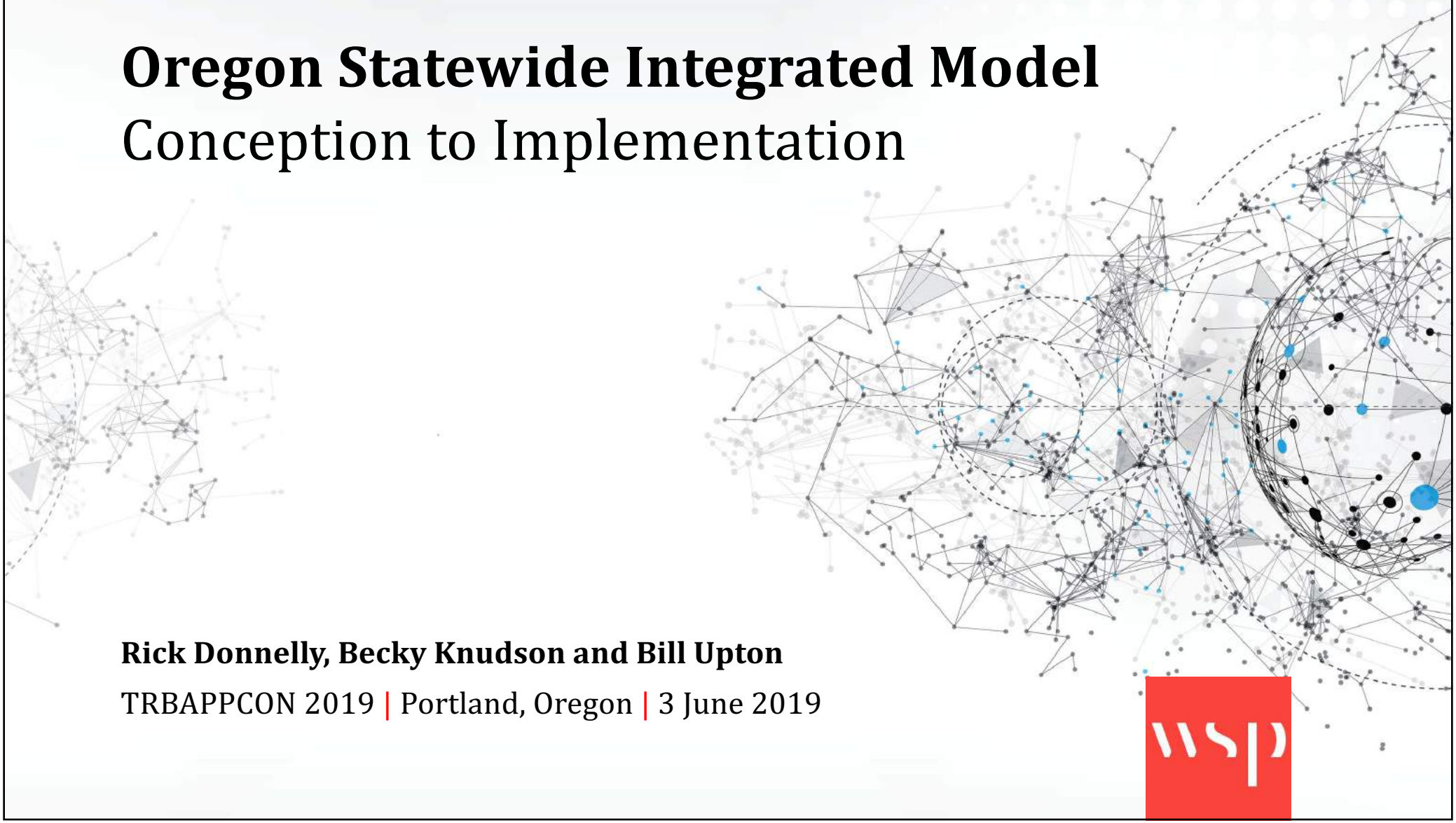
# Oregon Statewide Integrated Model
## Conception to Implementation



