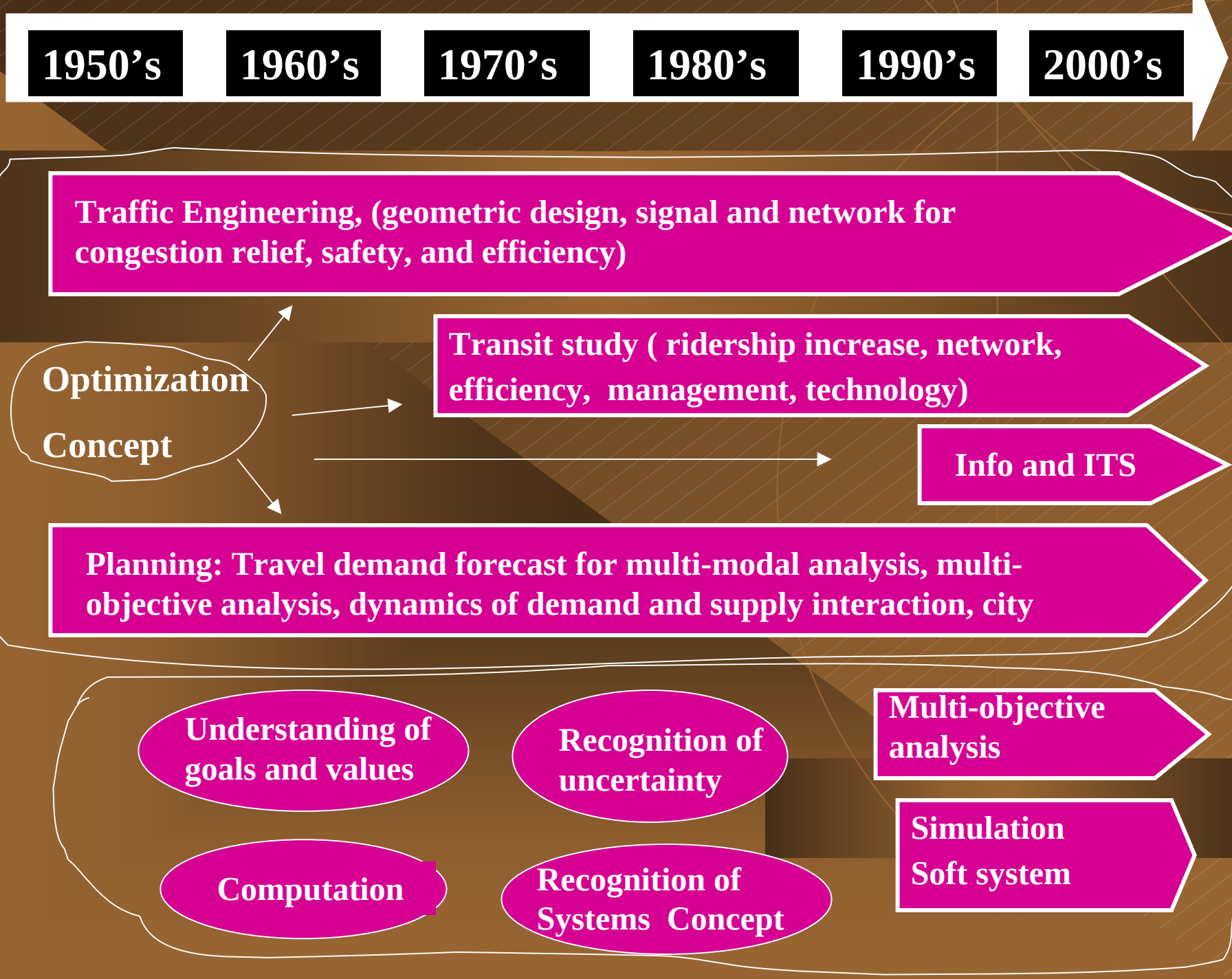
?

