Rationality, Garbage Cans and Stakeholders Engagement in transportation decision-making

Prof. Ennio Cascetta
Università degli Studi di Napoli Federico II
Dipartimento di Ingegneria dei Trasporti “L. Tocchetti”

Outline

1 Background

2 Decision-making in transportation
   - Decision: why, who, where, what, when
   - Components of decision-making processes

3 Models of decision-making processes

4 Public Engagement
   - Definition and levels
   - PE and decision making

5 The role of quantitative methods in transportation decision-making
1. background

- Decisions related to transportation systems, made by both public and private subjects, often impacts on diverse and contrasting interests.

- Decision on transportation are time-consuming and non-efficient due to the complexity of the legal procedures and the fragmentation of the decision-makers system.

- Decision on transportation systems often capture the public eye interest.

- Often, decisions on transportation systems do not perform as expected (planning failures, time and costs overruns).
1. TAV Turin-Lyon

1. Congestion Charge in London
1. background

PLANNING FAILURES
Striking difference between demand forecasts and actual value for rail and road projects (Flyvbjerg et al., 2007)

![Graphs showing inaccuracy for rail and road projects](image)

**Inaccuracy for rail projects (%)**

- **Average traffic over-estimation of 50%**
- **Acknowledged outliers**

**Inaccuracy for road projects (%)**

- **Average traffic over-estimation of 20%**
1. background

PLANNING FAILURES
Cost overruns for transportation infrastructure projects (Flyvbjerg et al., 2002)

Comparison of cost overruns among rail, bridge/tunnel and road projects (Flyvbjerg et al., 2002)

<table>
<thead>
<tr>
<th>Project type</th>
<th>Number of cases (N)</th>
<th>Average cost escalation (%)</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>58</td>
<td>44.7</td>
<td>38.4</td>
</tr>
<tr>
<td>Fixed-link</td>
<td>33</td>
<td>33.8</td>
<td>62.4</td>
</tr>
<tr>
<td>Road</td>
<td>167</td>
<td>20.4</td>
<td>29.9</td>
</tr>
<tr>
<td>All projects</td>
<td>258</td>
<td>27.6</td>
<td>38.7</td>
</tr>
</tbody>
</table>

Average cost overrun of 28%
1. background

TRENDS IN TRANSPORTATION DECISION-MAKING

- **Stronger awareness** of the impacts of transport-related choices and their externalities (e.g. environment, welfare, territorial inequalities, etc.) and larger opportunities to voice different opinions/interests

- **Opening** of transport markets once directly managed or strictly controlled by public authorities (infrastructure building and management, air and railway services, urban public transportation) to private operators

TRADITIONAL APPROACHES TO TRANSPORTATION PLANNING AND DECISION-MAKING IN TRANSPORTATION LITERATURE

- A process aimed at defining plans, actions and operations at different temporal horizons for a rational transport system (Manheim, 1979)

- Urban transportation planning is the process of: (Meyer and Miller, 2001)
  a) Establishing a vision of what a community wants to be and how the transportation system fits into this vision, and understanding the types of decisions that need to be made to achieve this vision
  b) Assessing opportunities and limitations of the future in relationship to goals and desired system performance measures
  c) Identifying the near- and long-term consequences to the community and to transportation system users of alternative choices designed
  d) Relating alternative decisions to the goals, objectives, or system performance measures established for an urban area, agency, or firm
  e) Presenting this information to decision makers in an understandable and useful form
  f) Helping decision makers establish priorities and develop an investment program
1. background

TRADITIONAL APPROACHES TO TRANSPORTATION PLANNING AND DECISION-MAKING IN TRANSPORTATION LITERATURE

- Transportation planning is a decision-making process based on rationality, aimed at defining and implementing transport system operations (Ortuzar and Willumsen, 2001).

- A planning process results in a sequence of decisions (plans or projects) taken at different, not necessarily predefined, moments in time, with each decision accounting for the effects of previous decisions and exogenous factors (Cascetta, 2009).

