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# Combining System Dynamics and Choice Modelling to Simulate Demand Effects of Integrated Customer-Centric Marketing and Revenue Management

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## Problem and Objectives

### ■ Problem:

Revenue Management and Customer-Centric Marketing are conflicting marketing activities, and affect customers' choices.

### ■ Research Aims

1. Assess how current practice determines



current practice

2. Recommend Revenue Management

#### *Top 5 Reasons to join*

1. Free online enrolment
2. Any seat redemption \*
3. No blackouts \*
4. Faster rewards
5. Points don't expire \*

to employing Revenue Marketing

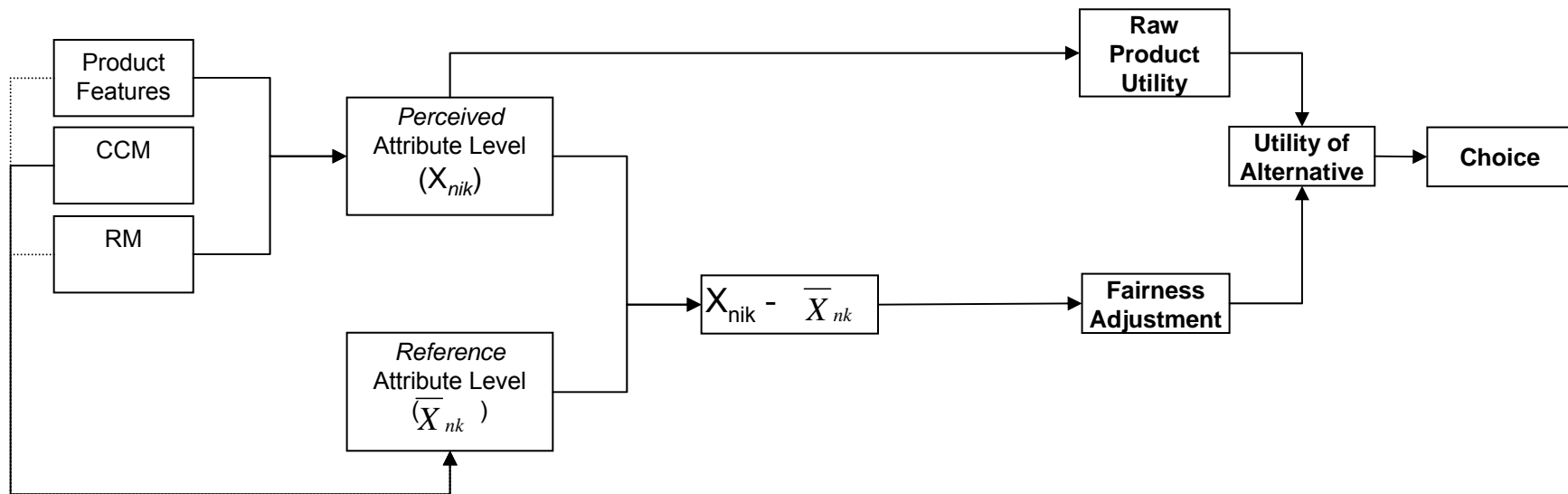
3. Simulate the

an integrated approach

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# 1. Effect of RM and CCM on customers' choices



$$v_{ni} = \alpha_{ni} + \beta_{nik} X'_{nik} + \beta_{2ni} FA_{ni}$$



## 1. Effect of RM and CCM on customers' choices

- **Survey** about past experiences and knowledge
- Congruent **choice experiments** for airline and hotel customers
- **Attributes:**  $4^7 \times 2^3$  within-subject based on an orthogonal main effects design (Sloane 2006)
- **Context:** Flight to Bangkok or Hotel Stay in Sydney/Melbourne
- **Information Conditions:** combined with a  $2^4 + 2^5$  full factorial between-subjects design
  - Contextual offerings
  - Semantic presentation of price
  - Justification of variations in prices and availabilities
  - Trip purpose
  - For business travel, payment method



## 1. Effect of RM and CCM on customers' choices

### ■ Core findings of stated choice experiments

- Conflicting Revenue Management and Customer-Centric Marketing affect customer choices directly and through reference-dependent fairness adjustments.
- Different customer segments show different choice behaviour and preferences.