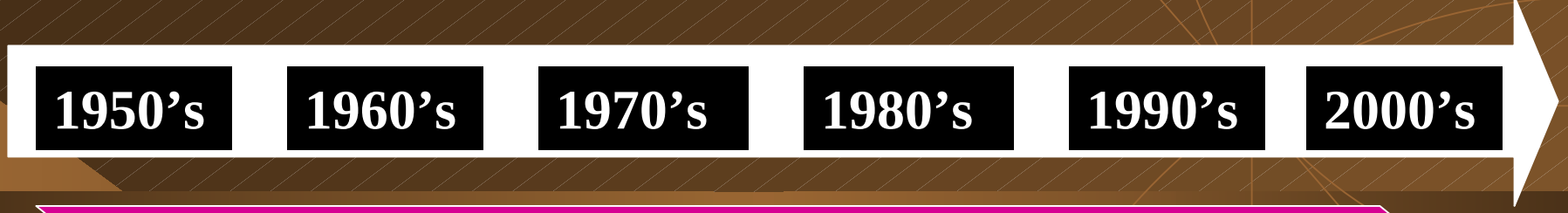
(2005-)

- 9/11 terrorism.
- War on terrorism – national security.
- Economic stagnation (job loss).
- Civil right issues expanded (fairness, equity, public hearings).
- Difficult issues, e.g., privacy vs. national security, gay marriage.
- Environmental concerns.
- Globalization

- Sustainability (livability, transportation and environment).
- Transportation security.
- Practical ITS applications.
- Transportation and public health connection.


1950's
1960's
1970's
1980's
1990's
2000's
Auto economy
Civil Rights
Oil crises
IT
Globalization
Motorization
Suburbanization
Road Building
Decay of city center
Return to city
Traffic congestion , decline of transit, safety, parking, sub. congestion
Poor vs. rich, crimes in the city
Environment, energy, alternative fuel
Technology (small cars, new fuel source), ITS
Citizen participation, equity
Security


1950's
1960's
1970's
1980's
1990's
2000's
Traffic Engineering, (geometric design, signal and network for congestion relief, safety, and efficiency)
Optimization
Concept
Transit study (ridership increase, network, efficiency, management, technology)
Info and ITS
Planning: Travel demand forecast for multi-modal analysis, multi-objective analysis, dynamics of demand and supply interaction, city
Understanding of goals and values
Recognition of uncertainty
Multi-objective analysis
Simulation
Soft system
Computation
Recognition of Systems Concept