"Planning is seen mostly as a public-oriented activity, based on the simulation of alternative projects and the assessment of priorities”

…but this is often not the case

outline

1 Background

2 Decision-making in transportation
   - Decision: why, who, where, what, when
   - Components of decision-making processes

3 Models of decision-making processes

4 Public Engagement
   - Definition and levels
   - PE and decision making

5 The role of quantitative methods in transportation decision-making
2. decision-making processes

Decisions:

Why? ... perspectives
Who? ... decision makers
Where? ... markets
What? ... types of decision
When? ... temporal perspective

2A. decisions: why, who where, what, when

PERSPECTIVES, main objectives (why?)

- Mobility planning
- Business planning
- Environmental planning
- Land-use planning
- ...

A decision-making opportunity/need may refer to multiple perspectives
2A. decisions: why, who, where, what, when

DECISION-MAKERS (who?)

- Public Administrations
  - European
  - National
  - Regional
  - Metropolitan/Urban

- Companies (private, public, mixed)
  - Construction and management of transport infrastructure (e.g. motorways, ports, airports)
  - Management of transport services (e.g. airlines, rail lines, containers lines)

The same decision-making (planning) process may involve several decision-makers at different scales and types.

TRANSPORT MARKETS (where?)

- Natural Monopoly
  Only one subject is possible/convenient for construction and/or management of a transport system (e.g. rail network, urban road network)
  - direct management by the Public Administration
  - competition for the market
    - concession contracts (including PPP and PF)
    - service contracts (e.g. subsidized Public Transportation Services)

- Competitive market (competition in the market)
  Several subjects compete for the same economic activity (e.g. rail services, air lines, etc.)
2A. decisions: why, who where, what, when

TYPES OF DECISION (what?)

- Regulations
  - Land use regulation
  - Location of activities (e.g. Public Facilities)
  - Market regulation
  - Air quality regulations, ...

- Services
  - Timetables
  - Fares, ...

- Infrastructure
  - Building
  - Upgrading, ...

- Vehicles & technologies
  - Fleet composition
  - ITS deployment, ...

2A. decisions: why, who where, what, when

Decisions on Transportation System or impacting on it
2A. decisions: why, who where, what, when

TYPES OF DECISION (what?)
Projects and plans

Decisions can be either:

- **finalized to their direct implementation**
  They can be termed as **projects** and have to contain the *adequate level of detail*, typically defined by the rules of the projects involving public interests.

- **or, require successive decisions to be implemented**
  Plans may involve some or all elements requiring further decision making steps to be implemented. They have longer perspectives, encompass a wider range of objectives and actions, and may include some options already implementable (projects), while other open to further decisions or design stages.

TEMPORAL PERSPECTIVE OF DECISIONS (when?)

- **strategic**
  related to regulations, services and infrastructures,
  taken by public administrations or by private companies,
  involve significant investments and/or time to be implemented and to get their return released

- **tactical**
  related to services, infrastructures and vehicles & technology,
  taken by public administrations or by private companies,
  involve limited investments and/or implementation and return times

- **operational**
  related to services and vehicles & technology,
  taken by public administrations or by private companies,
  involve no or very limited investments and very short implementation and return times
2A. decisions: why, who where, what, when

TYPES OF DECISION

Example of a road project

<table>
<thead>
<tr>
<th>WHY?</th>
<th>Mobility Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHEN?</td>
<td>Strategic decision</td>
</tr>
<tr>
<td>WHO?</td>
<td>Public Highway Authorities</td>
</tr>
<tr>
<td>WHERE?</td>
<td>Natural monopolies:</td>
</tr>
<tr>
<td></td>
<td>▶ Direct P.A. control/management</td>
</tr>
<tr>
<td></td>
<td>▶ Competition for the market (BOT, PF)</td>
</tr>
</tbody>
</table>

Example of a rail project

<table>
<thead>
<tr>
<th>WHAT?</th>
<th>Design Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometry and Functional characteristics</td>
<td></td>
</tr>
<tr>
<td>(e.g. type of road, road alignment, connectivity with the existing network, etc.)</td>
<td></td>
</tr>
<tr>
<td>ITS systems</td>
<td></td>
</tr>
<tr>
<td>(e.g. tolls and tolls collection, speed enforcement, ramp metering, variable speed limits, etc.)</td>
<td></td>
</tr>
<tr>
<td>Environmental impacts mitigation solutions</td>
<td></td>
</tr>
<tr>
<td>(e.g. noise barriers, ventilation systems, etc.)</td>
<td></td>
</tr>
<tr>
<td>Building technology and phases</td>
<td></td>
</tr>
<tr>
<td>Landscape insertion studies</td>
<td></td>
</tr>
</tbody>
</table>

