

Cycling and Strategic Transport Modelling

Tim Gent, Atkins

20 March 2017



*Is transport modelling
the enemy of cycling?*

*Are there ways of
incorporating cycling
successfully into
conventional transport
models?*

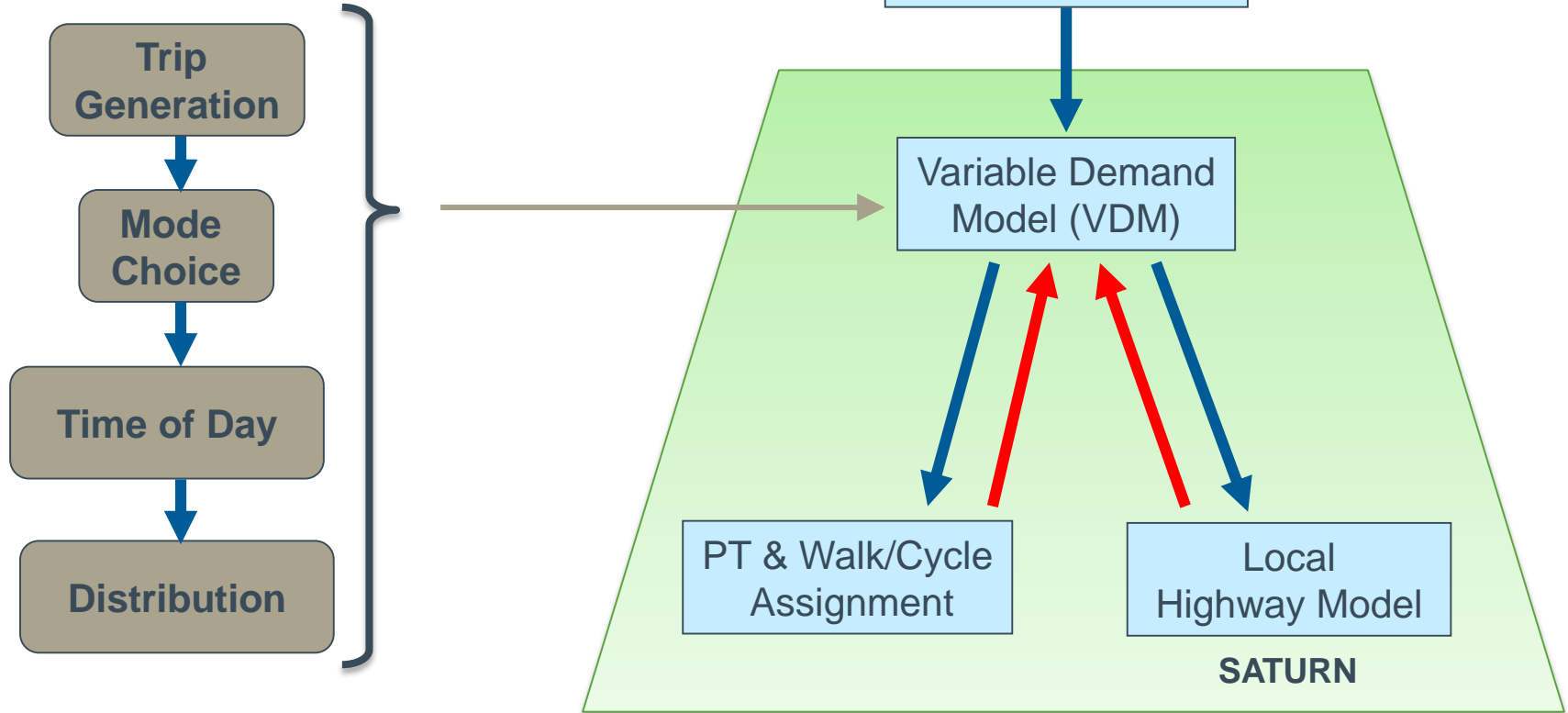
“Not necessarily.”

"I don't know, maybe,
but not as well as we'd
really like so, you know,
just think carefully
about the results and
apply some common
sense OK?"