Hard to define the goals and hard to find the means to achieve the goals

Complexity - wicked problem

Uncertainty

Solution techniques

Bounded rationality: Instrumental rationality Communicative rationality

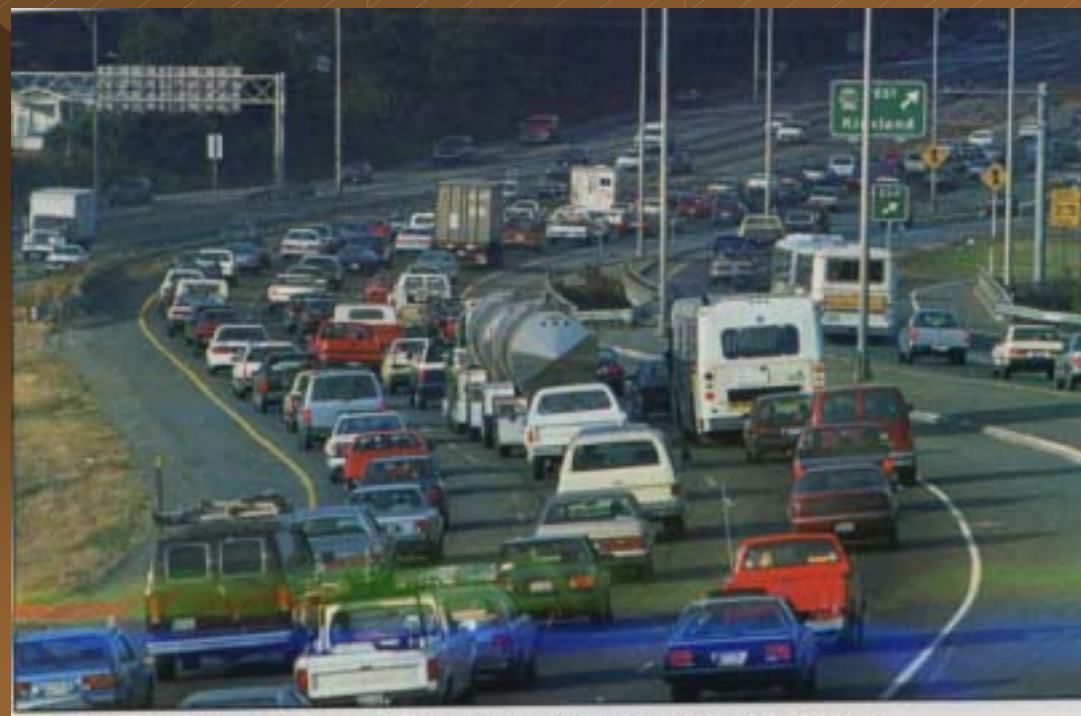
