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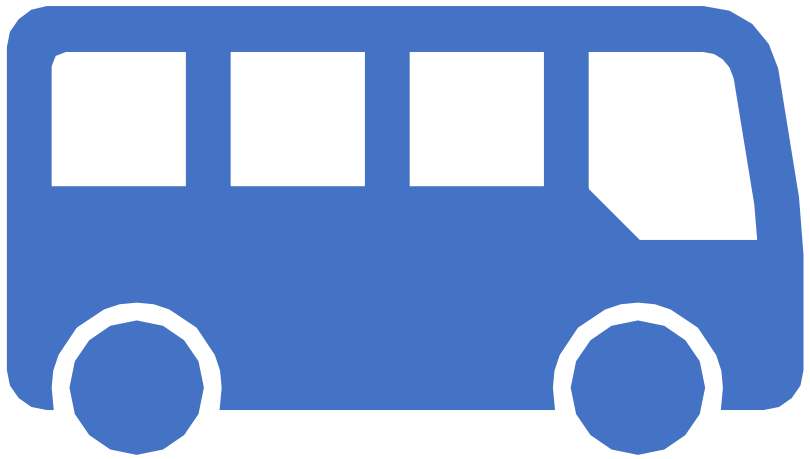


Rae J. Furlonge

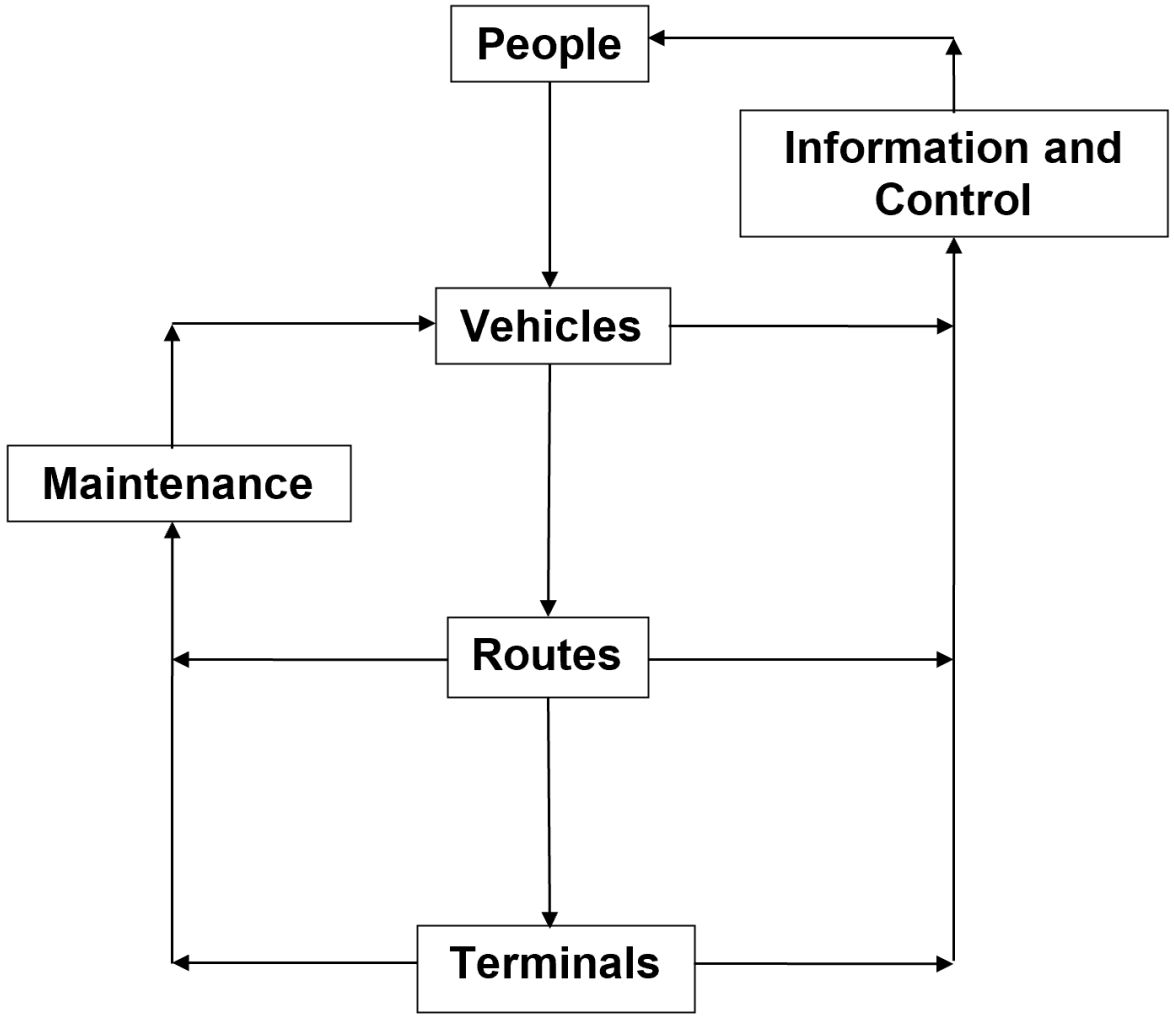
Forget Autonomous Vehicles: Focus on Equity and Active Transport