## 2. Recommend an Integrated CCM-RM solution

### Three generic options to integrate CCM and RM

1. Strategic focus on RM  
(RevPAR)
2. Strategic focus on CCM  
(RevPAC)
3. Equal strategic importance of RM and CCM  
(ValuePAC)

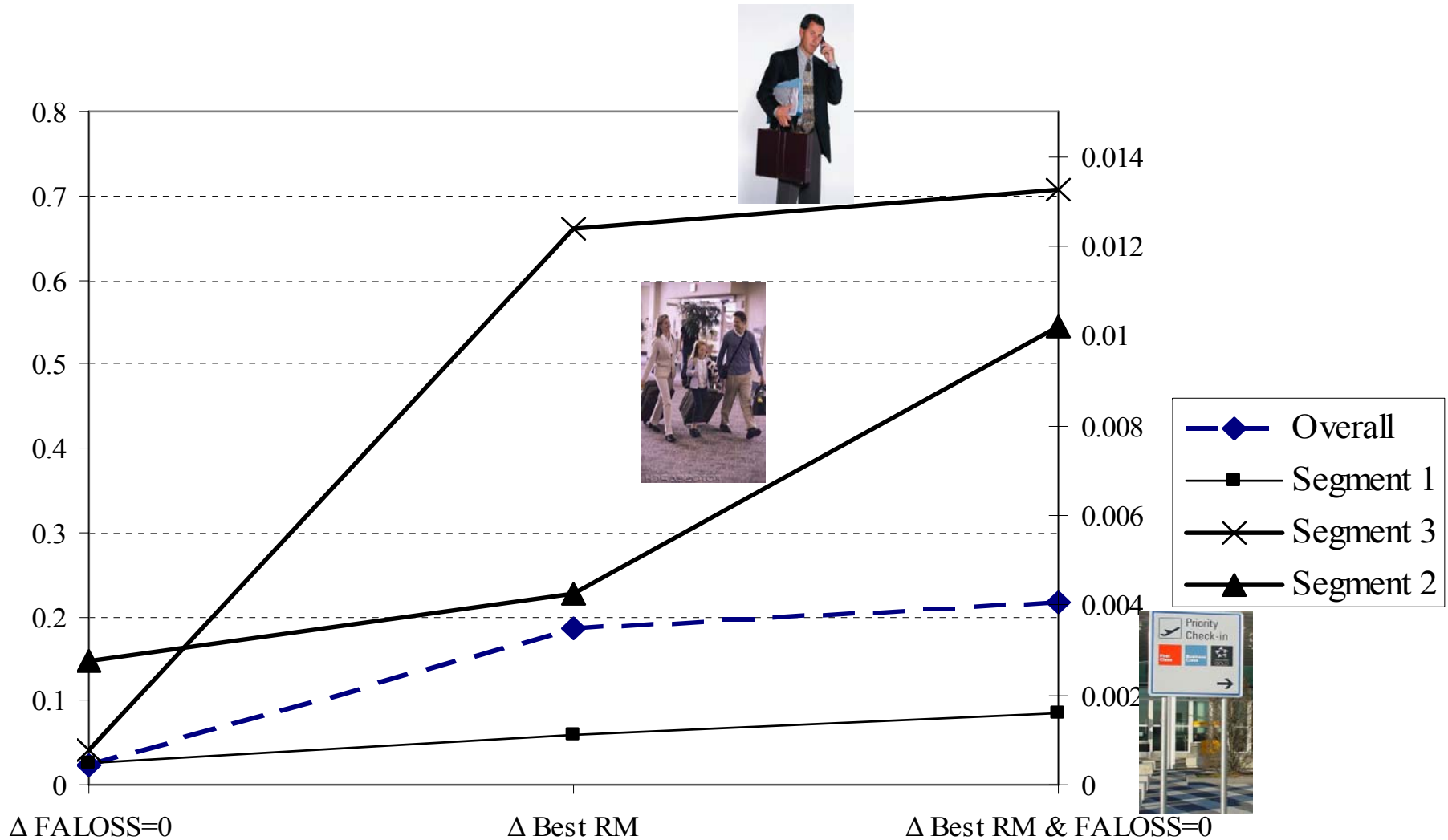


### 3. Simulate the Demand from an Integrated CCM-RM System

- The standard approach: Use preference estimates to predict
  - Customer choices
  - Demand
  - Revenues