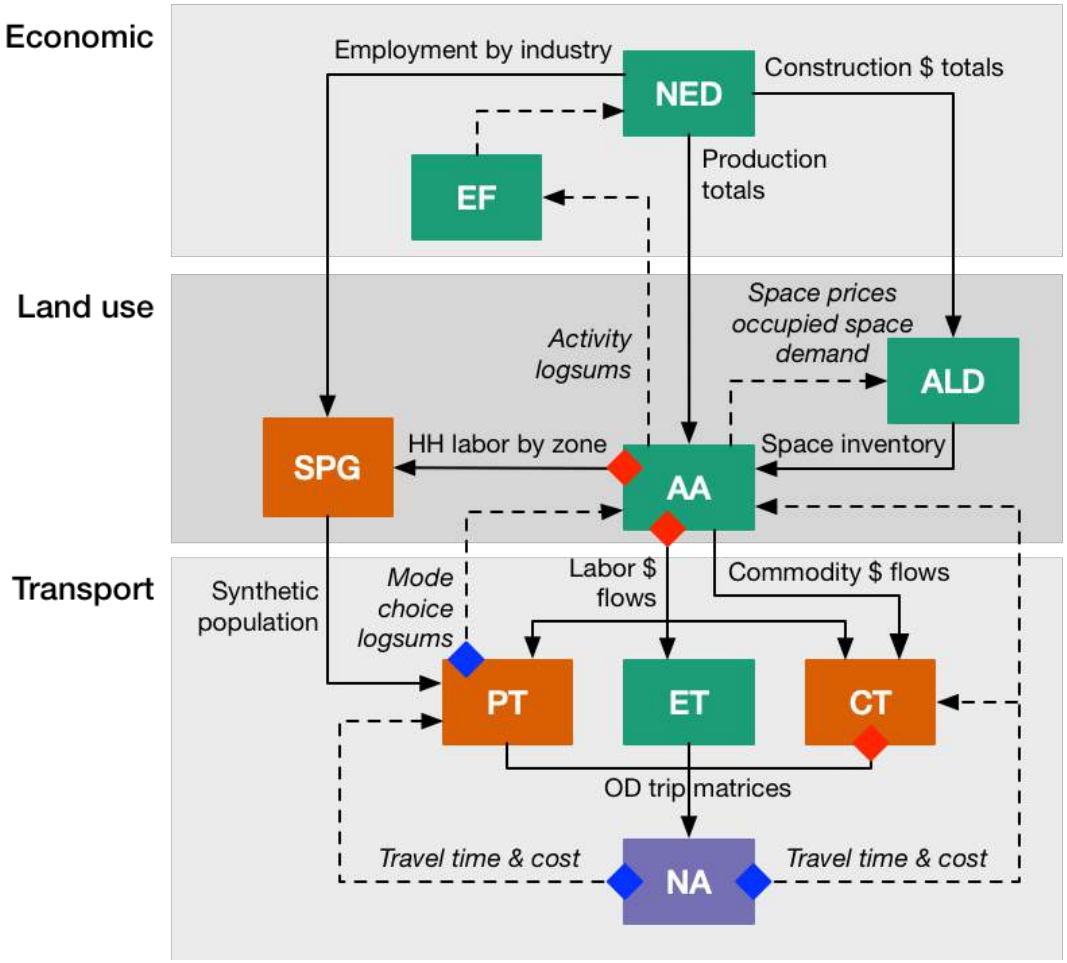
**Rick Donnelly, Becky Knudson and Bill Upton**

