Sustainability & Accessibility: The Next Step

**Purpose**
To create a evidence-based model for assessing the sustainability of a city's transport network.

**Context**
Recognition that city planners require accurate tools to assess alternative development scenarios.

**Methodology**

### Investigation
- **Structural form** of transport systems in world cities
- **Road Layout**
- **Public Transport Layout**

### Assess and Improve
- **Transport form** with visual, system-wide information
- Systems thinking approach
- Collective commitment to clear, measureable targets

### Collect data of trip production and trip attraction
- Trips are undertaken from each zone
- Trips are undertaken into each zone

### Visualise results
- Key targets of sustainable development
- Plotting sustainability space
- Land-use analytics

### Model data to create metrics for sustainability outcomes
- **Measure of environmental protection:**
  \[
  [CO_2 \text{ equivalent}]_{ij} = VKT_{ij} \times \text{Speed}_{ij} \times \text{Emissions}
  \]
  \[
  \text{VKT}_{ij} = \text{vehicle km travelled} \\
  \text{Speed}_{ij} = \text{average speed on shortest path} \\
  \text{Emissions} = \text{ratio of emissions for the average speed}
  \]

- **Accessibility**
  \[
  \text{Accessibility}_{ij} = [\text{opportunity}]_{ij} \times [\text{travel impedance}]_{ij}
  \]
  \[
  [\text{opportunity}]_{ij} = \text{total attractions to destination zone } j \\
  [\text{travel impedance}]_{ij} = \text{inverse relationship to difficulty of travel}
  \]

- **Measure of social equity:**
  - access to employment
  - access to employees

- **Measure of economic development:**
  - access to employees

**Future Plans**

- Design for cities in developing nations:
  1. Obtain data from Google Maps and other mobile mapping software
  2. Calculations can be undertaken on low-cost, open-source software

- Create an open-source platform for cross-disciplinary, city-to-city and public collaboration

- Further disaggregation of the metrics for a more experiential or behavioural based model for environmental impact, personal wellbeing and economic optimality.

- On-going focus on accessibility as the end goal rather than current goals: mobility, mileage and road km.

**Get involved**
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