Validity Claims

Truth, Rightness, Sincerity, Comprehensibility

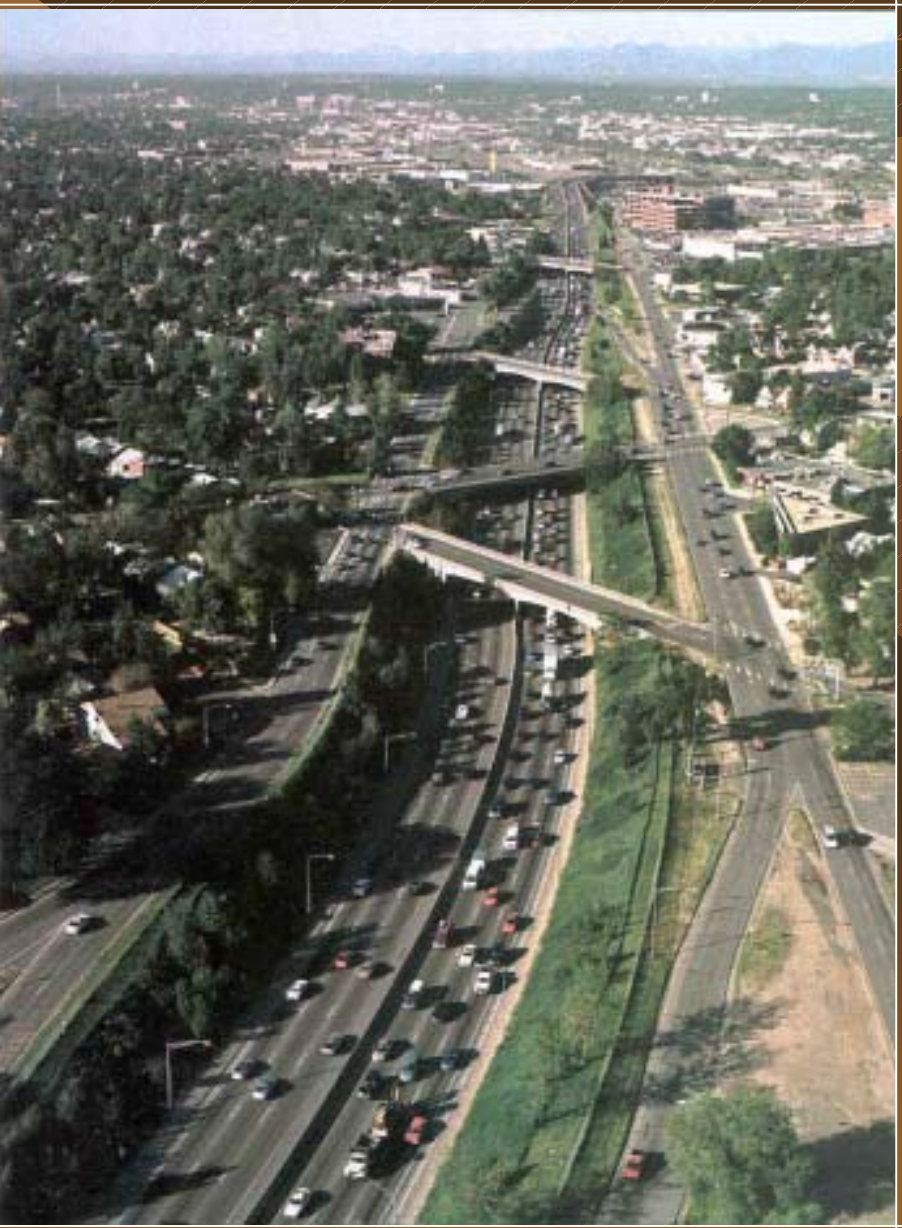
Soft System

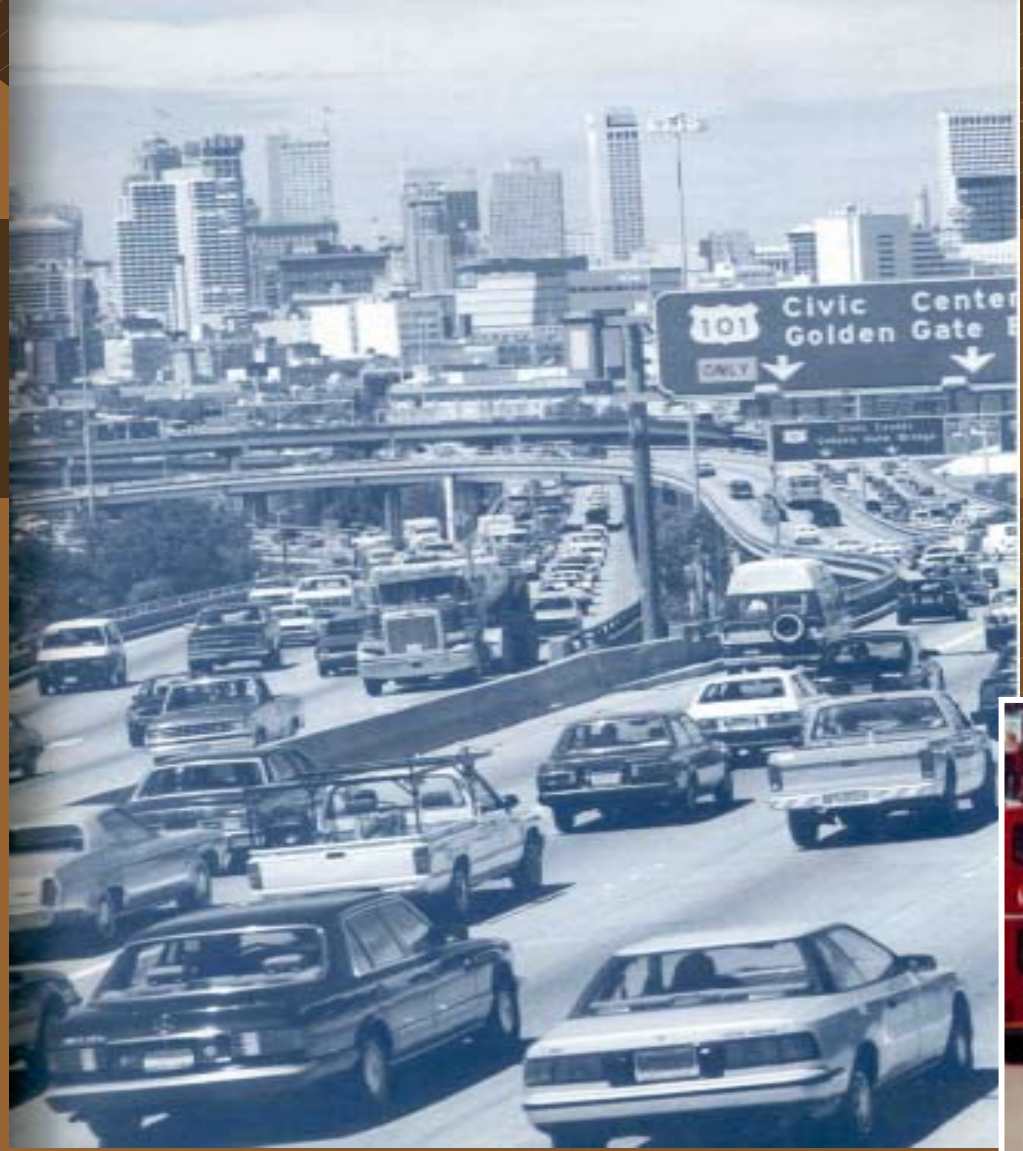
Allow creativity and humanistic cultural components in the planning