TRBAPPCON 2019 | Portland, Oregon | 3 June 2019

# Rapid 4W presentation

1. What
2. Why
3. Which
4. Wisdom

# The gist



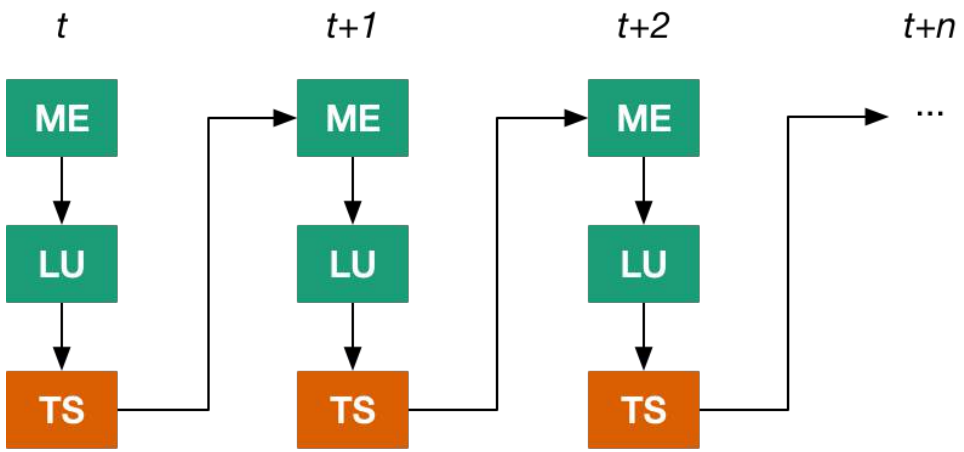

**Component models:**

| | |
|---|---|
| NED | Economic & demographic |
| EF | Economic Feedback (optional) |
| SPG | Synthetic population generator |
| ALD | Aggregate land development |
| AA | Activity allocation (part of PECAS) |
| PT | Person travel demand |
| CT | Commercial travel demand |
| ET | External travel demand |
| NA | Network assignment |

**Legend:**

- Alpha-beta zone conversion
- Beta-alpha zone conversion
- Aggregate/equilibrium model
- Microsimulation component
- Mesoscopic component
- *Feedback in next period*

# Simulated evolution




**Systems:**

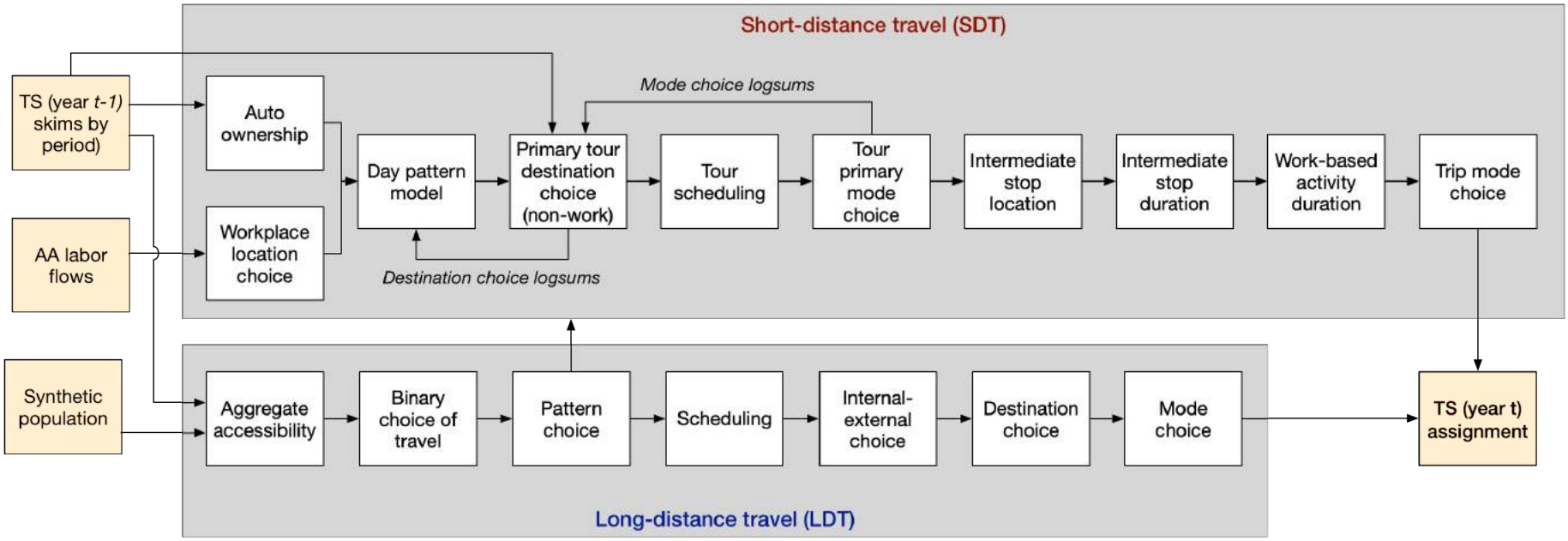
| | |
|---|---|
| ME | Macroeconomic |
| LU | Land use |
| TS | Transport system |

