

Broadening quantitative appraisal in transportation decision making processes through effective stakeholders engagement

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Outline

- 1. Risks and failures of transportation planning**
- 2. The role of assessment in transportation planning**
- 3. A model of Cognitive and participative decision-making process with different uncertainty levels**
- 4. An application to the Regional transport plan of Veneto (Italy)**
- 5. Conclusions and recommendations**

1. Risks and failures of transportation planning

Transportation planning: ***the decision-making process on public actions, including regulation and financing, related to transportation infrastructures and services in order to reach societal objectives***

“Desirable properties of transportation planning”:

- decisions addressing problems/needs widely recognized as such;
- decisions solving the problems/addressing the needs as much as possible and making reasonable use of limited resources;
- decisions having a large consensus among decision makers and stakeholders;
- decisions based on information, as accurate as possible, about their consequences and those of possible alternative courses of action

1. Risks and failures of transportation planning

Transportation Planning is a complex problem. *Multiple decision makers and impacted stakeholders with different and often contrasting values, objectives and interests. Some with veto or quasi veto rights.*

*“the kinds of problems that planners deal with – societal problems - are inherently different from the problems that scientists and perhaps some classes of engineers deal with. Planning problems are inherently **wicked**” (Rittel and Weber, 1973).*

Problems essentially unique, every wicked problem can be considered to be a symptom of another problem, it do not has an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan and solutions to wicked problems are not true-or-false, but good-or-bad” (Rittel and Weber, 1973)