Allow uncertainty

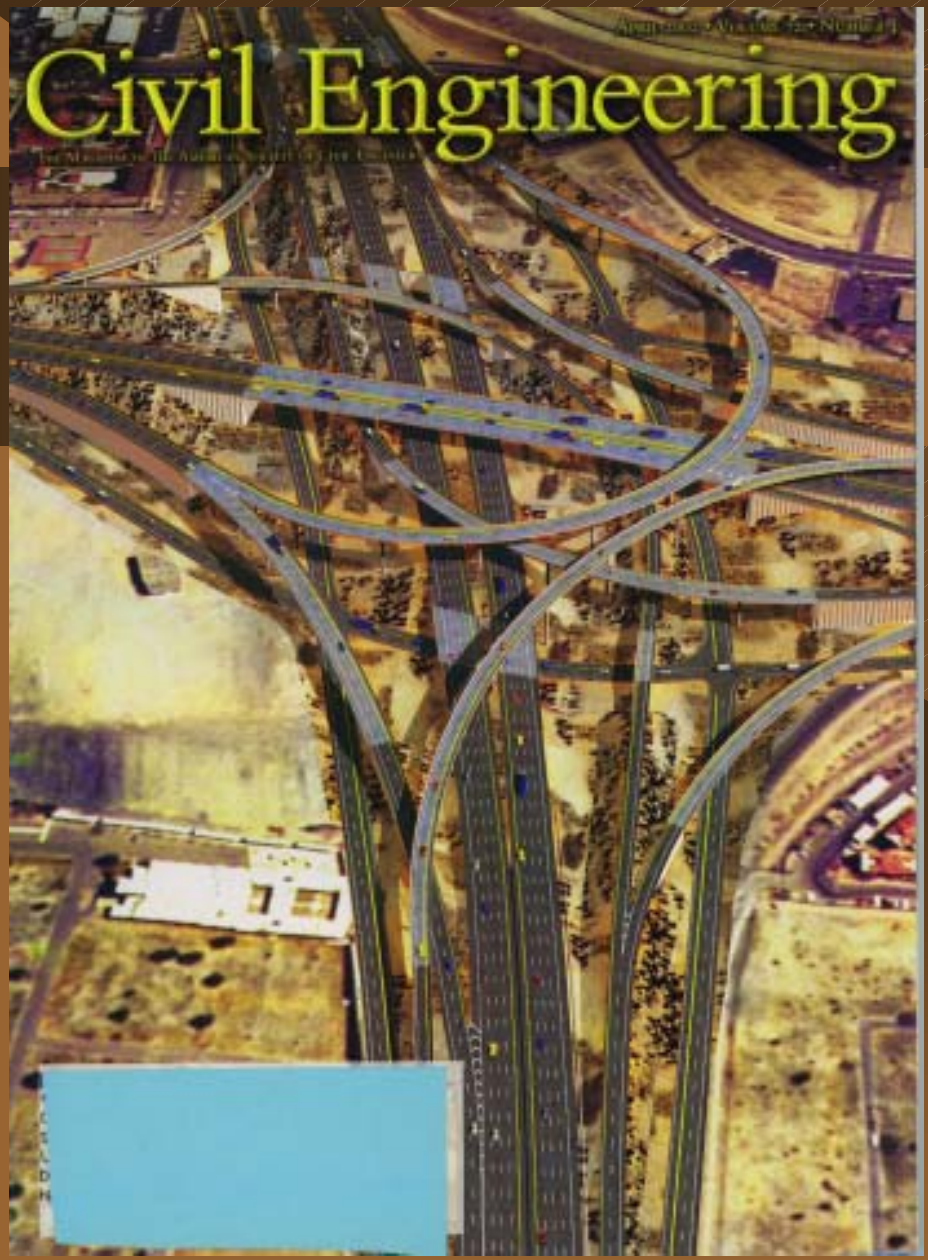


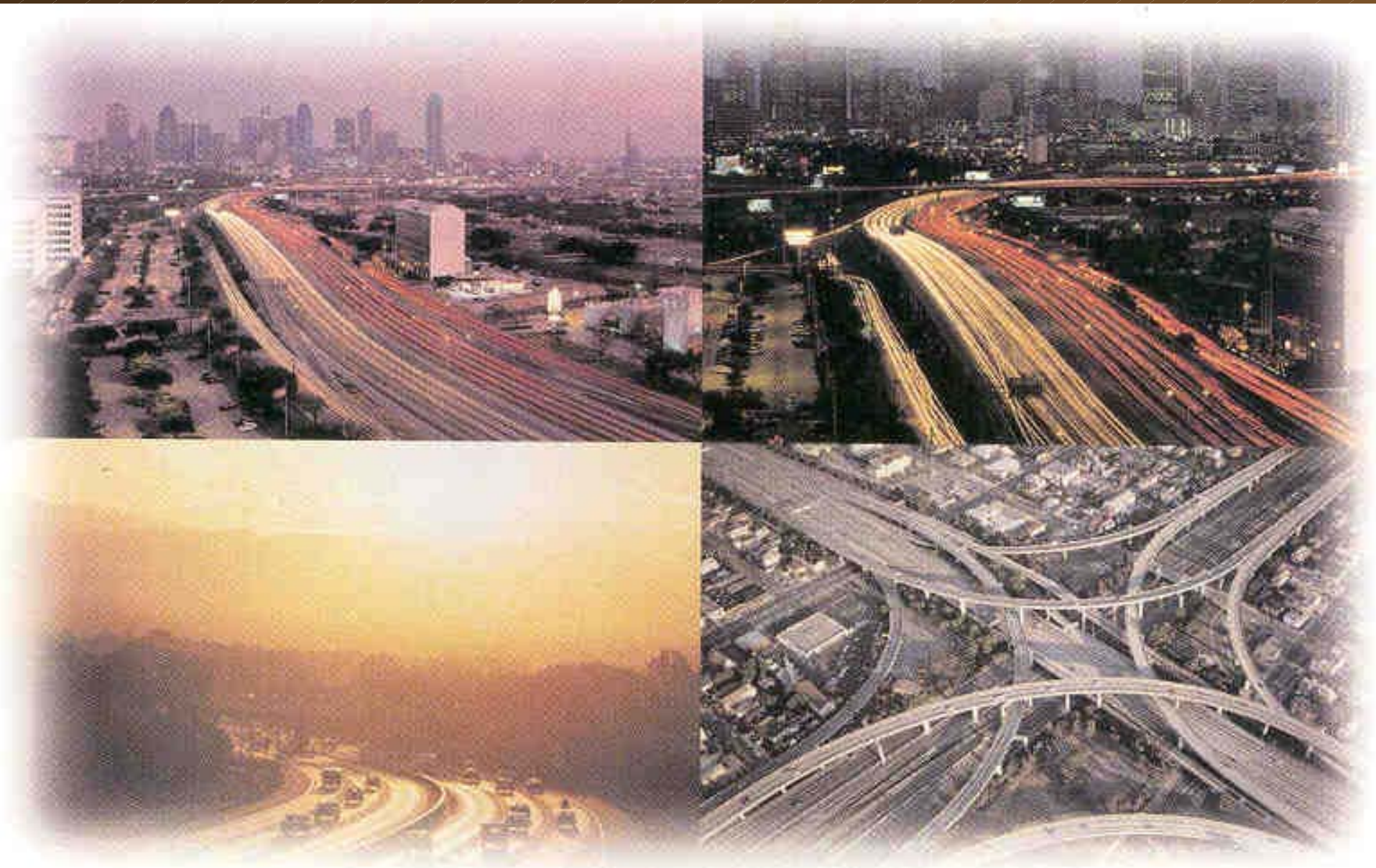
Traffic jams like this one are an all too common occurrence today in America's major metropolitan areas.