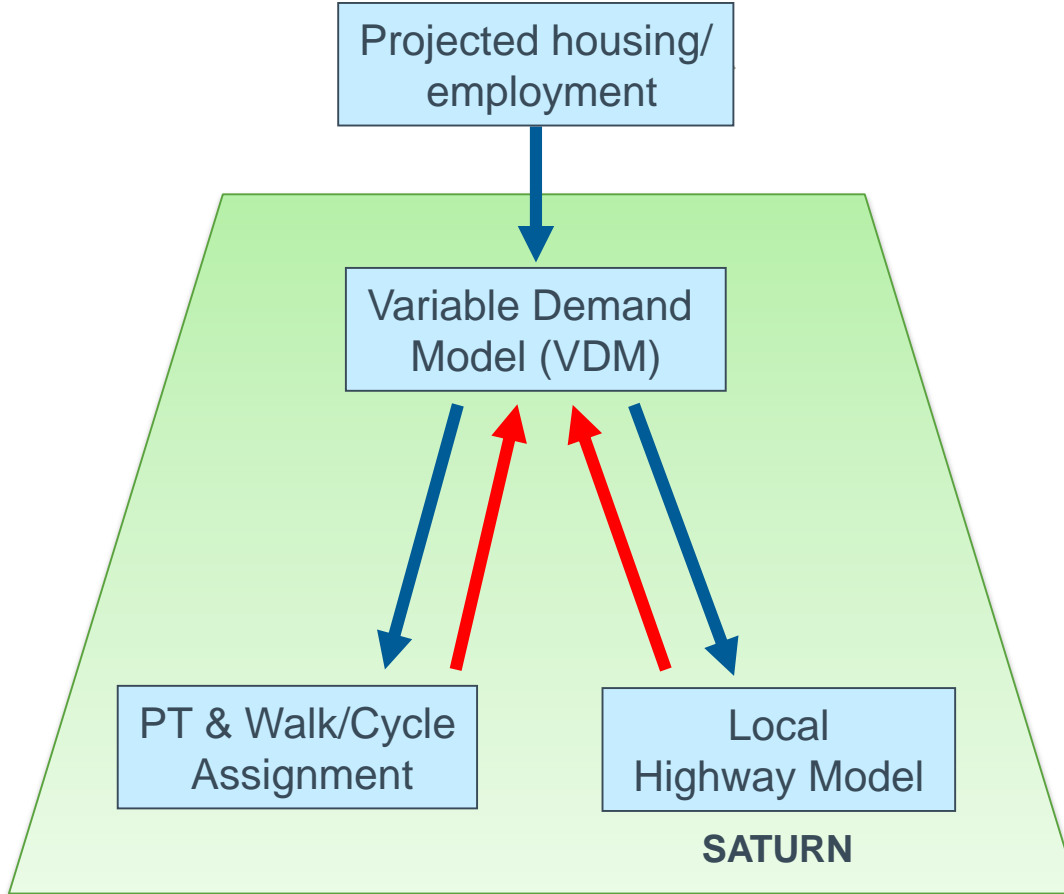
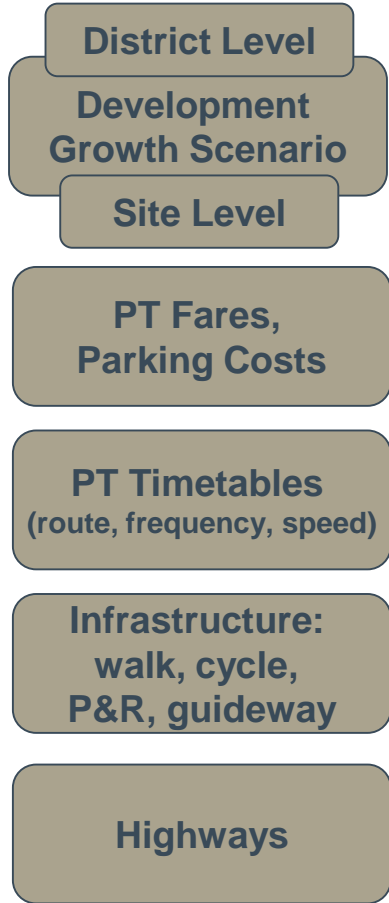
Topics

- What is a Strategic Transport Model?
- How can they represent cycling?
- What aspects can be modelled well?
- What aspects are tricky?
- Is it the model or reality that's the problem here?