1. Risks and failures of transportation planning

Level 1 Planning

Project Founding

Central Decision maker process

Level 2 Planning

Plan (P) Project (PR) 1

Local objectives
Decision Maker process

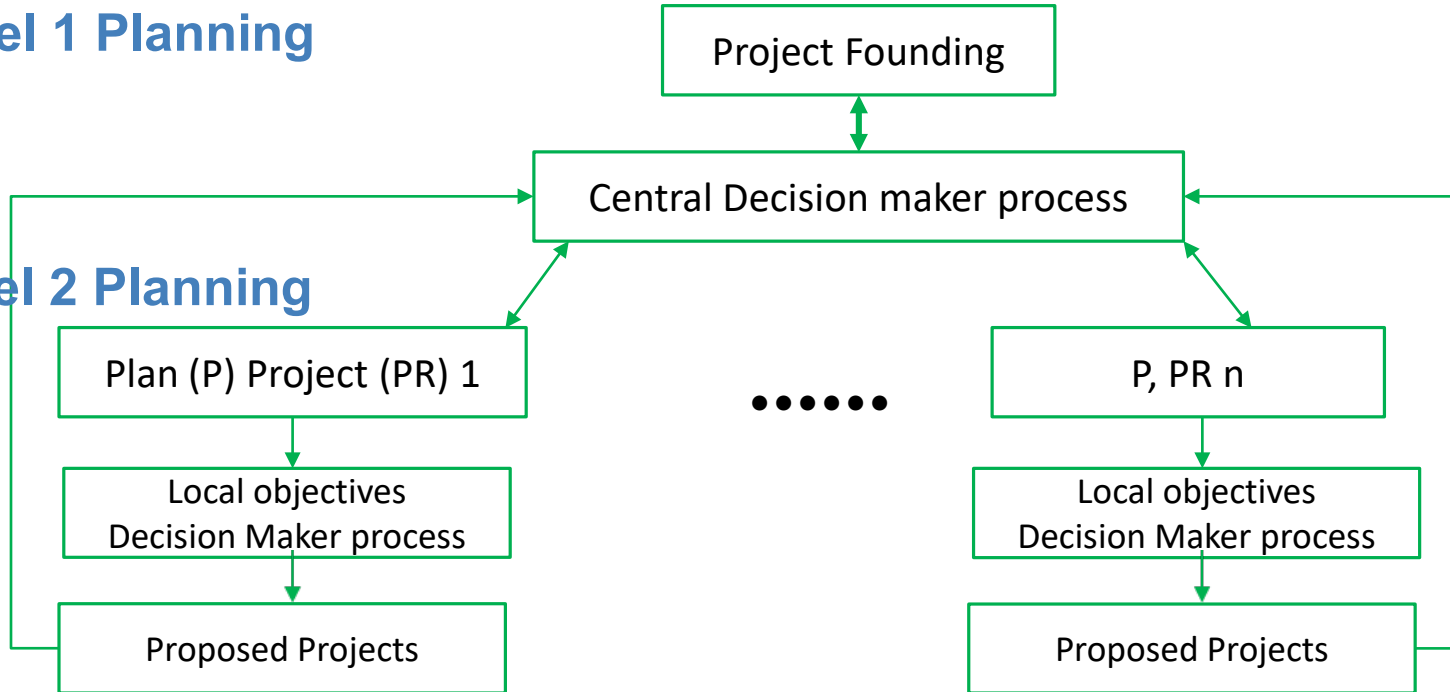
Proposed Projects

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P, PR n

Local objectives
Decision Maker process

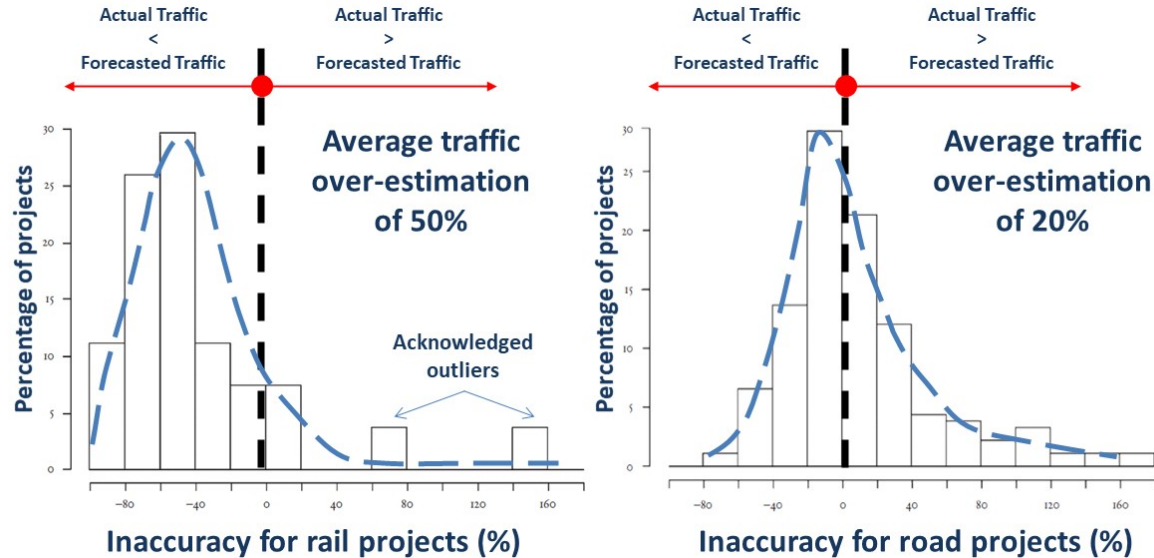
Proposed Projects



1. Risks and failures of transportation planning

Several types of “**planning failures**” in transportation planning and design:

- underestimation of implementation costs and times
- errors in demand/revenue forecasts
- miscalculation of direct effects, and of environmental and other external impacts
- the inability to carry through the planned actions due to lack of consensus or new governance cycles



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

1. Risks and failures of transportation planning

Example of errors in demand forecasts and miscalculation of direct and external impacts