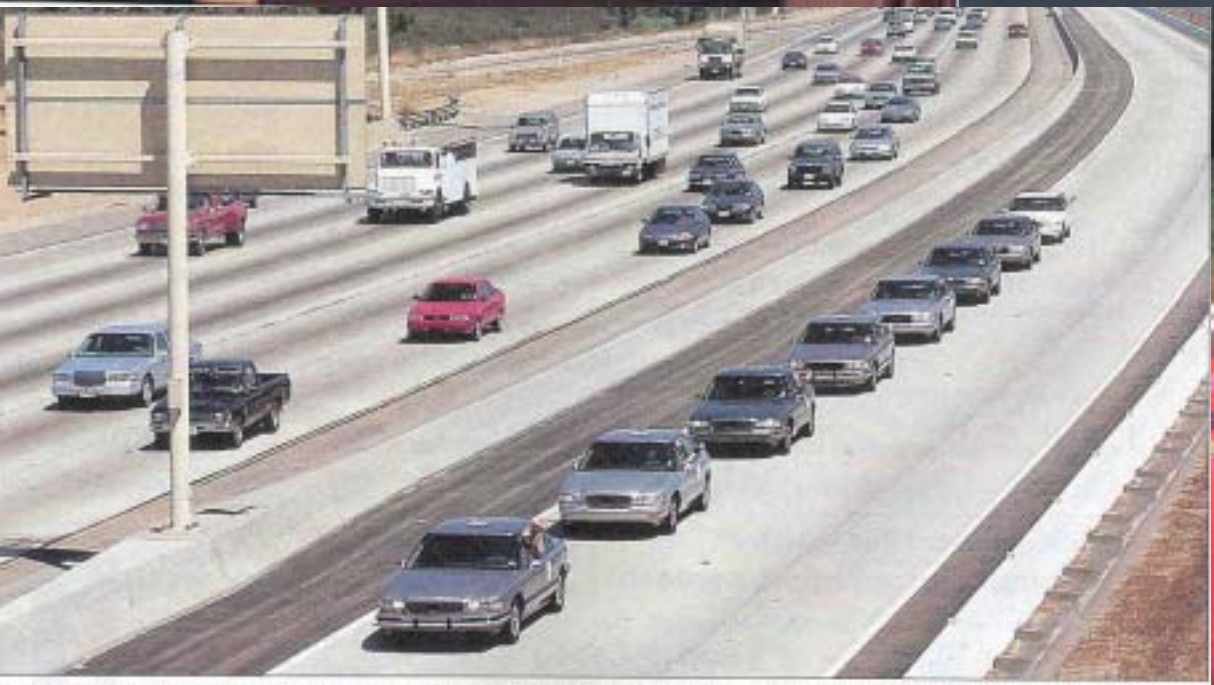



101
Civic
Golden Gate


THE BUSH


Civil Engineering





n eight-car platoon of PATH-automated Buick LaSabres on the express lane of I-15 in San Diego, Calif. "Drivers" are waving their
ands out the window to demonstrate automated steering.