Organization of the Presentation

1. Background to the Presentation
2. The Role of Autonomous Vehicles
3. Equity and Active Transport
4. Conclusion

Background to the Presentation

Basic Components of the Transportation System, and their Interaction



The Existing Situation

- Our existing transportation system is the cumulative result of countless separate decisions and investments made by public and private organizations and individuals.
- These organizations and individuals naturally view the system with an eye to their own requirements.
- They may all have a general interest in national transportation improvement, but their individual priorities are diverse and often conflicting.
- Yet, above all, every single one of us is dissatisfied with the level of service of the transportation system.

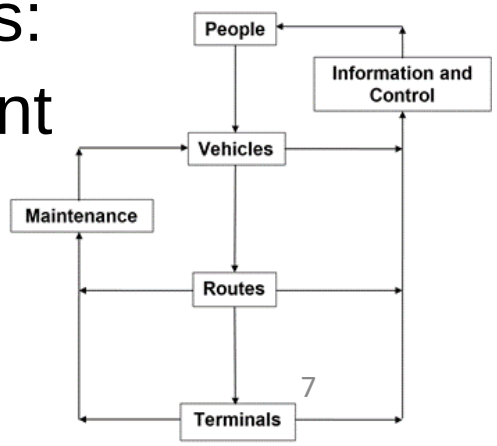
The Existing Situation

- The car has allowed many to travel where they will, in comfort and security, at a time of their own choosing. Of course, one can no longer choose our travel times on our roads, because of traffic congestion.
- The car is not just an aspect of modernity, it is a precondition for it, and owning a car remains a goal for many people in every part of the world (The Economist, December 6, 1997).
- Many people, including the finance lending institutions, value the car more than a home – it is easier to get a loan for a car than a house.

The Existing Situation

- Access to transportation is difficult for non-car owners and, made increasingly more so by the traffic congestion caused by car owners.
- But the emphasis of successive Governments has been making the ownership of cars cheaper and facilitating their use by progressive road capacity improvements.
- Our decision makers have been focussing almost exclusively on only two of the components of the transportation system: vehicles and routes
- To most people traffic problems mean transport problems, when in fact, traffic problems are a symptom of transport problems:

land use activities – transport planning = traffic management problems



The Existing Situation

- Until 1990, the imported used car industry did not exist in the Caribbean
- Japan's strict motor-vehicle inspections and high depreciation which cause vehicles to be worth very little after six years, as well as its stringent vehicle emission test standards make vehicle disposal very expensive in Japan.
- Thus, imported used car dealers have been able to grab these used cars at very low cost and in good condition, and compete successfully with imported new cars sales for nearly 30 years.
- Successive Governments have boasted that (1) they are providing access to cheap cars for the common man and creating many business entrepreneurs in imported used cars; and (2) how much revenue Government was making from the taxes on the flood of imported used vehicles.

The Existing Situation

- Our territories are struggling to meet the increased demand for foreign exchange for fuel and the increased turnover of used car imports. Also for increasing annual expenditures on road capacity improvements and road maintenance.
- Long delays resulting from traffic congestion, lack of parking facilities, and traffic accidents. Making matters worse is the fact that five-seater automobiles can most often be seen carrying only a single occupant.
- In addition, carbon emissions from automobile exhausts are a major source of air pollution.
- Vehicle safety and fuel standards of these imported used vehicles are impossible to monitor

The Existing Situation

- Negative environmental effects from scrapping of these vehicles and breakdowns, as a result of faster depreciation
- The poor visual impact of dumped or discarded imported used vehicles.
- Solid waste disposal problem of scrapped tyres.
- Accelerated vehicle theft as a source of supply of spares to upkeep these imported used vehicles.
- So what has really been achieved? It is that many who had finances simply bought additional vehicles for other members of their household, and several innovative persons bought fleets of vehicles to operate as illegal unregulated taxis to address the need for public transport.

