The Oregon Statewide Integrated Land Use & Transport Model – Generation 1

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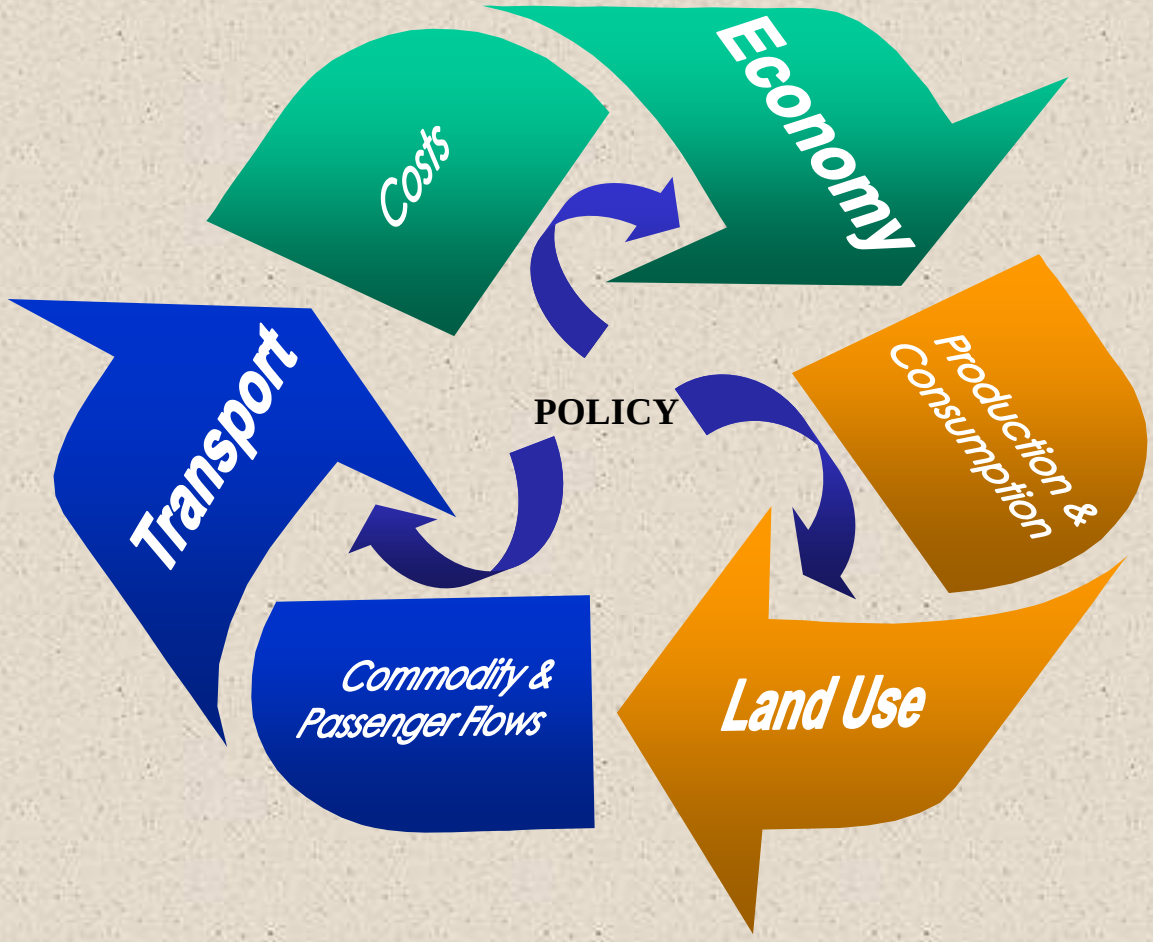
Required Analytical Capabilities

- Effect of land supply on land use and location decisions
- Effect of land supply on travel behavior
- Effect of highway capacity increases on travel behavior
- Effect of rail investment on highway use
- Effect of changes in the demographic and economic composition of Oregon