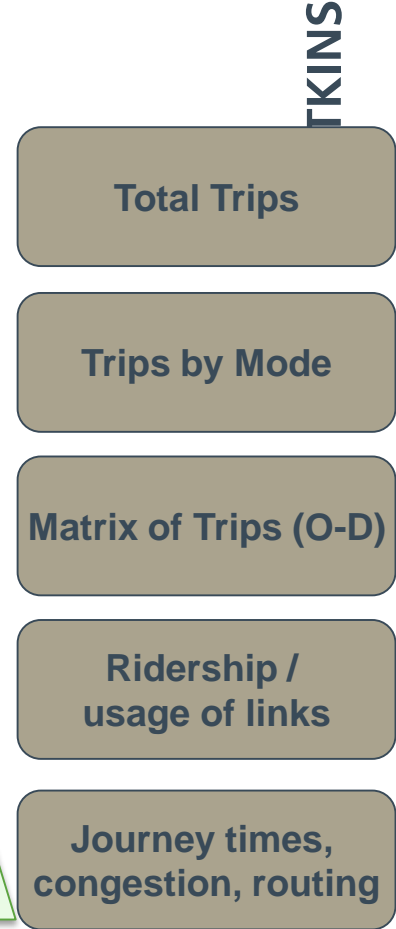
Structure of a Strategic Transport Model



INPUT

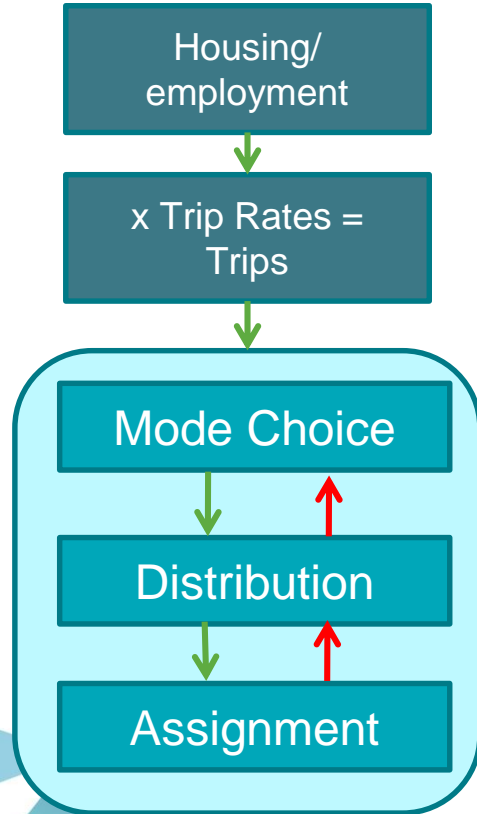


OUTPUT

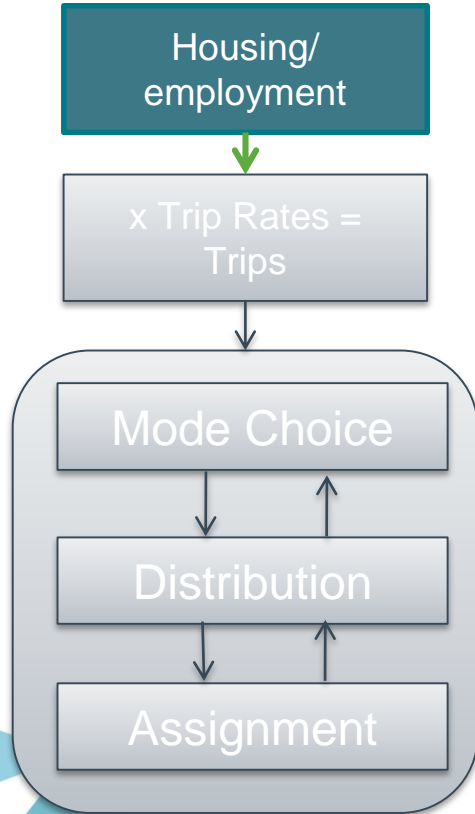


TKINS

How does the model represent cycling?