Rationality, Garbage Cans and Stakeholders Engagement in transportation decision-making

Milan, February 14th, 2013
2A. decisions: why, who where, what, when

TYPES OF DECISION

Example of plan: Regional Metropolitan System of Campania

<table>
<thead>
<tr>
<th>WHY?</th>
<th>Mobility Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHEN?</td>
<td>Strategic decision</td>
</tr>
<tr>
<td>WHO?</td>
<td>Regional Transport Authority</td>
</tr>
<tr>
<td>WHERE?</td>
<td>Natural monopolies</td>
</tr>
</tbody>
</table>

WHAT? Design Variables

- Line design and operations (e.g. railway lines, stations, timetables, interchange parking, service reliability, etc.)
- Vehicles and Technology (e.g. rolling stock number, performances, AVM services, etc.)
- Pricing policies (e.g. integrated fare system, etc.)

Example of a urban traffic plan

<table>
<thead>
<tr>
<th>WHY?</th>
<th>Mobility Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHEN?</td>
<td>Tactical decision</td>
</tr>
<tr>
<td>WHO?</td>
<td>Local Transport Authority</td>
</tr>
<tr>
<td>WHERE?</td>
<td>Natural monopoly</td>
</tr>
</tbody>
</table>

WHAT? Design Variables

- Traffic control and operations (e.g. actuated/coordinated control, circulatory directions, one-way roads, parking area and regulations, parking fares, etc.)
- ITS systems (e.g. speed enforcement, limited access zones, priority light control, route clearance, infomobility and ATIS, V2I communication systems, etc.)
- Pricing policies (e.g. congestion charge, eco-pricing, tolling system, mobility credits, etc.)
- Maintenance plans and Monitoring (e.g. traffic counts, demand forecasting, etc.)
1 Background

2 Decision-making processes
- Decision: why, who, where, what, when
- Components of decision-making processes

3 Models of the decision-making process

4 Public Engagement
- Definition and levels
- PE and decision making

5 The role of quantitative methods in transportation decision-making

2B. components of decision-making processes

Decision-making processes impacting on several subjects both within and outside the organization (public or private) in charge of the decision

- Decision-makers
  Those who are formally in charge of the choice

- Process coordination
  People and procedures used to plan and manage each stage of the process

- Stakeholders
  Those who hold a stake in a particular issue, even though they have not a formal role in the decision-making process

- Opportunities/problems
  They stimulate the decision-making process

- Objectives (stated/unstated)
  Targets pursued by decision makers and stakeholders

- Contextual barriers
  Anything restricting or causing the delay or cancellation of a project. They set constraints, such as institutional, legal and financial restrictions

- Consensus barriers (see later)

- Coalitions: Groups of actors whose objectives converge to one solution

- Implementation: Development of the project or part of it
### 2B. components of decision-making processes

#### STAKEHOLDERS

<table>
<thead>
<tr>
<th>Institutions and Authorities</th>
<th>Users</th>
<th>Transport operators</th>
<th>Business and Unions</th>
<th>Local communities</th>
<th>Media</th>
<th>Financial institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union</td>
<td>Direct users (passengers)</td>
<td>Transport operators</td>
<td>National and local industry associations</td>
<td>Transport users associations</td>
<td>TV station</td>
<td>Banks</td>
</tr>
<tr>
<td>National government and authorities</td>
<td>Direct users (freights)</td>
<td>Transport operator associations</td>
<td>National and local trade unions</td>
<td>Local interest groups (e.g. borough associations)</td>
<td>Radio station</td>
<td>Funds</td>
</tr>
<tr>
<td>National parliament</td>
<td>Indirect users (passengers)</td>
<td>Consultants</td>
<td>National and local craft unions</td>
<td>Environmental associations</td>
<td>Newspapers</td>
<td>Insurances</td>
</tr>
<tr>
<td>Regional governments and Authorities</td>
<td>Indirect users (freights)</td>
<td>Retailers associations</td>
<td>Citizens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional transport authority</td>
<td>Industry in public works</td>
<td>Visitors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local authorities (Provinces and Municipalities)</td>
<td>Industry in vehicles production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political parties and single members</td>
<td>Industry in technology production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### DYNAMISM/POWER MATRIX