Statewide Model



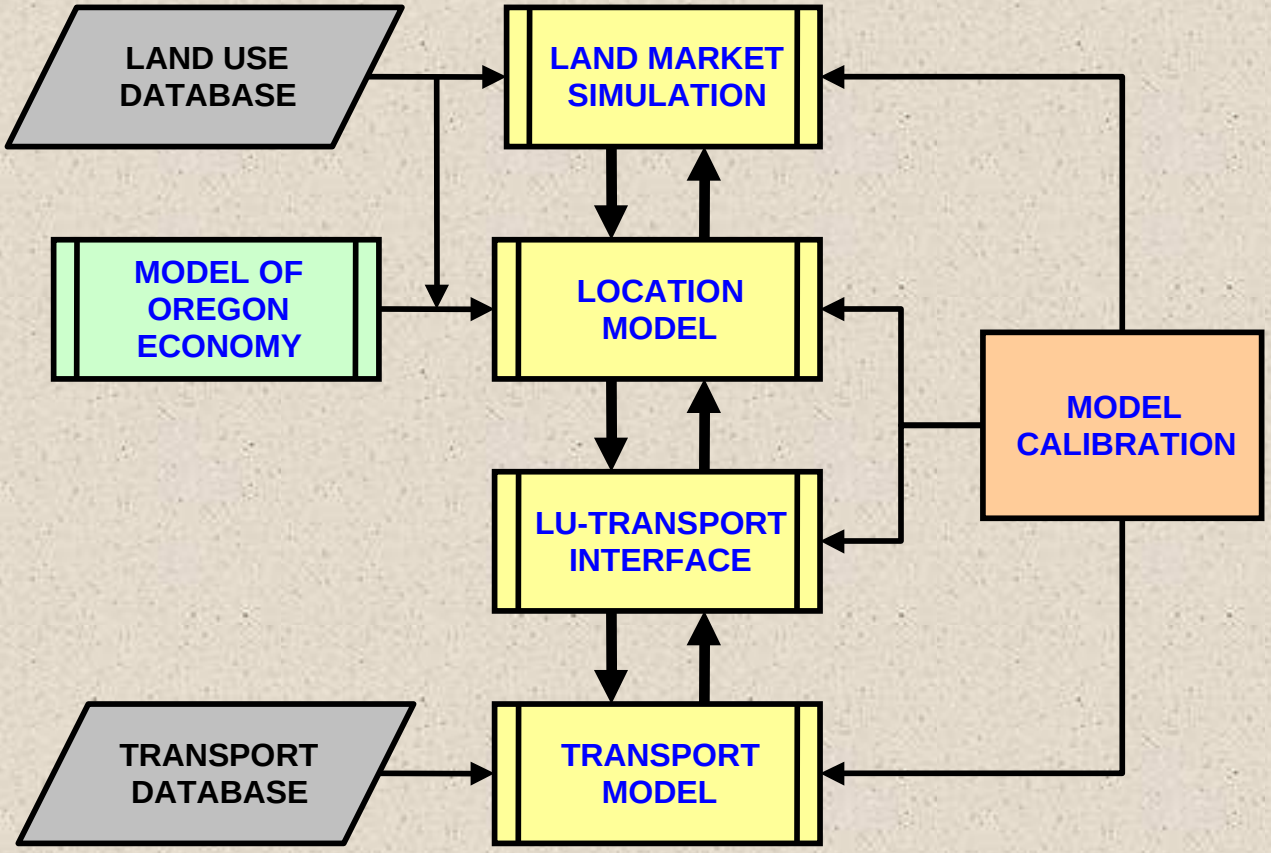
Model structure

- **Economy represented in terms of production and consumption relationships**
- **Includes markets and prices - including land and floorspace prices**
- **Travel arises as a result of economic interactions**
- **Calibrated using Oregon data**

Principal Features of TRANUS

- Consistent theory and structure
- Truly integrated land use and transport models
- Nested MNL structure
- Integrated time series framework
- Hierarchical scenario definition
- Graphical user interface

Statewide Model Structure



Economic Model

- Spatially aggregate (statewide)
- Specific to Oregon
- Based on IMPLAN Model (528 sectors)
- Annual transactions in $ million
- Aggregated to 28 sectors, then to 12 sectors
- 3 household and 4 land sectors

Sector Definitions

Industries

- Agriculture/Forest/Fisheries
- Construction & Mining
- Lumber & Wood
- Printing & Publishing
- High Tech & Electronics Manufacturing
- Other Manufacturing
- Transport/Communications/ Utilities
- Wholesale
- Retail
- FIRE
- Services
- Government