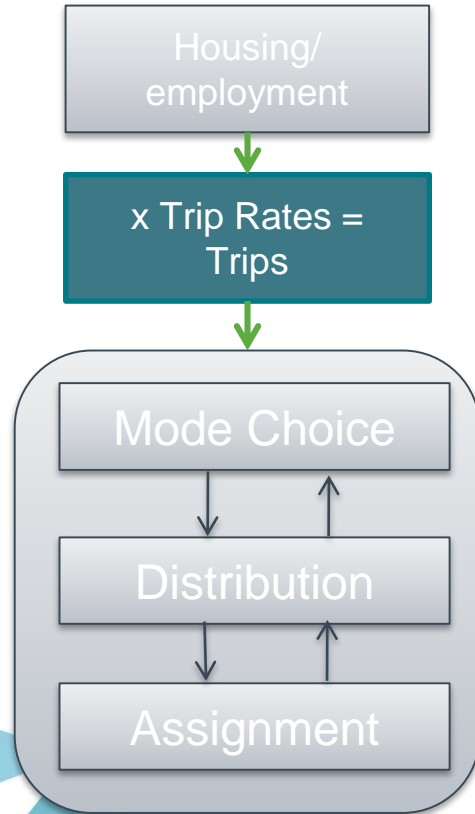
How does the model represent cycling?



Land Uses:

- Includes population, activities (shopping, leisure)
- Usually people working / non-working, broad age
- Normally, nothing here indicates likelihood of cycling

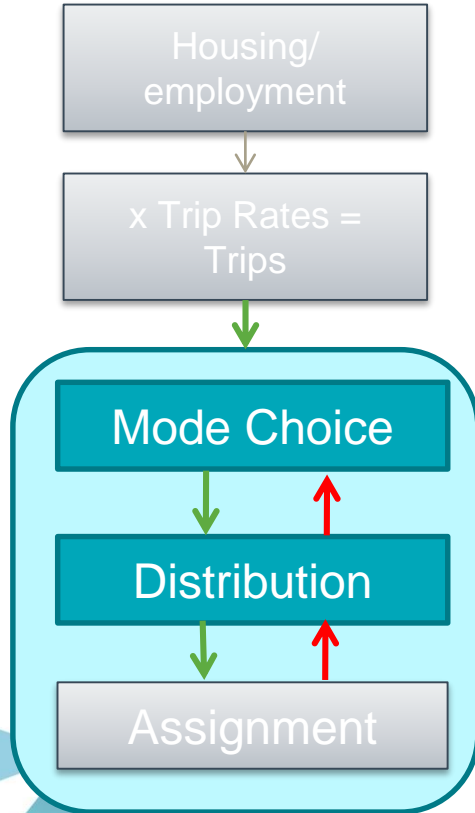
How does the model represent cycling?



Trip rates:

- Number of trips made by a type of person, for a specific purpose (e.g. homebased work, non-homebased shopping)
- Often includes ONLY motorised trips, i.e. trip rate excludes walk and cycle
- Increasingly, new models have trip rates with ALL trips, by all modes

How does the model represent cycling?



Choice of travel mode:

- For a given location, choice between:
 - Car, PT, Walk, Cycle
 - (Sub-modes and access modes follow)

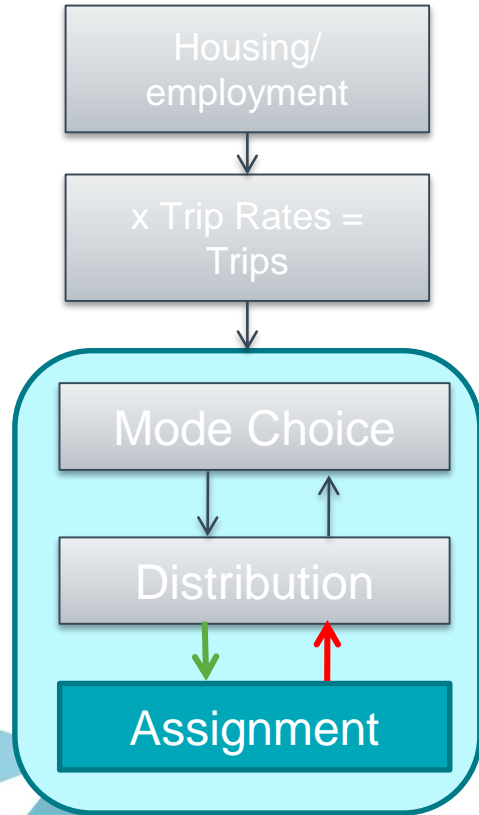
Distribution:

- Where will trips for each mode go
- Logit formulation

$$\text{Prob}_p = \frac{\exp(-\lambda U_p)}{\sum_q \exp(-\lambda U_q)}$$

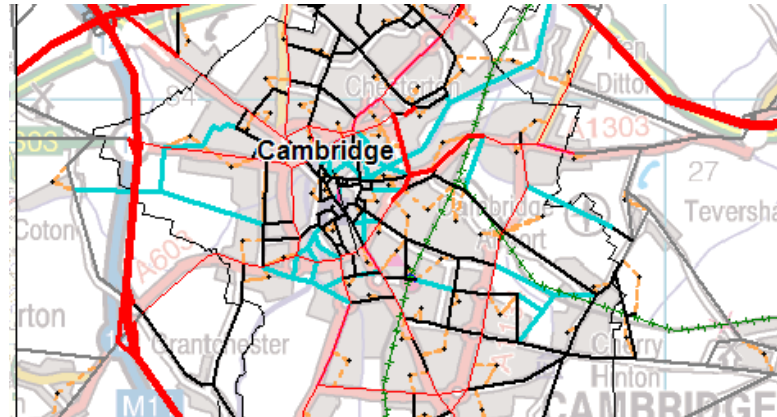
- U = Utility or cost, measure of difficulty of travelling by mode p to/from location
- λ = sensitivity parameter

How does the model represent cycling?



Assignment:

- Building up costs from network
- Distance-based, road-network, or bespoke cycling network



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What aspects are modelled well?

- Sense-checking cycling levels:
 - How many people live near enough to cycle?
 - What proportion of people will cycle now / in future?
How many is that?
- Trade-offs between modes:
 - Will improving public transport remove cycle trips?
 - How much quicker is car than cycle?
- In a Strategic Transport Model, everything must add up!

What aspects are tricky? (1/3)

- Base Year data!
- How many cycle trips are there, who is making them?
- Key sources: Census JTW and National Travel Survey
- For a minority mode, honesty of answers is crucial:
 - How often do you really cycle to work?
- Cycle counts: single day counts? How accurate are they?

Census JTW – Not detailed!

LC7604EW - Method of travel to work (2001 specification) by NS-SeC

Source	ONS Crown Copyright Reserved [from Nomis on 19 March 2017]					
Population	All usual residents aged 16 and over in employment the week before the census					
Units	Persons					
date	2011					
geography	Cambridge					
Method of travel to work (2001 specification)	All categories: Method of travel to work (2001 specification)	Work mainly at or from home	Train, underground, metro, light rail, tram, bus, minibus or coach	Driving a car or van	All other methods of travel to work	
NS-SeC						
All categories: NS-SeC	59,865	6,570	6,734	17,985	28,576	48% 'Other' (incl. cycling)
1. Higher managerial, administrative and professional	16,988	1,576	2,307	4,827	8,278	
2. Lower managerial, administrative and professional	14,922	1,971	1,762	4,839	6,350	
3. Intermediate occupations	5,667	256	700	1,739	2,972	
4. Small employers and own account workers	4,335	1,756	155	1,567	857	
5. Lower supervisory and technical occupations	3,179	136	267	1,195	1,581	
6. Semi-routine occupations	5,720	186	651	1,724	3,159	
7. Routine occupations	4,257	151	401	1,506	2,199	
L15 Full-time students	4,797	538	491	588	3,180	66% 'Other' (incl. cycling)

What aspects are tricky? (2/3)

- λ , 'Alternative Specific Constants', and elasticities
- Factors which are balanced in model calibration, represent trade-offs
- E.g. a 10% rise in fuel cost leads to a 3% fall in car vehicle km = -0.3 elasticity
- No known correspondence for cycling, so extent of change in mode share difficult to judge
- The past is our only guide to the future

What aspects are tricky? (3/3)

- In the model, cycle 'costs' are distance-based
- Takes into account the ROUTE, but not the quality
- Means segregated and quality routes will not automatically attract more cyclists
- Equally, cyclists not deterred by traffic levels and speeds
- BUT these effects can be overlaid if local factors developed

Conclusions

- A Strategic Transport Model can include cycling
- Very beneficial for keeping active modes in the picture, counting all trips and trade-offs
- Limited by how little we can quantify numbers and trade-offs
- Reality of cycling decisions being represented very complex
- Intelligent use of the model and careful thought will ensure case for/against cycling is made fairly