<table>
<thead>
<tr>
<th>POWER</th>
<th>DYNAMISM</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>Powerful but predictable</td>
</tr>
<tr>
<td>LOW</td>
<td>Fewer problems</td>
</tr>
</tbody>
</table>

#### INTEREST/POWER MATRIX

<table>
<thead>
<tr>
<th>POWER</th>
<th>INTEREST</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>Keep satisfied</td>
</tr>
<tr>
<td>LOW</td>
<td>Minimal effort</td>
</tr>
<tr>
<td>LOW</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

2B. components of decision-making processes

- **Decision-makers**
  Those who are formally in charge of the choice

- **Process coordination**
  People and procedures used to plan and manage each stage of the process

- **Stakeholders**
  Those who hold a stake in a particular issue, even though they have not a formal role in the decision-making process

- **Opportunities/problems**
  They stimulate the decision-making process

- **Objectives (stated/unstated)**
  Targets pursued by decision makers and stakeholders

- **Contextual barriers**
  Anything restricting or causing the delay or cancellation of a project. They set constraints, such as institutional, legal and financial restrictions

- **Consensus barriers**

- **Coalitions**: Groups of actors whose objectives converge to one solution

- **Implementation**: Development of the project or part of it

---

### MULTIPLE, CONFLICTING, OBJECTIVES

**Stated**

- To Improve accessibility (Activity participation)
- To Reduce production costs (Efficiency)
- To Reduce users generalized costs (Quality)
- To improve public health (i.e. reduce harmful pollutants, increase road safety, ...)
- To reduce environmental impacts (i.e. gas emissions, visual intrusion in the surrounding landscape, impact on the biosphere, ...)
- To reduce territorial inequalities and group disparities (Equity)
- To foster territorial development (re-development areas, new districts, ...)
- To promote economic growth (i.e. to increase firms productivity and competitiveness, ...)
- To maximize company profit and market power

---

**Unstated**

- To enlarge public consensus / minimize conflicts upon decisions
- To legitimize public role
- To maximize personal profit
- To weaken competing companies
2B. components of decision-making processes

- **Decision-makers**
  Those who are formally in charge of the choice

- **Process coordination**
  People and procedures used to plan and manage each stage of the process

- **Stakeholders**
  Those who hold a stake in a particular issue, even though they have not a formal role in the decision-making process

- **Opportunities/problems**
  They stimulate the decision-making process

- **Objectives (stated/unstated)**
  Targets pursued by decision makers and stakeholders through the interventions

- **Contextual barriers**
  Anything restricting or causing the delay or cancellation of a project. They set constraints, such as institutional, legal and financial restrictions

**Consensus barriers**

- **Coalitions**: Groups of actors whose objectives converge to one solution

- **Implementation**: Development of the project or part of it

---

**CONSENSUS BARRIERS**

**Consensus**: problems associated with achieving acceptance by stakeholders

Not only related to new infrastructures and plants but also to new traffic schemes (e.g. road pricing), new lines etc.

“There is no opinion, however absurd, which men will not readily embrace as soon as they can be brought to the conviction that it is generally adopted”

— Schopenhauer

2B. components of the process

TYPICAL CONSENSUS BARRIERS
NIMBY and other syndromes

- NIMBY  Not In My Back Yard
- NIABY  Not In Anyone’s Back Yard
- NAMBI  Not Against My Business or Industry
- BANANA  Build Absolutely Nothing Anywhere Near Anything (or Anyone)
- NIMTO  Not in My Term of Office

2B. components of decision-making processes

- Decision-makers
  Those who are formally in charge of the choice
- Process coordination
  People and procedures used to plan and manage each stage of the process
- Stakeholders
  Those who hold a stake in a particular issue, even though they have not a formal role in the decision-making process
- Opportunities/problems
  They stimulate the decision-making process
- Objectives (stated/unstated)
  Targets pursued by decision makers and stakeholders through the interventions
- Contextual barriers
  Anything restricting or causing the delay or cancellation of a project. They set constraints, such as institutional, legal and financial restrictions
- Consensus barriers
- Coalitions: Groups of actors whose objectives converge to one solution
- Implementation: Development of the project or part of it
3. models of decision-making processes