Copenhagen-Malmö Oresund Bridge

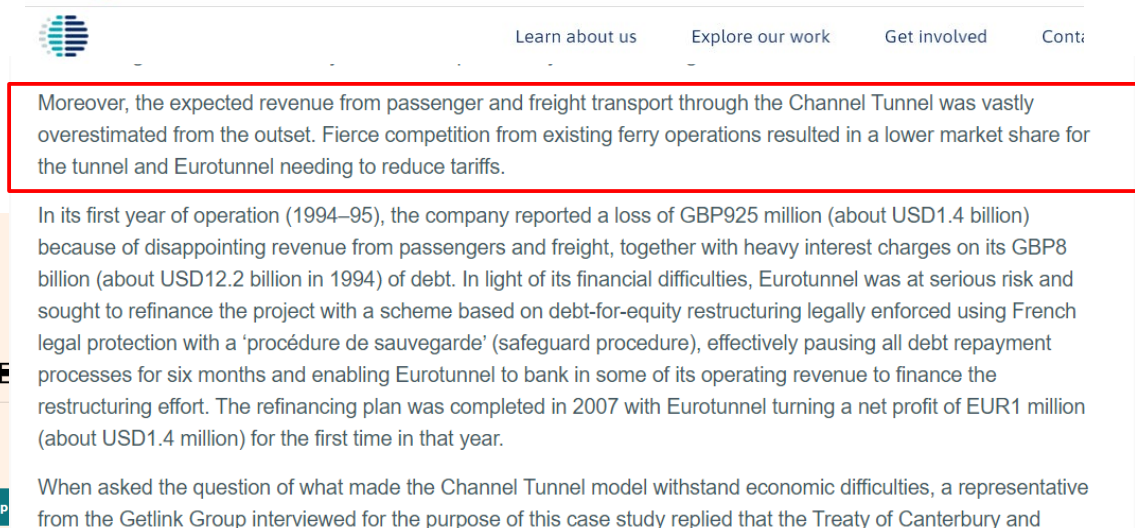
- 2000: the bridge comes into service
- after a few months observed traffic is lower by about 50% w.r.t. forecasted traffic (*overestimating the real utility in the short term... it costs too much*)
- 2008: observed traffic is greater than about 33% respect forecasted traffic (*underestimation of long-term effects*)



1. Risks and failures of transportation planning

Example of errors in demand/revenue forecasts

The Channel Tunnel



Moreover, the expected revenue from passenger and freight transport through the Channel Tunnel was vastly overestimated from the outset. Fierce competition from existing ferry operations resulted in a lower market share for the tunnel and Eurotunnel needing to reduce tariffs.

In its first year of operation (1994–95), the company reported a loss of GBP925 million (about USD1.4 billion) because of disappointing revenue from passengers and freight, together with heavy interest charges on its GBP8 billion (about USD12.2 billion in 1994) of debt. In light of its financial difficulties, Eurotunnel was at serious risk and sought to refinance the project with a scheme based on debt-for-equity restructuring legally enforced using French legal protection with a 'procédure de sauvegarde' (safeguard procedure), effectively pausing all debt repayment processes for six months and enabling Eurotunnel to bank in some of its operating revenue to finance the restructuring effort. The refinancing plan was completed in 2007 with Eurotunnel turning a net profit of EUR1 million (about USD1.4 million) for the first time in that year.

When asked the question of what made the Channel Tunnel model withstand economic difficulties, a representative from the Getlink Group interviewed for the purpose of this case study replied that the Treaty of Canterbury and



FINANCIAL TIMES
Channel tunnel operator defaults

Louisa Mitchell AUGUST 16 2006

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Eurotunnel defaulted on a senior secured bank loan under France's new bankruptcy protection law when it failed to make €350,000 in interest

1. Risks and failures of transportation planning

Example of errors by lack of consensus

TAV Turin-Lyon



3 July 2011 Last updated at 16:08 GMT

Italy high-speed rail tunnel: Fresh clashes in Alps

Police have again clashed with demonstrators in the Italian Alps over the construction of a new high-speed rail link with France.



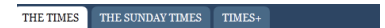
The government says it is determined to press ahead, despite the protests



Italy high-speed rail protest turns violent



June 2011 Last updated at 16:26 GMT
lash over new high-speed rail tunnel in Italian Alps



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Protesters derail start of longest Alps tunnel

Richard Owen

The Times | Published: 02 December 2005 | European Football

...by its Italian initials as **TAV**. The focus of their protests...Venus the slo
'No TAV' hangs in banners...Government claims that the **TAV** is vital if
commercial traffic...protesters last year, to **no** avail. "Blocking...