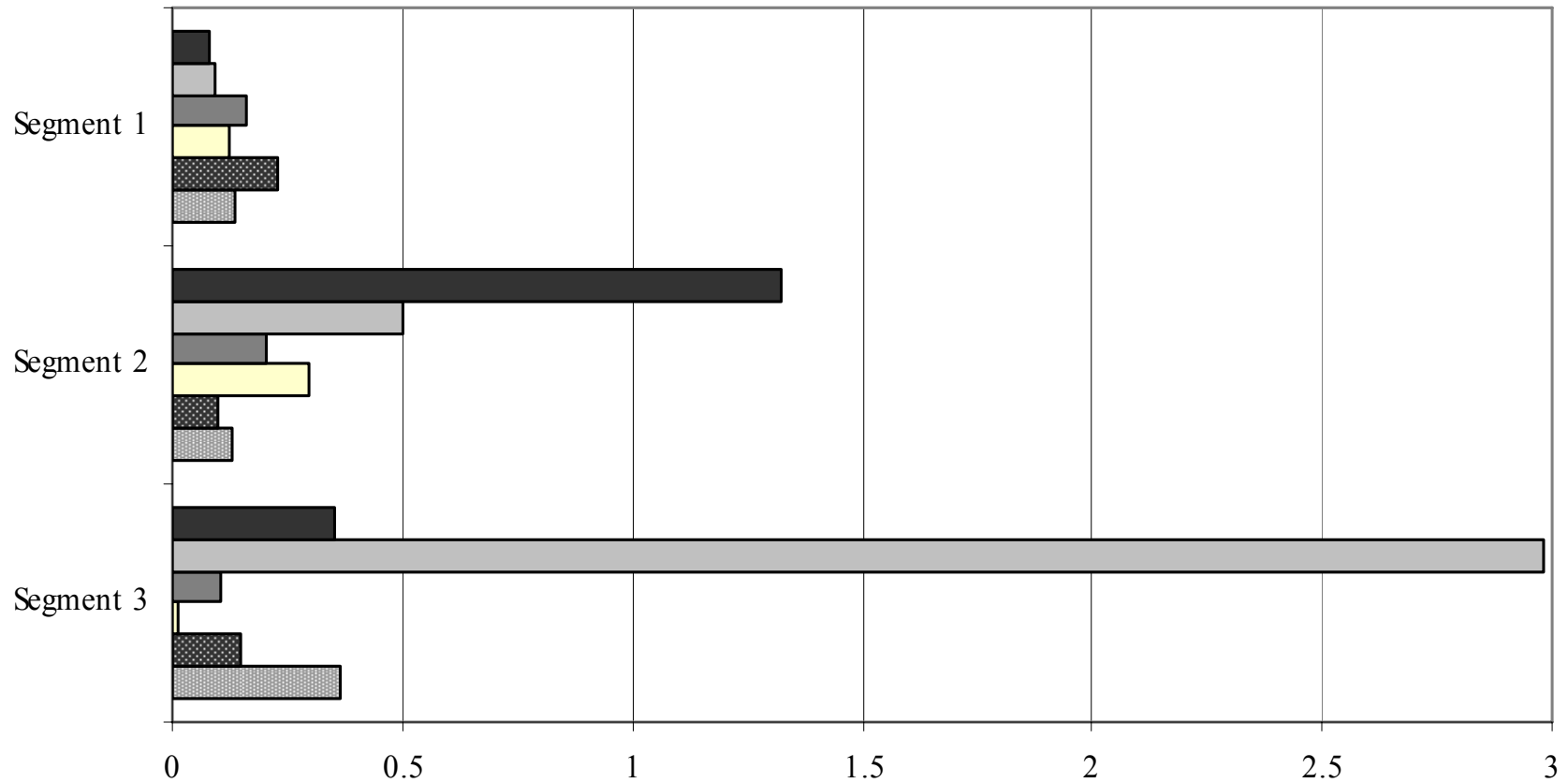
# Changes in Choice Probability (Airlines)