**Legend:**

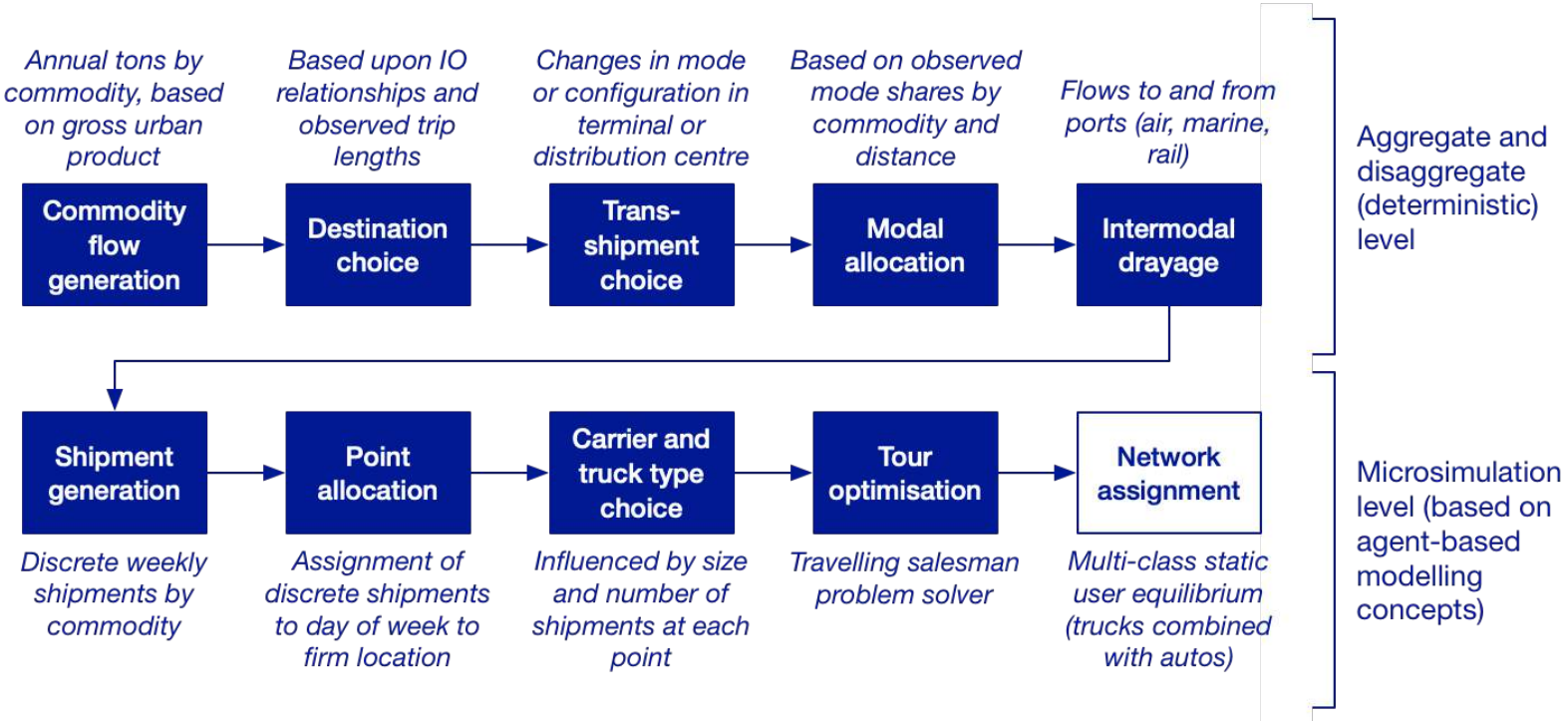
Aggregate/equilibrium models

Microsimulation components

# Person travel model



# Commercial travel model



# Why?

**Original requirements (1998)**

*Effects on land use and travel decisions:*

- Land supply
- Congestion
- Cumulative retail location choices
- Large commercial growth at UGB boundary
- Roadway capacity increases
- Network connectivity changes
- Parking supply
- Urban form influence mode choice
- Rail investment on highway use
- Changes in demographics

**Additional requirements (2010)**

*Ability to evaluate effects of:*

- Climate change
- Fuel scarcity
- Economic downturn
- Pricing
- Technological changes
- Supply chain recoil
- Gentrification

**Anticipated requirements (2017)**

*Ability to inform major changes:*

- Autonomous vehicles
- Dynamic micro-pricing
- Mobility as a service
- "Second machine age" effects
- …