1. Risks and failures of transportation planning

Example of errors by lack of consensus
Congestion Charge in London

In Edinburgh more than 74% of residents voted against a charge



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Go-slow protest over road charge

Hundreds of drivers have taken part in an anti-congestion charge protest in London in a last-ditch attempt to stop the western extension of the zone.

Organised by the West London Residents Association, the go-slow began at Addison Road, in Kensington.

Protesters argue the £8 charge, being introduced from Monday, will damage businesses and cost residents hundreds of pounds a year.

But Transport for London believes congestion will be cut by 15%.

TfL also claims the number of vehicles will be reduced by 10 to 15% once the charge is introduced.

The zone will expand west from central London on Monday to include Kensington and Chelsea.

*Click to see new congestion charge area

The protest convoy and march travelled along the Earls Court Road, which will be the boundary of the new zone.

One resident said: "We're fighting [London Mayor Ken Livingstone]. At least we can show him that we care, even if he doesn't."

“ Since the introduction of the charge in 2003, traffic levels have been reduced in the central zone by 20% ”
TfL spokesman

2.30pm update

Livingstone praises congestion zone extension

Matt Weaver and agencies
guardian.co.uk, Monday 19 February 2007 14:47 GMT

STOP THE EXTENSION

An anti-congestion charge protester in London. Photograph: Sang Tan/AP

Ken Livingstone today hailed as a success the westward extension of the congestion charge zone in London, despite angry protests from residents in west London.

1. Risks and failures of transportation planning

Example of error of inability to carry planned actions due to new governance cycles ("Penelope" syndrome)

Detroit Light Rail Shut

- 2009: the US DOT allocated \$ 600 million for the construction of light railroad in Detroit
- 2011: Municipality declared the project not feasible (the costs are not sustainable) and proposed the construction of a rapid bus network
- 2012: the municipality turns back and decides to build Light Rail Shut



By MATTHEW DOLAN
DETROIT—The derailed plan to bring a train line to the Motor City received a possible reprieve Friday after government officials agreed to review a more-limited project.
Last month, the U.S. Department of Transportation and Democratic Mayor Dave Bing abandoned a roughly \$600 million plan to build a light-rail line along a key corridor that supporters had insisted would attract new residents and jump-start economic growth. Instead, they proposed a less-expensive plan pushed by the Michigan governor for a network of express buses covering more than 100 miles to deliver workers from the city to the job-rich suburbs.

On Friday, they reversed course again under pressure from members of Congress and a coalition of business leaders who backed the light-rail project.



In a Failure of Municipal Ambition, Plans for Detroit Light Rail Shut Down as Focus Shifts to BRT



1. Risks and failures of transportation planning

Uncertainty in transportation planning

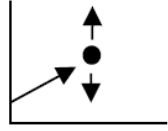
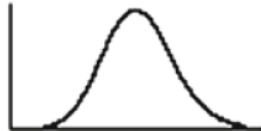
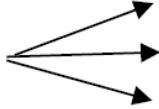
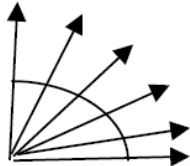
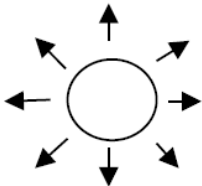
Demand uncertainty (*e.g. socio-economic variables related to travel demand, users' travel behavior, traffic levels*)

Supply uncertainty (*e.g. supply performance, construction times and costs, technological disruptive innovations*)

Context uncertainty (*e.g. political cycle, stakeholders interested, decisions of other interfacing Transport Agencies, regulatory constraints*).