TRANSPORT-RELATED DECISION-MAKING PROCESS

A sequence of activities performed by several actors (including decision-makers and possibly stakeholders) in order to decide on options including projects, plans, and not deciding (delaying)

CLASSIFICATION

- RATIONAL models
- A-RATIONAL models
3. models of decision-making processes

RATIONAL MODELS

Rationality: Acting in the best possible way considering the aim (Elster, 1986)

Minimal Requirements of Rational decisions: (Cascetta et al., 2013)

- **consistent**
  - both internally w. r. t. the stated objectives and existing constraints, and externally with other decisions (plans, projects) taken in other interacting contexts or at different moments in time

- **comparative**
  - considering one or more alternatives (e.g. not deciding, one of the available options, searching for other possibilities)

- **aware**
  - based on unbiased information about the options (features), the context (physical and decisional) and their likely impacts (costs, benefits, risks and opportunities), for technical, economic and administrative feasibility

- **flexible**
  - open to changes due to new information on alternative options and their effects, to changes in the economic, physical, institutional contexts, and taking into account decision “opportunity costs” (i.e. postponing unnecessary decisions)

3. models of decision-making processes

RATIONAL MODELS

- **STRONG RATIONALITY**
  *Homo oeconomicus* is a utility maximizer relative to his/her choices

- **COGNITIVE OR BOUNDED RATIONALITY**
  Decision-makers have limited time, capacity and resources and therefore choose an alternative which is satisfying, learning from previous choices
3. models of decision-making processes

RATIONAL MODELS

The strongly rational approach

1. **Problem complexity**, that is impossibility of evaluating all the alternatives and the related impacts
2. **Different and often contrasting objectives** among decision-makers and stakeholders
3. **Each option** brings a series of favourable or unfavourable **consequences difficult to compare**
4. **Cognitive limits** to the capacity of the decision makers of considering all the feasible options, and in the uncertainty of the results
5. **Limited times and resources** to assess and compare alternatives
6. **Presence of stakeholders** with a veto right
3. models of decision-making processes

RATIONAL MODELS

Application areas of the strongly rational approach

✓ Simple objectives (e.g. to minimize total travel time, production costs, with constraints expressed by quantitative variables)

✓ Possibility to automatically generate alternative options (Supply and Demand problems)

✓ Limited or no impact on stakeholders

✓ Limited number of decision-makers

Examples

Public-oriented context: the design of the optimal control scheme at road intersections, or the optimal frequencies for transit lines, etc.

Private point of view: the design or management of the personnel shifts, yields management, dispatching of ships in a container terminal, etc.
3. models of decision-making processes

RATIONAL MODELS
Cognitive/Bounded Rational approach

It is loosely consistent with:

- Bounded Rationality Choice Theory (Simon 1957; Rubinstein, 1999; Kahneman, 2003) *(Behavioral Economics)*
- Learning Theory in Dynamic Decision-Making Models (Brehemer, 1992; Gonzalez et al., 2003) *(Management science/Psychology)*

- The actors are still goal-oriented but they implicitly take into account their *cognitive limitations* in attempting to achieve those goals
- The decision-making model is intrinsically *dynamic*, with several feedback loops adapting the “solutions” to their ability to satisfy objectives and constraints until reaching a “satisfactory” level of compliance
- *The problem setting may be revised* if solution satisfying previously set objectives and constraints are not found within reasonable time and resource budgets
- The concept of *satisfaction* is necessary a *fuzzy* one, as no single value objective function can be referred to, and even non-quantitative objectives and constraints are included in the process
3. models of decision-making processes

RATIONAL MODELS
Application areas of the cognitive/bounded rationality approach

✓ Multiple (and possibly ill-posed) objectives, also related to non-quantitative variables
✓ Not exhaustive knowledge of the context variables/available solutions
✓ Impacts on multiple stakeholders
✓ Several decision-makers
✓ Significant uncertainty in the simulated impacts

A-RATIONAL MODELS
The garbage can model (Cohen et al., 1972; Daft, 2001; Lipson, 2007)
Originally proposed for describing organizational decision-making processes in companies

The variables
- Actors/participants (A)
- Problems (P)
- Solutions (S)
- Decision Opportunities (O)

O are the cans in which A throw P and S. The decision depends on the random coupling of P and S

Applications to public decision-making in transportation can be found in Cascetta and Carteni (2012)
3. models of decision-making processes