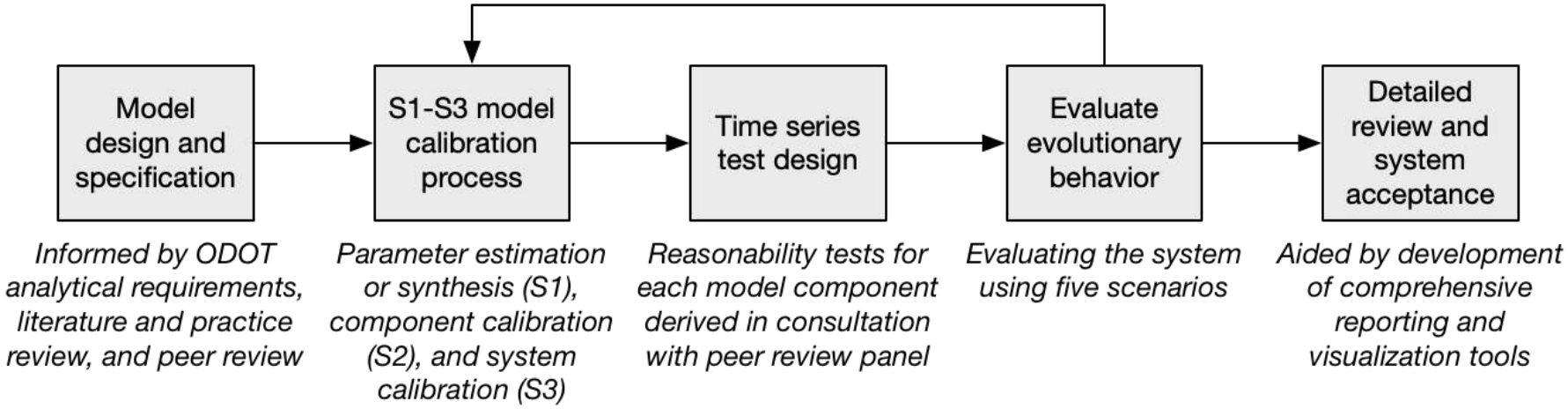
# Lessons learned: methodological

- Noisy price data
- Dynamics → complexity
- Black swans rule
- Expect parameter storm
- Don't fight the data
- Expansive view of validation
- Embrace machine learning

*Values shown subject to frequent revisions*

| Group | Model | Dev | User |
|---|---|---|---|
| Land use and economic | Macroeconomic | 21 | 4 |
| | Population synthesis | 18 | 8 |
| | Economic allocation | 120 | 28 |
| Transport | Internal person travel | 64 | 9 |
| | Long-distance person travel | | |
| | Commodity flow | 12 | 3 |
| | Long-distance freight | | |
| | Truck tour model | 9 | 2 |
| | Network analyses | 28 | 8 |
| Evaluation | Post-processors | 2 | 2 |
| | Total parameters | 274 | 64 |
| | Percent of total parameters | | 23.4 |