1. Risks and failures of transportation planning

4 levels of uncertainty

Context (X)	Complete determinism	Level 1	Level 2	Level 3	Level 4 (deep uncertainty)		Total ignorance
					Level 4a	Level 4b	
		A clear enough future 	Alternate futures (with probabilities) 	A few plausible futures 	Many plausible futures 	Unknown future 	

(Head, 2010)

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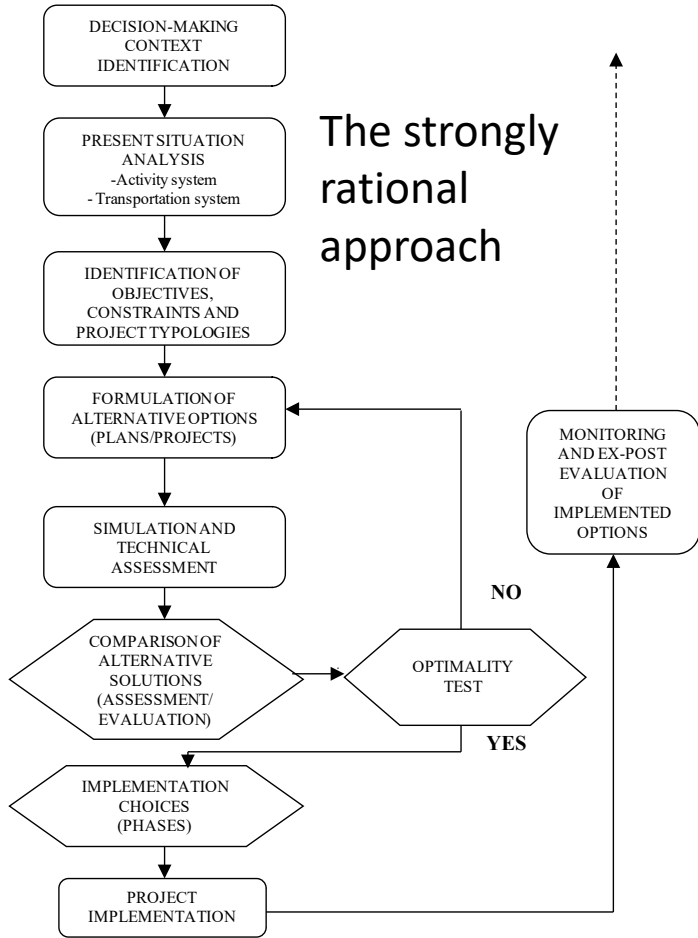
2. The role of assessment in transportation planning

Assessment in planning and design

Technical activity aimed to (define and) compare alternative options on the basis of related impacts.

Assessment techniques, to be effective, should be consistent with the overall decision-making approach followed

The strongly
rational
approach



2. The role of assessment in transportation planning

Consistency with the decision-making process

Gap between problem complexity and assessment tools “planning models” in the technical community

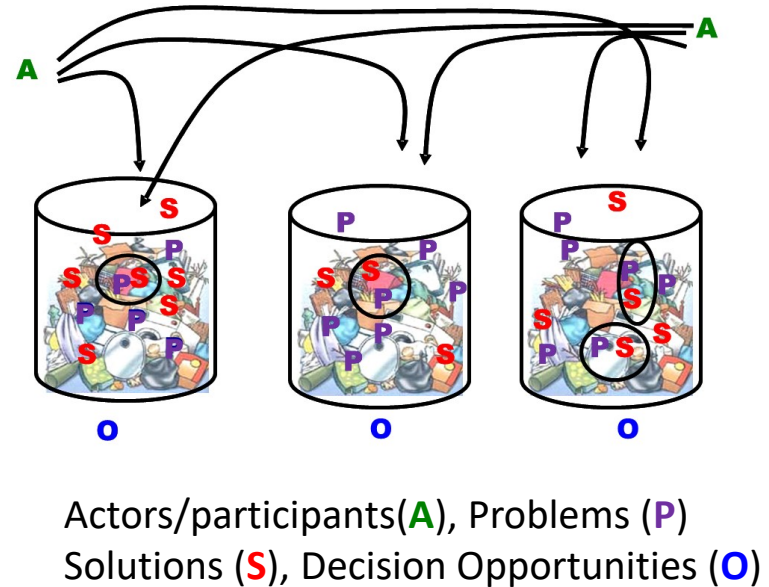
It is assumed that decisions are taken following a strongly sort of rationality decision ma with well-defined aims, constraints and future scenarios, and that Decision Support Systems - DSS (e.g. quantitative methods/tools/models) and assessment techniques such as **cost-benefit analyses**, play a central role in the overall process