Statistics

	1970	1998
Population (x1,000)	203,984	284,797 (x k) (2001)
No. of households(x1,000)	63,401	102,528
1 person households (x1,000)	10,980 (1969)	24,732 (125%)
2 person households (x1,000)	18,448	31,834 (72%)
3 person households (x1,000)	10,746	16,827 (56%)
4+	22,330	25,597 (14%)
Persons / household	3.16	2.56 (1995)
Vehicles / household	1.16	1.78 (1995)
Households without vehicles(x1,000)	12,876 (20%)	7,989 (8.1%)
Households with 1 vehicles(x1,000)	30,252(48%)	32,064(32.4%)
Households with 2 vehicles (x1,000)	16,501(26.4%)	40,024(40.4%)
Households with 3+ vehciles (x1,000)	2,875 (4.6%)	18,914(19.1%)
Licensed drivers/household	1.65	1.78 (1995)

Statistics (Cont'd)

Daily VMT per driver	20.64 mi	32.14 mi (1995)
Household vehicles(x1,000)	87,284	229,745
Person-miles of travel	1,404,137	3,411,122
No. of passenger cars	89,243,557	129,748,704
Pass car-miles	917,000	1,502,000
Person miles of travel (x000,000)	1,404,137	3,411,122
No. of working women(x1,000)	75,758	131,697
male (x1,000)	48,487	71,105
women (x1,000)	27,271	60,593
Poverty line 4 person family	$18,104/year	3,290,000 (11.7% of population)
	1 out of 4 blacks below poverty line	

Modes of travel for commute

79.6% auto solo 11.1% carpool 5.1% transit 3.9% car pool status unknown

Average commute time

Private vehicles	17.4	23.5 min
Transit	35.2	49.6 min

Demographic Data Update

	1969	1977	1983	1990	1995	2001
persons/HH	3.16	2.83	2.69	2.56	2.63	2.58
vehicles/HH	.16	1.59	1.68	1.77	1.78	1.90
vehicles/driver	0.70	0.94	0.98	1.01	1.00	1.07
Workers/person	0.38	0.44	0.45	0.49	0.51	0.52
Annual Miles/Driver	8,685	10,006	10,536	13,125	13,476	13,836

Source

inklings preliminary results from the 2001 nhts

Future Implications: Background

- Demographic pattern
  - Aging population
  - Small households (single or 2 person)
  - Immigration
  - Diversity - race, population segments
- Economic and labor force patterns
  - Flexible and fluid workforce (service industry)
  - De-industrialization, world wide trade
  - Women working (60% of women)
- Land use patterns
  - Suburbanization
  - Dispersed residential area
  - Unattractiveness of center city as activity center (?)

Technologies

- Communications/ information, alternative fuel

- Travel pattern
- Technology
- City and community
- Environment
- National policy
- Infrastructure

Future Implications

- Travel Pattern
  - More auto trips, longer and chained trips, dispersed origins and destinations, more congestion, more difficult to predict traffic growth
- City and Community
  - Less attractiveness of center city as employment centers, high cost of government services, concentration of poor
- Nation
  - Greater reliance of foreign oil, greater import cars, productivity reduction, government service delivery, decision making power shift, equity
- Environment
  - Air quality, noise, vegetation, climate change, livability
- Technology
  - Alternative fuel, alternative power, environment, disabled person aids, walking aids, ITS
- Infrastructure
  - Deterioration, maintenance and monitoring, real time control, financing, cost responsibilities

Our Future

- Busy Life.
  - **Multi-tasks**

Demand for

High speed.

High capacity.

More comfort.

Safety and security.

Individualized service.

Environmental and Energy constraints.

Importance of planning

Transportation policy

Transportation technologies

Land use and transportation

Financing of transportation

Environment and energy

Food, shelter, health, and mobility are the four essential things in life. Among them, mobility promotes intelligence of human being

Questions and Comments?