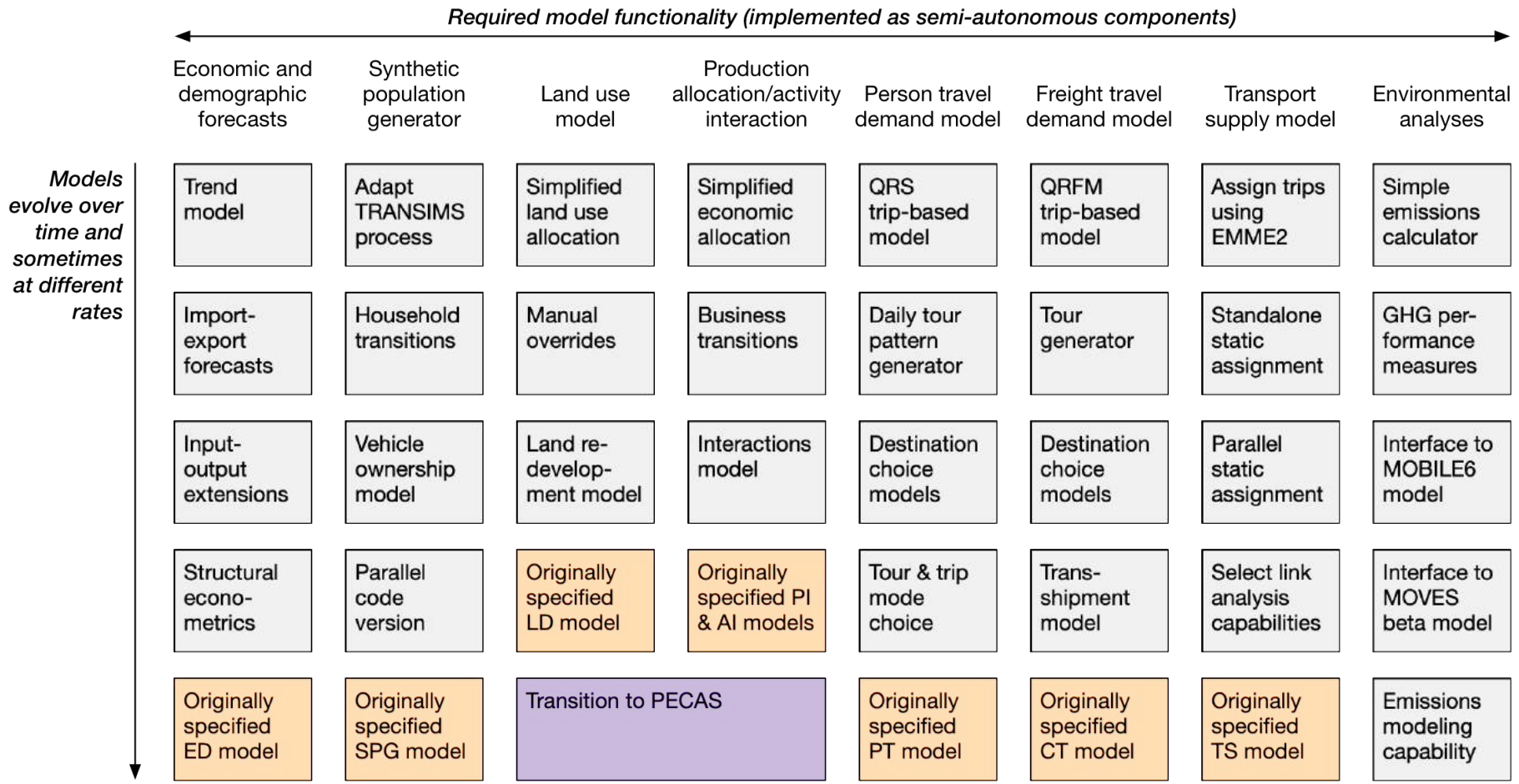
# Three-stage validation



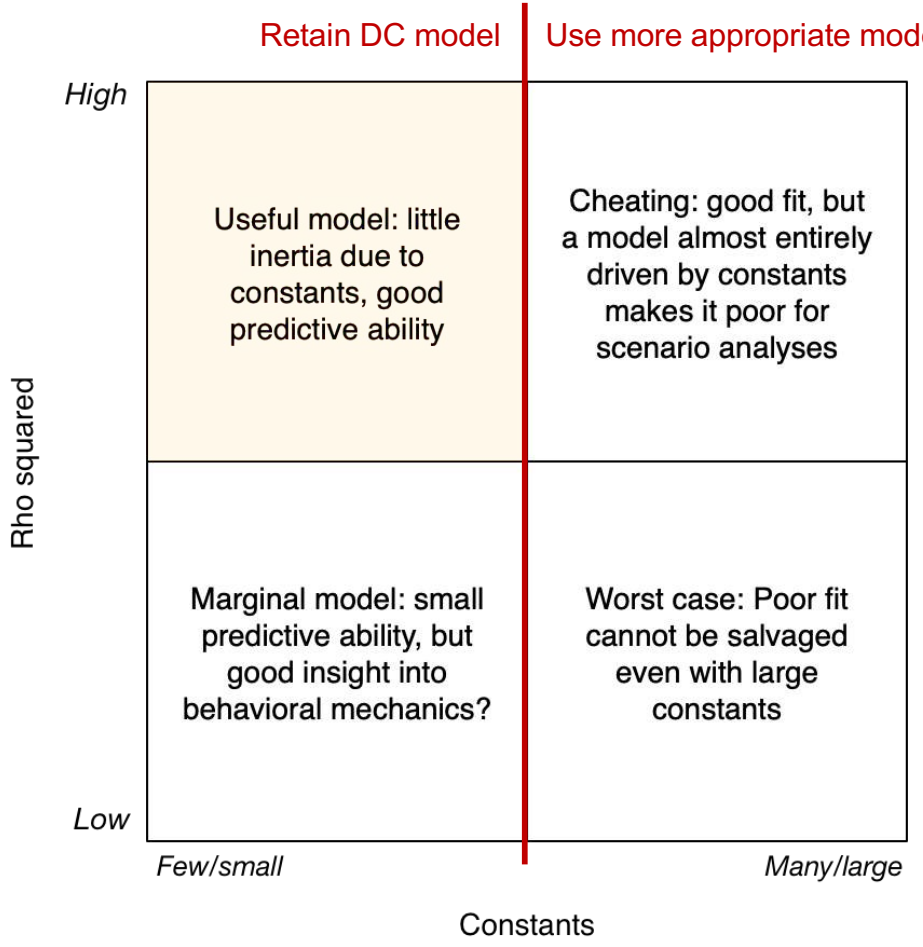
# Lessons learned: institutional

- Imperative of the champion
- Necessity of agile development
- Land use model development cost
- Long-term dependence on developer
- Value of peer review
- Data anchors the process
- Rapidly changing requirements