Households

- Low Income
- Middle Income
- High Income

Land

- Industrial
- Commercial
- Urban residential
- Rural residential

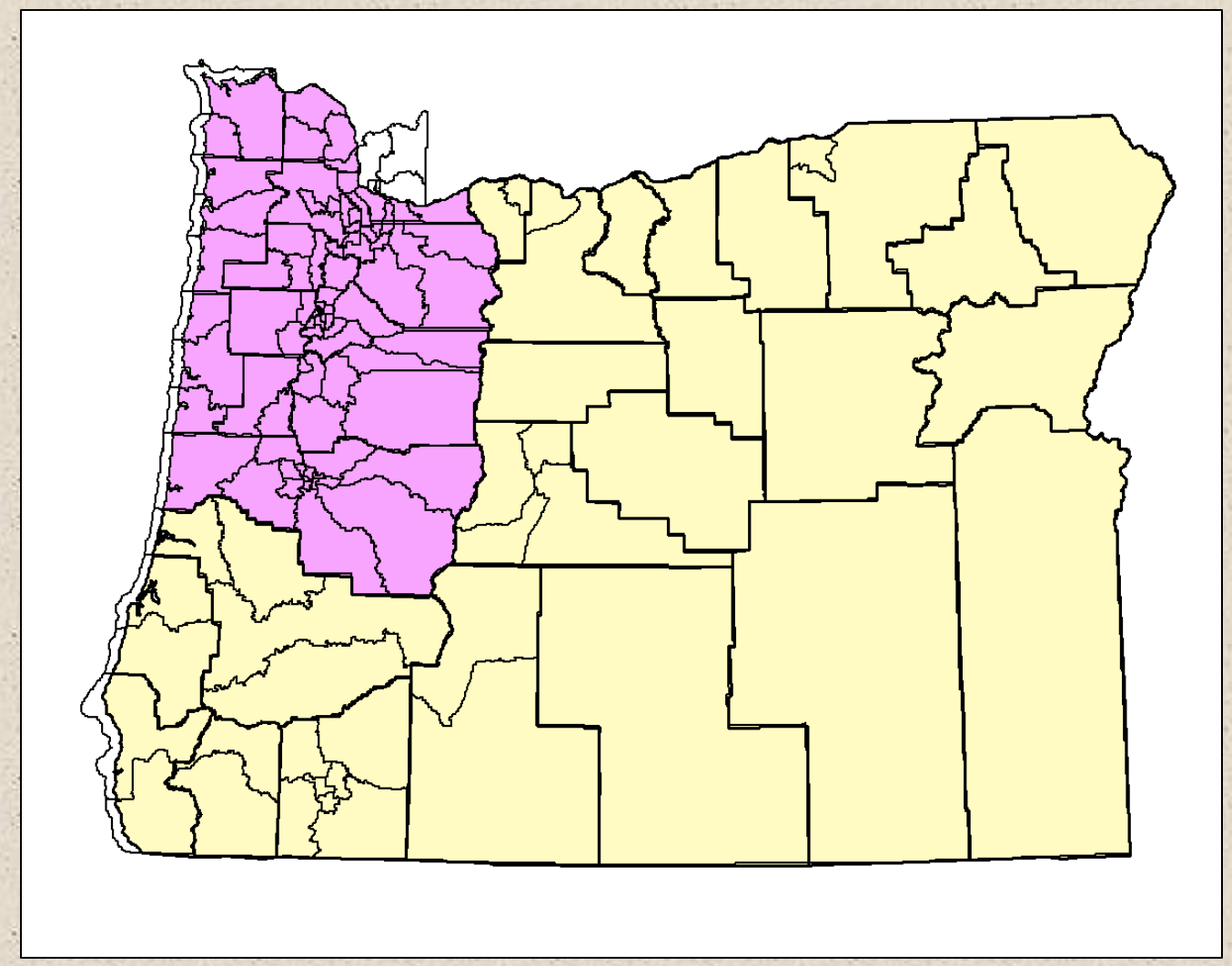
Social Accounting Matrix

	CONSUMING SECTORS (n)																	
	Industries												Households					
PRODUCING SECTORS (m)	AGFF	CONS	OMFG	WOOD	PRNT	TECH	TCPU	WLSE	RETL	FIRE	SERV	GOVT	HH_Lo	HH_Mi	HH_Hi	OTHFD	Exports	TOTAL
Industries																		
AGFF	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
CONS	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
OMFG	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
WOOD	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
PRNT	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
TECH	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
TCPU	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
WLSE	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
RETL	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
FIRE	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
SERV	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
GOVT	a	a	a	a	a	a	a	a	a	a	a	a	p	p	p	o	x	T
Households																		
HH_Lo	l	l	l	l	l	l	l	l	l	l	l	l						T
HH_Mi	l	l	l	l	l	l	l	l	l	l	l	l						T
HH_Hi	l	l	l	l	l	l	l	l	l	l	l	l						T
Land																		
IND		e	e	e	e	e	e	e										
COM			e			e	e		e	e	e	e						
UrbRES													e	e	e			
RurRES													e	e	e			