2. The role of assessment in transportation planning

CLASSIFICATION OF PLANNING MODELS

- ❑ **RATIONAL** models
 - strongly rationality
 - satisficing or bounded rationality
 - cognitive

- ❑ **A-RATIONAL** models
 - Garbage can model
 - Assesment has a purely formal role (if any)



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3. A model of Cognitive and participative decision-making process with different uncertainty levels

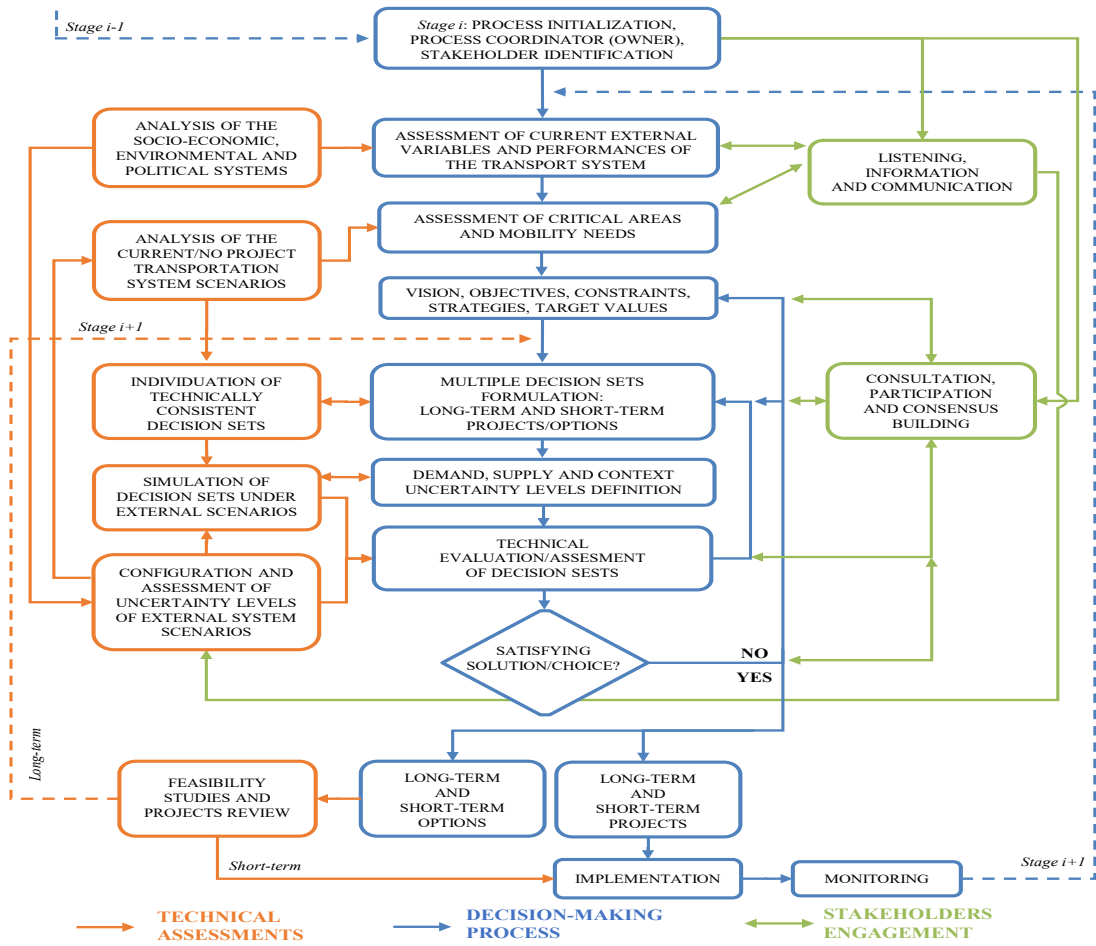
The main characteristic of the proposed model (1/2):

- The process evolves through **successive decision-making stages**, allowing actors, institutional and otherwise, to learn from previous stages and system monitoring as well as from the definition and assessment of alternative decision sets;
- **at each stage** a number of **decisions are made** involving the implementation of **long-term** non-reversible and **short-term** reversible projects.
- **Decisions include** the need to better define long- and short-term options through **feasibility projects** to be assessed and possibly be included in successive stages of the decision-making process thus reducing demand, supply and context uncertainty levels especially for long term, non-reversible options.