A-RATIONAL MODELS
The garbage can model

It deals with “organized anarchies”, i.e. organizations where there are three properties:

1) Choices are made on the basis of ill-posed and inconsistent ideas

2) A solution/an idea could be proposed even if there is not a problem or it could contribute to define it. On the contrary, a problem could exist without being able to find a solution

3) Participation changes: different actors are involved over time
3. models of decision-making processes

A-RATIONAL MODELS

An example: the modern tram

- A solution to different classes of problems (environmental pollution, congestion, urban redevelopment, etc.)
- Actors, mostly stakeholders, constantly come in and out the decision scene, as their involvement depends more on the relevance of the negotiating rather than on the nature of the decision to be taken
- Choice opportunities appear just when the organization can afford to take a decision, but, at that time, multiple, different and competitive problems push together towards the same choice opportunity

An example: a-rational planning of an infrastructure (e.g. motorway)

- It is thought to solve congestion or accessibility problems
- It is proposed as part of a political program
- It possibly results from some stakeholders interests, not from any specific system analysis process
3. models of decision-making processes

A-RATIONAL MODELS

The garbage can model

Decisions based on an a-rational approach have some limitations:

- **Non-efficiency**: the “organized anarchy” often brings to projects that do not solve the problems or might solve them only partially.

- **Instability**: decisions depend crucially on the actors (decision-makers and stakeholders) contributing to it, and are not retraceable if they change.

- **Lack of legitimization**: the organization is able to survive without making its processes understandable by the members of the organization itself.

---

Application areas of the garbage can model

- No regulations requiring formal assessment of projects, proposals, plans
- Strong interests for a specific solution rather than for solving the problem
- Limited public debate (see later)
3. models of decision-making processes

“Real-life decision-making process could be approximated by different models at different stages”

outline

1 Background

2 Decision-making in transportation
   ◆ Decision: why, who, where, what, when
   ◆ Components of public processes

3 Models of decision-making processes

4 Public Engagement
   ◆ Definition and levels
   ◆ PE and decision making

5 The role of quantitative methods in transportation decision-making
4A. definition and levels

- Public Engagement (PE) is the process of identifying and incorporating stakeholders’ concerns, needs and values in the transport decision-making process.

- It is a two-way communication process that provides a mechanism for exchanging information and promoting stakeholder interaction with the formal decision-makers and the transport project team.

- The overall goal of engagement is to achieve a more transparent decision-making process with greater input from stakeholders and their support of the decisions (larger coalitions).

- Stakeholders management is also studied in organization and management sciences (Clarkson, 1999)

---

4A. definition and levels

THE FIVE LEVELS OF PE

1. **Stakeholders identification**: e.g. authorities, local communities, etc.

2. **Listening and stakeholders management**: systematic analysis of the current social, cultural and economic conditions with a direct impact on stakeholders.

3. **Information communication**: information relative to the project provided by the stakeholders.

4. **Consultation**: decision-makers listen to the different points of view and interact with the stakeholders.

5. **Participation**: extension of the consultation level where the groups, directly interested, become joint partners of the project and in the project implementation. They take part in making the final choice.
4A. definition and levels

SOME EXPERIENCES OF PUBLIC ENGAGEMENT REGULATIONS

In the United States:
- Title VI of the Civil Rights Act (1964)
- The Intermodal Surface Transportation Efficiency Act (1991)
- Office of Public Engagement (since 2009)

In France:
The National Public Debate Commission was established in 1995 with the Barnier law, related to the protection of the environment. Public debates to be organized between the various actors during the implementation phase of the large-scale public projects promoted by the State.

In UK:
Code Of Practice On Consultation (2000): how consultation exercises are best run and what people can expect from the Government when it has decided to run a formal consultation exercise

THE ARCH-ENEMY OF PE: THE DAD (DECIDE, ANNOUNCE, DEFEND) SYNDROME
(e.g. Susskind et al., 1983; Walker, 2009)

Administration makes a DECISION (the best project/plan), it ANNOUNCES the project to the population and other stakeholders that have not been involved previously. This produces many oppositions and the Administration is obligated to DEFEND the decision against criticism, accusations and controversy without having the opportunity to improve the project (if only marginally)

Limits of the DAD
- It fosters barriers
- It increase costs
- It increases times
4A. definition and levels