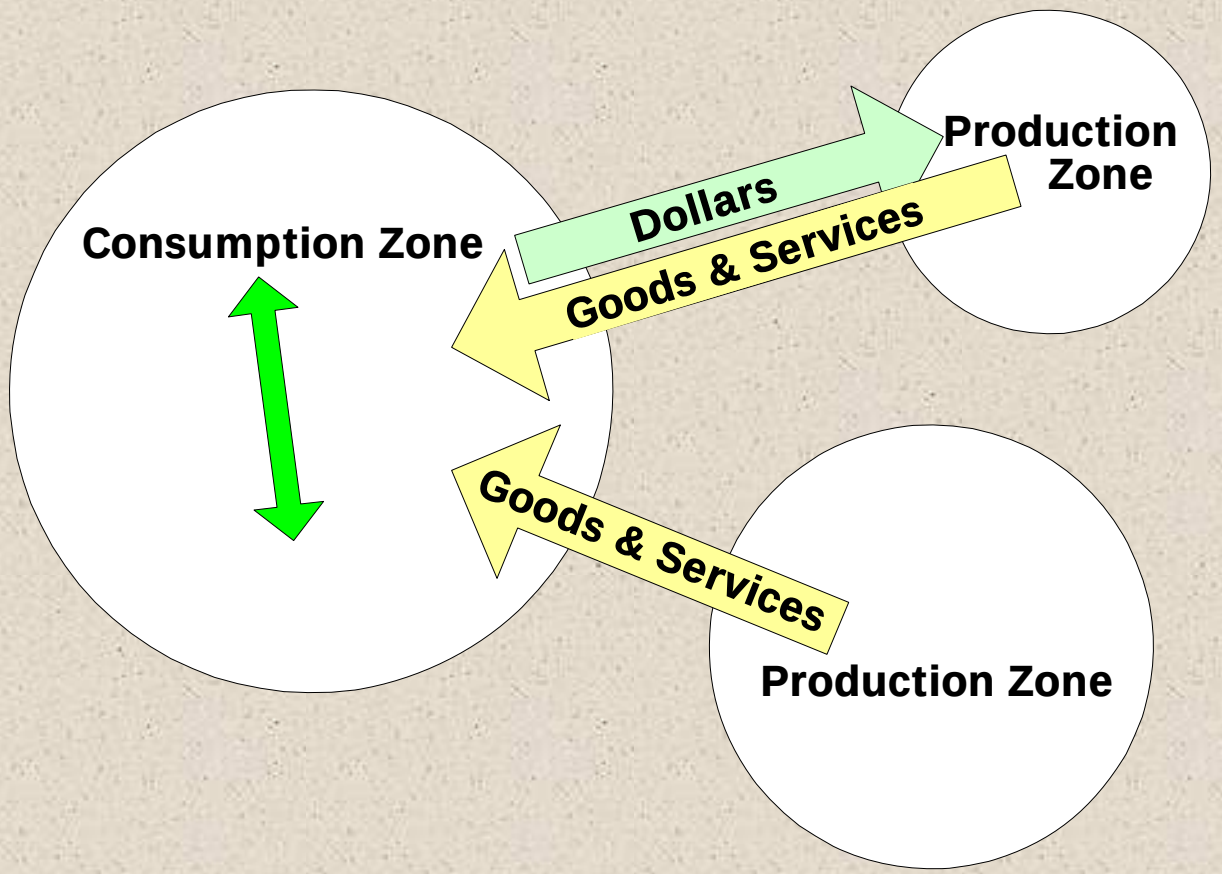
Location Model Highlights

- Production and consumption relationships
- Generation of induced demand
- Location of induced demand
  - Utility function
  - Utility scaling
  - MNL distribution function
- Equilibration of demand and prices