# Agile development



# DC model rant



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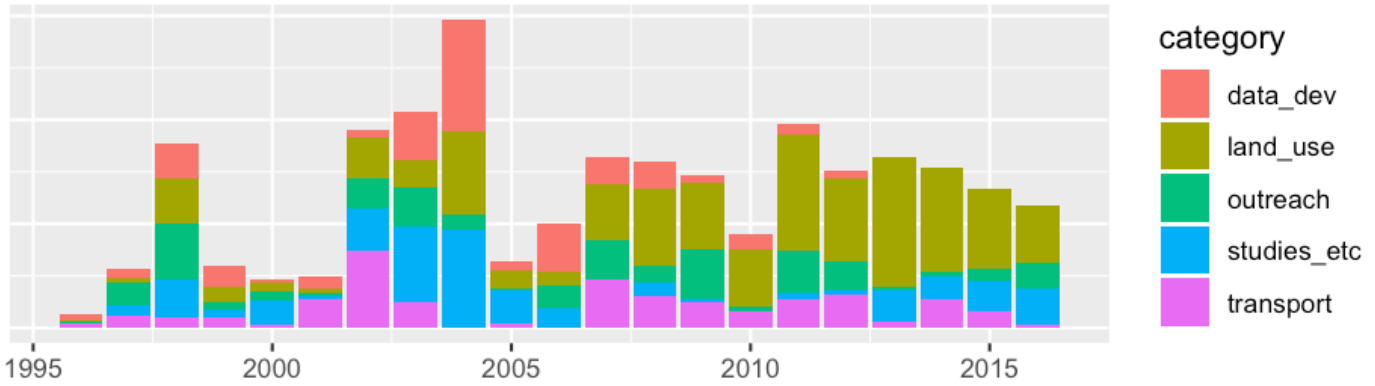
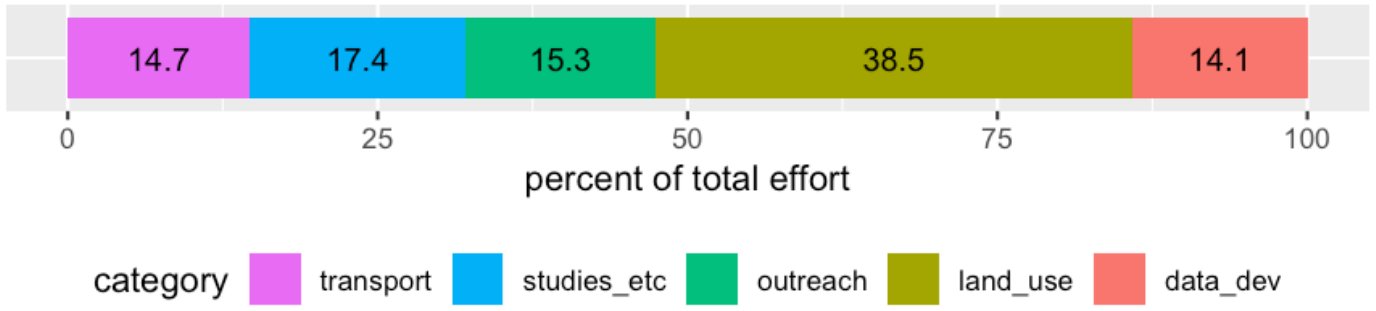
# Building SWIM2.x



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Agile *mindset*

# Questions for the SWIM team?

**Champions**

Becky Knudson
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**Key Contributors**

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