The Existing Situation

- Even though private car ownership is high, the reality is that the majority of the population do not have access to a private car.
- Evidence of this may be seen every morning and evening with persons, particularly women and children, desperately awaiting some form of public transportation.
- The correct technical approaches are often not acceptable for several reasons, including: (1) They are politically unpopular, and the fear of being voted out becomes a concern; and, (2) They require a long lead-time for implementation (including planning and preparation) and successful testing.
- The solutions to transportation problems are not obvious. If they were, then we would have had them addressed successfully long ago.

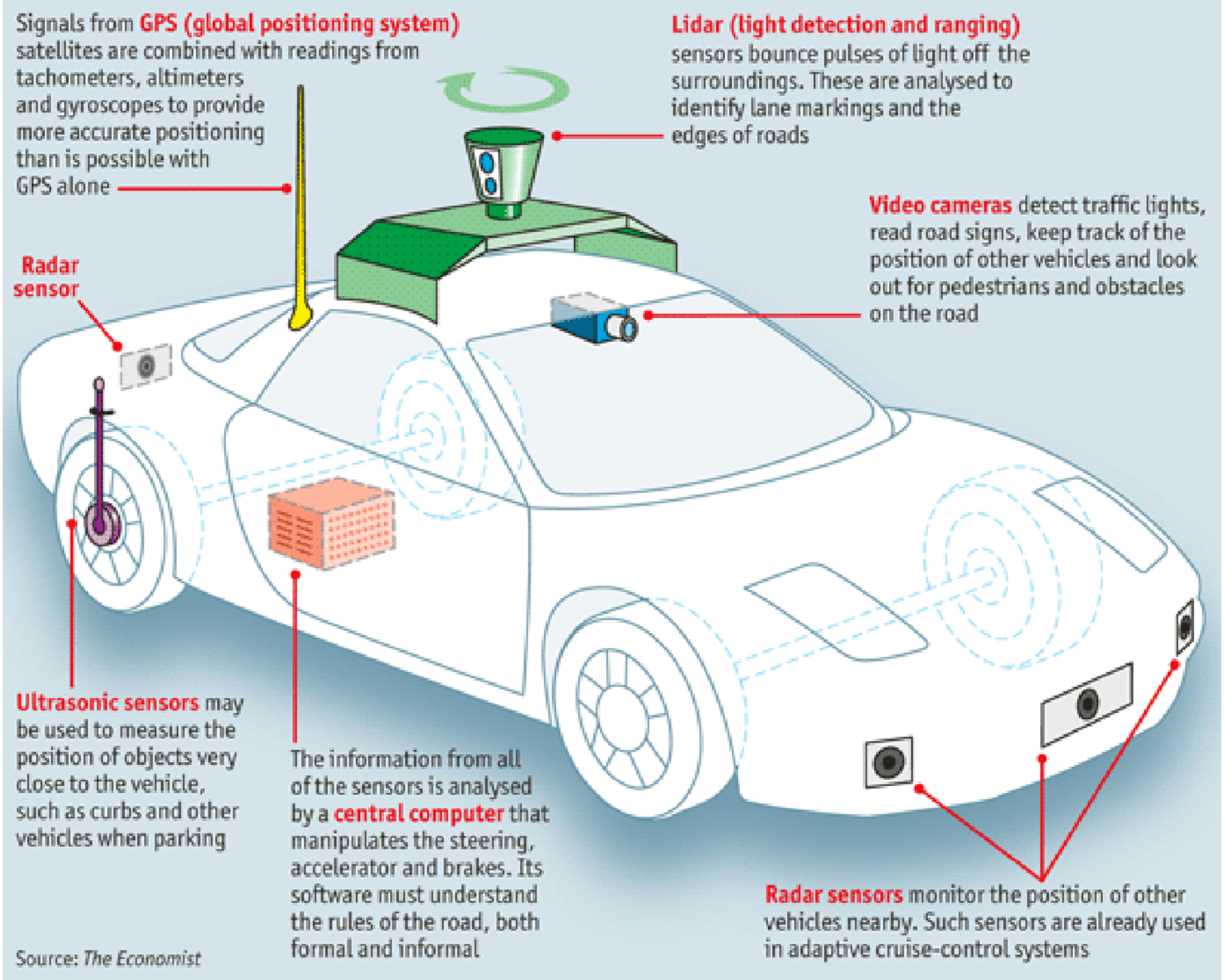
The Role of Autonomous Vehicles

Automobile Domination

- Most people will simply not give up the comfort and convenience of their cars, despite the huge traffic congestion being both caused and experienced by them, except if penalties are imposed on them as a congestion alleviation device to coerce them to change their mode of transport.
- Regardless of the degree of car ownership, there will always be a significant portion of the population who are unable to access a private car.
- It is an advantage to a society who can offer high-quality public transportation services and other activities suited to walking access. These minimise the creation of second class citizens, or those not owning cars, or who cannot or do not want to drive.
- According to Professor Vukan Vuchic, in his book "Transportation for Livable Cities," one of the fundamental characteristics of a livable nation should be the ability to travel conveniently without having to own or operate a car.

Autonomous Vehicles Defined

- A vehicle that is navigated using a number of well-placed sensors that detect and continuously observe the location and movement of other vehicles, people, and traffic control devices, etc.
- There are different levels of automation: Level 0: The human driver is in complete control of all functions of the car. Level 1: Only one function is automated. Level 2: More than one function is automated at the same time (e.g., steering and acceleration), but the driver must remain constantly attentive. Level 3: The driving functions are sufficiently automated that the driver can safely engage in other activities. Level 4: The car can drive itself without a human driver.


Signals from GPS (global positioning system) satellites are combined with readings from tachometers, altimeters and gyroscopes to provide more accurate positioning than is possible with GPS alone
Lidar (light detection and ranging) sensors bounce pulses of light off the surroundings. These are analysed to identify lane markings and the edges of roads
Video cameras detect traffic lights, read road signs, keep track of the position of other vehicles and look out for pedestrians and obstacles on the road
Radar sensor
Ultrasonic sensors may be used to measure the position of objects very close to the vehicle, such as curbs and other vehicles when parking
The information from all of the sensors is analysed by a central computer that manipulates the steering, accelerator and brakes. Its software must understand the rules of the road, both formal and informal