## Changes in Flight Alternative Attractiveness

- Upgrades (points→free for platinum)
- Validity (one purchase p.a.→always)
- Fees (\$50→free)
- Cancellation (no→10% fee)
- Routing (via Sin→direct)
- Price(\$1210→\$990)





## Integrated CCM-RM Rules for Airlines

Attribute \ Segment	Routing	Cancellations & Changes	Membership Fees	Validity	Upgrades	Perceived Unfairness
Segment 1	-	10% fee	\$50	always	-	eliminate
Segment 2	direct	-	-	-	-	eliminate
Segment 3	direct	-	\$50	-	Free for platinum	-



## Revenue Changes for Airline Example

Segment	Size	Measure
Segment 1	47.43%	p
		Revenue
		Demand
Segment 2	35.99%	p
		Revenue
		Demand
Segment 3	16.58%	p
		Revenue
		Demand
Overall	100%	Revenue
		Demand
Protection levels		
Revenue		
Total revenues		

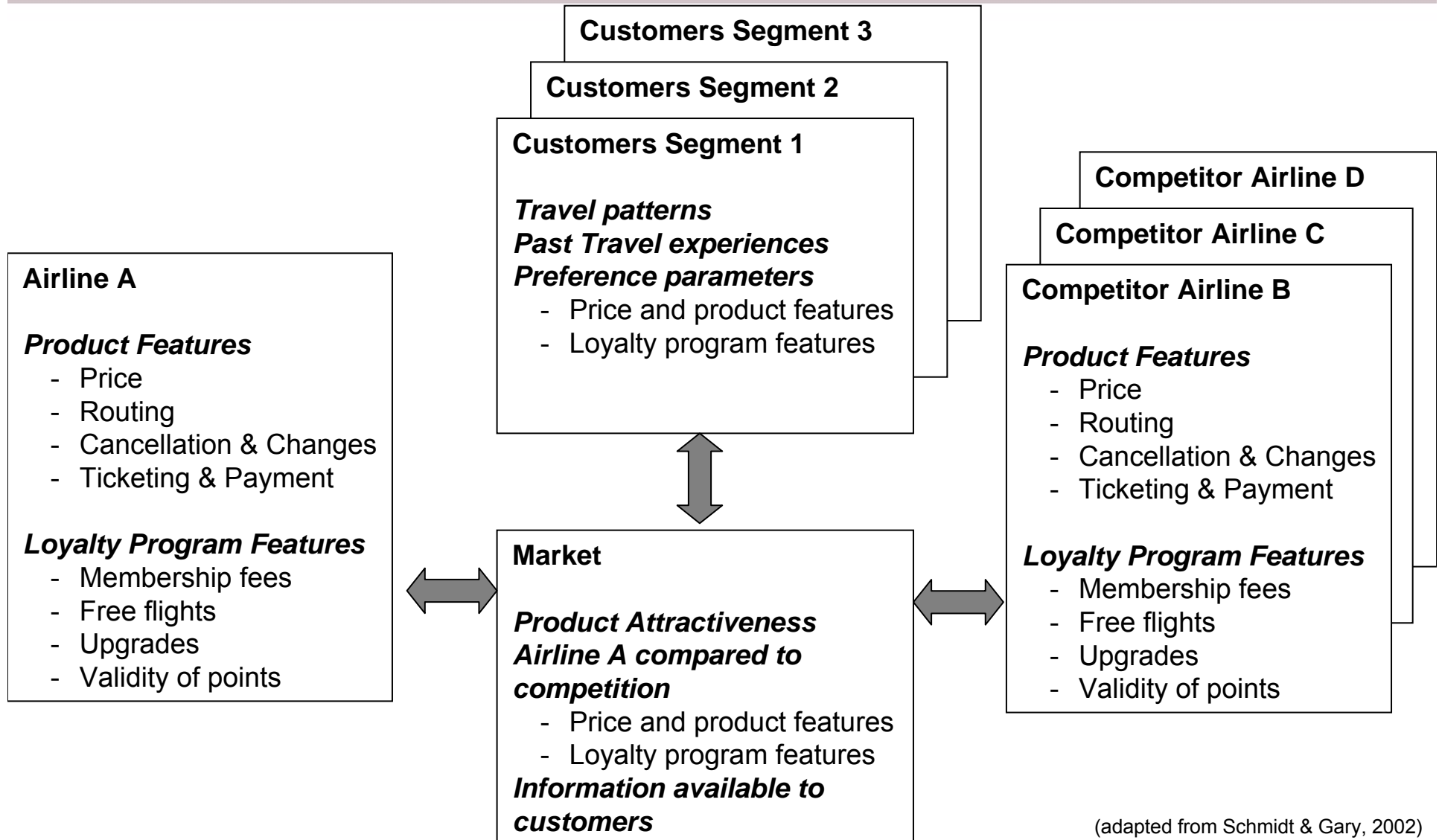


### 3. Simulate the Demand from an Integrated CCM-RM System

- **BUT:** Prediction scenarios have problems
    - Do not capture market dynamics of competition
    - Preference estimates are static
    - Do not allow feedback loops
- ⇒ combine choice modelling with system dynamics