Outline

1 Background

2 Decision-making in transportation
   ✓ Decision: why, who, where, what, when
   ✓ Components of public processes

3 Models of decision-making processes

4 Public Engagement
   ✓ Definition and levels
   ✓ PE and decision making

5 The role of quantitative methods in transportation decision-making
4B. PE and decision-making

- Public Engagement and rational decision-making do not necessarily imply each others (e.g. DAD syndrome and PE based on “pure” negotiation)
- PE and the cognitive/bounded rational approach have a strong interaction potential
Outline

1. Background
2. Decision-making in transportation
   - Decision: why, who, where, what, when
   - Components of public processes
3. Models of decision-making processes
4. Public Engagement
   - Definition and levels
   - PE and decision making
5. The role of quantitative methods in transportation decision-making

4. The role of quantitative methods in transportation decision-making

Some Suggestions

1. Understanding and modeling mobility and transport related phenomena
2. To assist in the design, assessment and evaluation of transport-related decisions:
   - What If
   - What To
3. To contribute towards reaching larger consensus through Public Engagement (e.g. information-based PE)
4. To provide inputs for economic/financial plans of operators
5. To analyze new transport markets and their possible regulations
4. the role of quantitative methods in transportation decision-making

SOME INDICATIONS FROM THE NEW PERSPECTIVE

- To model the impacts relevant to stakeholders and decision-makers
- To present results in ways that can be understood by non-experts
- To increase the design (and modeling) effort for the preliminary stages
- To adopt assessment methods allowing the evaluation of both quantitative and qualitative impacts for different actors
- To highlight the (neglected) relevance of ex-post studies
- To quantify the uncertainty entailed in the simulation results and in the assessment methodology
- To improve the capability to capture users’ willingness to pay for transport services
4. The role of quantitative methods in transportation decision-making

Model the impacts relevant to stakeholders and decision-makers

4. the role of quantitative methods in transportation decision-making

Model the impacts relevant to stakeholders and decision-makers
4. the role of quantitative methods in transportation decision-making

Model the impacts relevant to stakeholders and decision-makers

Creative ways to represent results that can be understood by non-experts

Establishing the role of quantitative methods in PE decision-making processes

- Make use of **appropriate communication language**
- Adoption of “**self-explanatory**” graphics for the presentation of results (“one picture one thousand words”)
- **Analogies** for quantitative variables (e.g. impact levels classified by letter)
- Use “**causal**” presentation of data (e.g. travel time reductions due to solution of certain bottlenecks in certain areas)
- Make reference to **comparable case-studies** (the outside view)
- **Flexible aggregation levels**
4. the role of quantitative methods in transportation decision-making

Increase the design (and modeling) effort for the preliminary stages

Adopt assessment methods allowing the evaluation of both quantitative and qualitative impacts for different actors (Cost-Benefit analysis is not enough!)

Multiple Agent Multi-Criteria Decision Making (MAMCDM)
4. the role of quantitative methods in transportation decision-making

Highlight the (neglected) relevance of ex-post studies

- To give feedbacks to stakeholders and decision-makers for further stages of the process
- To increase credibility and establish limits of quantitative methods
- To fine tune models
- To enrich the stock of “narratives” to be used for similar projects
- To shine light on recurrent planning fallacies
- To provide elements for “outside views” of similar projects

Quantify the uncertainty entailed in the simulation results and in the assessment methodology, for risk assessment
Uncertainty Propagation and Global Sensitivity Analysis frameworks
4. the role of quantitative methods in transportation decision-making

Improve the capability to capture users’ willingness to pay for transport services
More reliable simulation of transport services revenues

- Traditionally, quantitative tools mainly focus on physical measures (e.g. flows, speeds, travel times, etc.)
- Increasing need to capture willingness to pay for different users’ segments of transportation services (e.g. yield management)
**basic references (1/3)**

**Reference paper**

**Planning failures**

**Rationality, Garbage Cans and Stakeholders Engagement in transportation decision-making** Milan, February 14th, 2013

**basic references (2/3)**

**Decision-Making in Transportation and Models – RATIONAL MODELS**

**Decision-Making in Transportation and Models – A-RATIONAL MODELS**

**Decision-Making in Transportation and Models – PUBLIC ENGAGEMENT**
The role of quantitative methods in transportation decision-making