Radar sensors monitor the position of other vehicles nearby. Such sensors are already used in adaptive cruise-control systems
Source: The Economist

The ParkShuttle, Netherlands

The ParkShuttle, Netherlands

- It is a fully autonomous, low-capacity people-mover system which operates without any physical guidance.
- A shuttle can be manually called at the stop, and there are buttons in the shuttle to request each stop individually.
- As of 2018, the route is 1.8 km long and uses six shuttle vehicles numbered. Every shuttle has 12 seats and room for 10 standees and operates on weekdays from 6 am until 9 pm at 2½-minute intervals during rush hours. Outside rush hours, the shuttle has a frequency of at least once every 6 minutes to allow vehicles to be charged.
- A camera and communications system are mounted in the vehicle. Both are in contact with the central control room. The camera allows constant monitoring of vehicle security and a rapid response to any irregularity. The communication system permits communication between the passengers and the control room, functioning as an intercom.

AV Predictions (Litman, 2020)

- The first commercially available autonomous vehicles are likely to be expensive and limited in performance.
- Shared autonomous vehicles (self-driving taxis) and rides (micro-transit services) are being tested in some jurisdictions, but it will probably be the 2030s before they are widely available.
- Shared vehicles have moderate operating costs, and offer moderate convenience and comfort. They should be cheaper than current taxi and ridehailing services, but offer lower quality service since no driver will be available to assist passengers, provide security, or clean vehicles.
- Because of their industry's high labour costs and predictable routes, long-haul buses and freight trucks are particularly appropriate for autonomous operation, so self-driving buses and trucks may become common in the 2030s and 2040s.

Equity and Active Transport

The Influence of People in Directing the AV Agenda

- We should not be asking when AV will take over, but what do we want AV to do for us.
- We should not be wondering how AV technology will change our lives but determine policies and prepare plans for shaping the designs to meet our needs.
- What are we trying to achieve, and why? And how do we coordinate this information?
- The decisions with respect to investment in transport and infrastructure should be prioritised on the basis of maximization of net social benefits.

The Caribbean and other SIDS

- Small Island Developing States (SIDS) are a group of small island countries that tend to share similar sustainable development challenges, including small but growing populations, limited resources, susceptibility to natural disasters, vulnerability to external shocks, and excessive dependence on international trade and energy.
- They are usually semi-constrained cities and have a limited ability to expand (Litman, 2016), as many of them have a seaport boundary.
- In such cities, private automobile ownership should be discouraged, roadway design that favor walking, cycling and public transit, and road operations that limits vehicle travel to what their road system can accommodate.