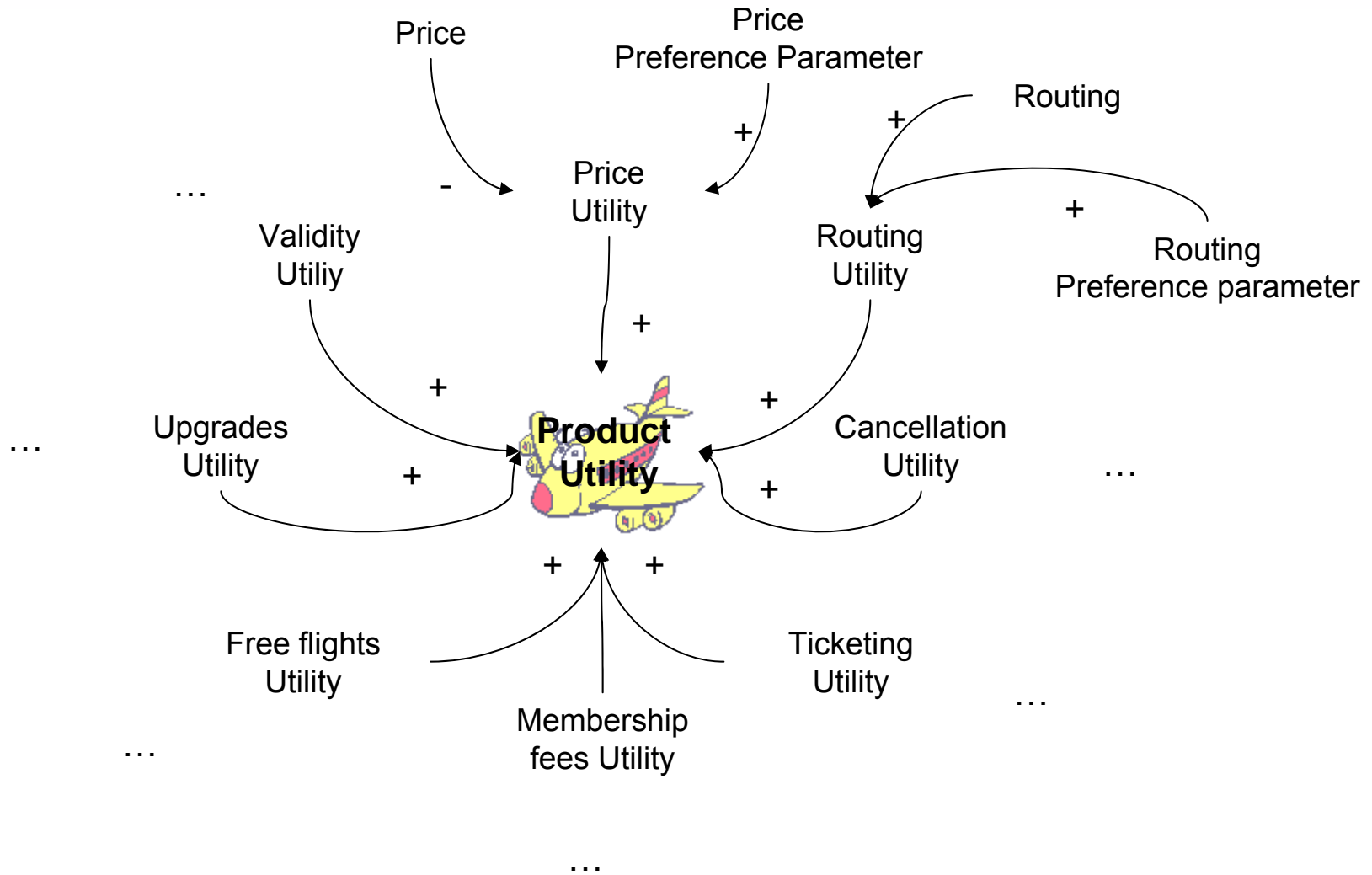


## Overview of simulation model



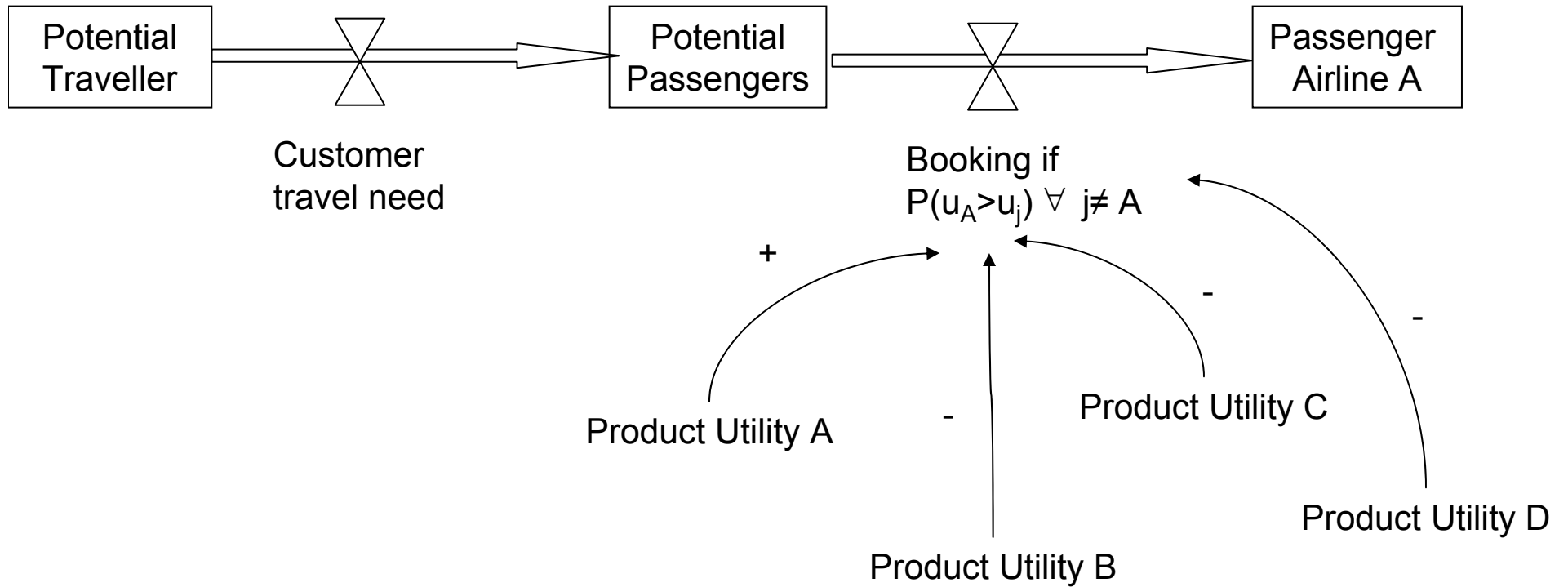


## Defining Product Utility in System Dynamics Model





# Causal Structure





## ?? ? – Thanks for your input

- System Dynamics or Agent-based?
- Airlines adapt their offers based on competitors' behaviour and customers' preferences.
- Coding utilities and choice probabilities