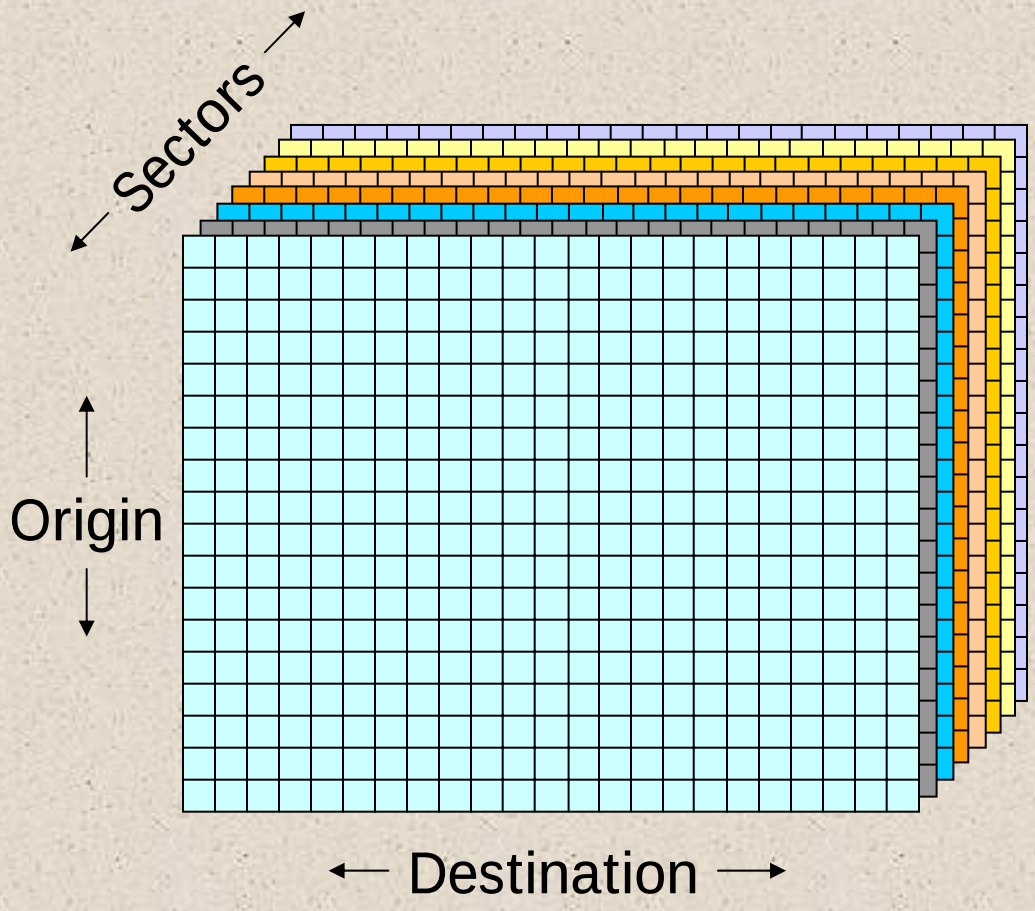
Model Structure: Zone System



Spatial Relationships



Sectors and Spaces Define the Model



Land Use-Transport Interface

- Maps socioeconomic sectors to transport categories
- Specific unit conversions
  - Dollars to households for person travel
  - Dollars to tons for freight movement
- Defines directionality
  - Two-way for person travel
  - One-way for freight movement
- Defines temporal relationship