Some Issues on Equity

(Tsay and Herrmann, 2013, p. 46)

- Equity is defined by the World Bank as the “fairness with which impacts (benefits and costs) are distributed.”
- Transportation decisions have a major impact on people’s opportunities for mobility and accessibility. For most households, transport expenditures represent a large share of their budget.
- Moreover, communities that do not have access to transit networks also lack access to economic opportunities and basic services, including emergency services, public services and utilities, healthcare, basic food and clothing, education and employment, and social and recreational activities.
- This exclusion hurts sectors of society that are already the most vulnerable—low-income households, physically or mentally disabled individuals, and those who are already socially isolated…

Some Issues on Equity

(Litman, 2018)

- Critics claim that transit has excessive costs and public subsidies. The truth is that total transit costs and subsidies are small compared with those of automobile travel. (p. 50)
- Transit expenditures represent about 3% of total motor vehicle expenditures, and transit subsidies represent about 10% of automobile financial subsidies… (p. 50)
- Critics do not seem to understand the concept of accessibility, and so evaluate transport system quality simply in terms of vehicle traffic congestion, ignoring other factors such as the geographic distribution of destinations, roadway connectivity and transportation system diversity. (p. 85)

Traditional Transportation Planning

(Newman and Kenworthy, 1999)

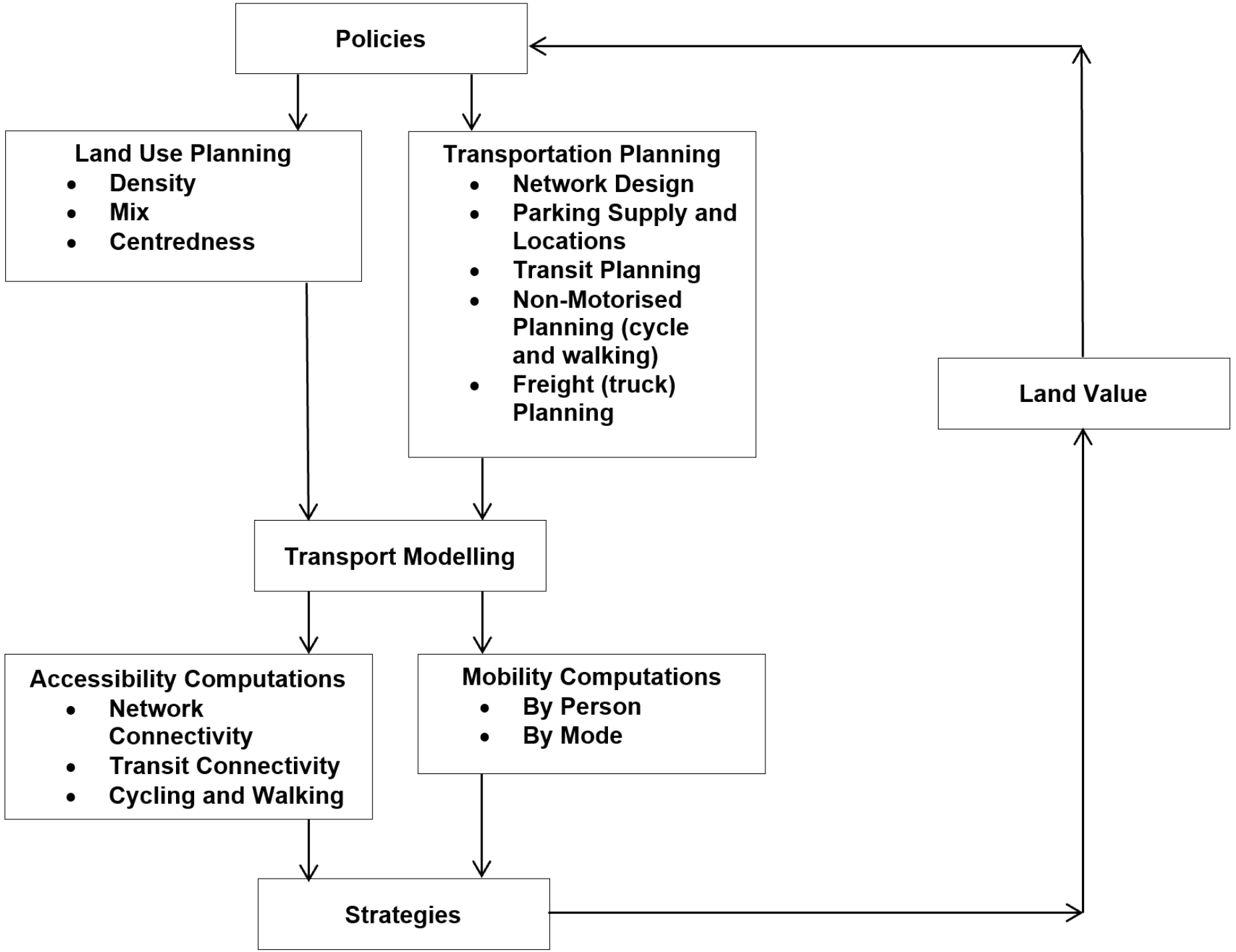
- Automobile dependence is an inevitable outcome of the standard processes of transportation planning and traffic engineering.
- … right from the outset, land use/transportation studies tended to be strongly associated with planning for roads and cars rather than a balance of transportation modes…
- Most forecasting was based on private transportation growth and land use patterns based around this. Once such land use was in place, the only transit that can service it was an inefficient bus service; thus the conclusion was inevitably reached that a massive increase in road funding was needed to provide the “grand transportation plan” needs.

