



# ITS 832

## Chapter 10

### Values in Computational Models Revalued

Information Technology in a Global Economy

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# Introduction

- Technology perceptions
- Technology and public decision making
- Methodology
- Case studies
- Analysis
- Summary and conclusions

# Technology Perceptions

- Debate on underlying assumptions of models
- Are models biased?
  - Is technology biased?
  - Are model builders biased?
  - Are model users biased?
- Technological determinism
  - Technology is not neutral or value-free
- Social construction of technology
  - Technology is designed with bias, or values
- Technological instrumentalism
  - Technology is neutral and value-free

# Technology and Public Decision Making

- Policy making involves complex systems
- Model bias must be understood to evaluate results
- Bias, or value can be categorized
  - Values of the data
  - Values of the model
  - Values of the decision-making process

# Methodology

- Select six case studies
- Carry out secondary analysis of results
- Identify cases with three basic characteristics
  - New model designed for case
  - Relate to policy issues with the natural or built world
  - Highly complex and controversial issues

# Case Studies

- Morphological Predictions in the Westerschele (Belgium and the Netherlands)
- Morphological Predictions in the Unterlbe (Germany)
- Flood-Risk Prediction (Germany and the Netherlands)
- Determining the Implementation of Congestion Charging in London (UK)
- Predicting and Containing the Outbreak of Livestock Diseases (Germany)
- Predicting Particular Matter Concentrations (the Netherlands)

# Analysis

- Analyzing empirical data resulted in several findings
- Values in data
  - Cases 1-4 exhibited higher trustworthiness of data
  - Margin of error high in all cases
- Values in the model
  - Similar to values in data findings
- Values in the decision-making process
  - Clear lines of authority in cases 1, 4, and 5
  - Lack of clear authority (cases 2, 3, and 6) leads to conflict

# Summary and Conclusions

- Model effectiveness is impacted by bias
- Values can originate from multiple sources
  - Data
  - Model design
  - Model use
- Outcome validity requires a clear understanding of values put forth by model use