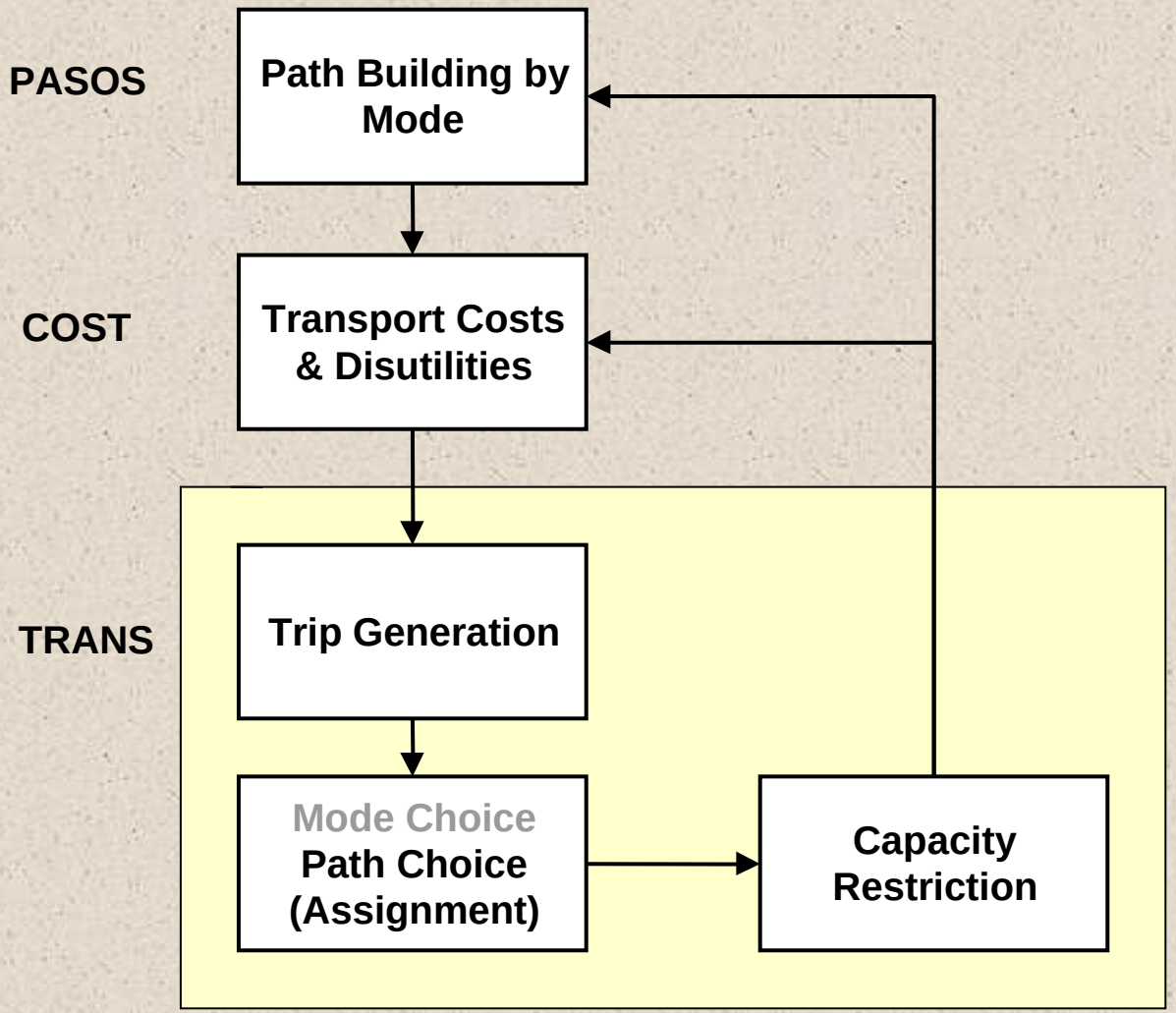
ECONOMIC FLOWS (Z-Z)

CONSUMING SECTORS	PRODUCING SECTORS (Note Re-Orientation)																		
	Industries												Households			Land			
	AGFF	CONS	OMFG	WOOD	PRNT	TECH	TCPU	WLSE	RETL	FIRE	SERV	GOVT	HH_Lo	HH_Mi	HH_Hi	IND	COM	UrbRES	RurRES
Industries																			
AGFF	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f				
CONS	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	e			
OMFG	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	e			
WOOD	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	e			
PRNT	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	e			
TECH	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	e	e		
TCPU	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	e	e		
WLSE	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	e	e		
RETL	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f		e		
FIRE	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f		e		
SERV	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f		e		
GOVT	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f		e		
Households																			
HH_Lo	f	f	f	f	f	f	f	f	f	f	f	f						e	e
HH_Mi	f	f	f	f	f	f	f	f	f	f	f	f						e	e
HH_Hi	f	f	f	f	f	f	f	f	f	f	f	f						e	e

TRANSPORT FLOWS (Z-Z)

Transport Categories	Industries												Households				MODES	
	AGFF	CONS	OMFG	WOOD	PRNT	TECH	TCPU	WLSE	RETL	FIRE	SERV	GOVT	HHIncLo	HHIncMi	HHIncHi		Passenger	Freight
CmuteLo													1				1	
CmuteMid														2		→	1	
CmuteHi															3		1	
Recreation	4								4		4	4				→	1	
HBOther									5	5	5	5					1	
NHBOther									6	6	6	6				→	1	
NHBWork	7	7	7	7	7	7	7	7	7	7	7	7					1	
VisitorBus																→	1	
VisitorOth																	1	
Freight	8	8	8	8	8	8	8	8								→		2

Transport Model



Model Structure: Temporal Dynamics