Sustainable Transportation

- Sustainable transportation is about moving more easily and driving less.
- It means providing more mobility options to more people.
- It means providing greater connectivity between the places need to get to.
- Sustainable transportation has not played a role in the development of SIDS although there is reason to believe that investment in sustainable transport would advance socio-economic development and gender equity in these nations.

Mobility and Accessibility

- Mobility refers to how frequently you travel
- It is commonly measured as the product of the number of persons or vehicles and their distances travelled.
- Accessibility refers to how easily you travel between land use activities, or the overall difficulty in getting from an origin to a destination.
- It is a measure of the degree of connectivity of a particular location to/from other locations
- While both terms are important, the latter estimates land-use–transportation connectivity and so is a more important measure in determining transportation policy.


Policies
Land Use Planning
Density
Mix
Centredness
Transportation Planning
Network Design
Parking Supply and Locations
Transit Planning
Non-Motorised Planning (cycle and walking)
Freight (truck) Planning
Land Value
Transport Modelling
Accessibility Computations
Network Connectivity
Transit Connectivity
Cycling and Walking
Mobility Computations
By Person
By Mode
Strategies

Towards Equity in a Car-Dependent Society

- Overcome the shortcomings in transit administration and management
- Provide reliable transit services
- Provide adequate service frequencies
- Provide sufficient service in the off-peak, particularly at nights and weekends
- Provide dedicated bus lanes
- Provide adequate passenger information systems
- Provide sufficient marketing and awareness of transit services

Towards Equity in a Car-Dependent Society

- Provide high quality waiting environments in terms of cleanliness, lighting, furniture, shelters, safety, toilets, wi-fi and phones, trash receptacles, and commercial or service opportunities
- Provide improved locations of stops (to facilitate first mile / last mile access), especially considering fear of sexual harassment and other personal insecurity threats that deter women from walking, thus reducing their independence, health and affordability.
- Pay meaningful attention to accessibility of the aged, disabled, and people with prams

Towards Equity in a Car-Dependent Society

- Give much less priority for private transportation
- Develop possibilities for land use integrated with transit. Concentrating housing and employment within existing urban areas tends to increase transit system efficiency (by reducing travel distances between local destinations (homes, services and jobs), and this is known as Smart Growth.
- Provide demonstration projects of land use/transit integration

Conclusion

Conclusion

- AV technology will no doubt provide many benefits for mankind.
- But there are travel equity needs that must be provided by the transportation system right now, such as
  1. Affordable, representing good value for money;
  2. Caring, treating passengers with dignity and respect;
  3. Effective, serving a wide range of origins and destinations;
  4. Secure, providing a travel experience that is not blighted by fear of assault, attack or other anti-social behaviour throughout the journey

Conclusion

- No other transportation strategy has been as effective in getting people to leave their cars as the Covid-19 pandemic:
    1. If mobility was deemed non-essential, you had to stay at home;
    2. Telecommunication has become the most valued form of business and education interactions; and,
    3. Active travel, such as walking and bicycling is being seen as more attractive in urban areas.
- The result is that traffic congestion was removed, and carbon emission was drastically reduced, and thus the cities became livable again.
- We should not return to the old normal.

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Thank You!