3. A model of Cognitive and participative decision-making process with different uncertainty levels

The main characteristic of the proposed model (2/2):

- The model distinguishes **technical assessment**, **process management** and **public engagement** activities, specifying the interplay among them
- **Stakeholders** should be involved at the beginning of the “planning stage”, where problems, objectives, constraints and the “**rules of the game**” are discussed and agreed before any specific proposal/evaluation is considered.



3. A model of Cognitive and participative decision-making process with different uncertainty levels

(Cascetta et al., 2021)

3. A model of Cognitive and participative decision-making process with different uncertainty levels

Stakeholders participation in the decision-making process Involving stakeholders concerns, needs and values -*Two way communication process providing mechanism for exchanging information*

5 LEVELS:

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

STAKEHOLDERS
IDENTIFICATION

LISTENING -
STAKEHOLDERS MANAGEMENT

INFORMATION COMMUNICATION

CONSULTATION

PARTICIPATION

3. A model of Cognitive and participative decision-making process with different uncertainty levels

Benefits and risks of stakeholders participation

Benefits:


- Improving options and final output of the process
- Legitimate the planning organization and its choices
- Reduce uncertainty levels about stakeholders reactions
- Increase stability of decisions over successive governance cycles

Risks

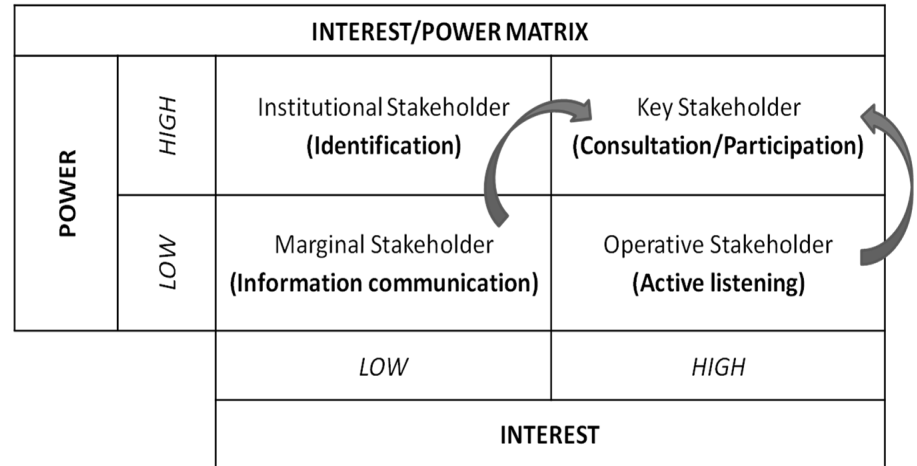
- Instrumental use for achieving particular predefined objectives
- Distortions in societal representation (e.g. youngs, minorities, vocal interests)

3. A model of Cognitive and participative decision-making process with different uncertainty levels

Public Engagement is a technical activity to be explicitly included in the process

 Stakeholders
Empowerment

the case of the High-Speed Rail link between Torino and Lyon, where the vivid protest of organized groups of citizens hindered the construction of the infrastructure for several years and induced major changes in the project. In this case, operative stakeholders (e.g., citizens) became the key stakeholders by empowering themselves.



Fonte: Gardner, et al. 1986

New possibilities for reaching underrepresented groups and improving the assessment of societal preferences .e.g. Participatory Value Evaluation (PVE), via internet and the media

3. A model of Cognitive and participative decision-making process with different uncertainty levels

Regulation of the feasibility project for transport infrastructure in Italy

(Dlgs, 56, 2017)

STEP 1



STEP 2



(D.Lgs.228/2011)

3. A model of Cognitive and participative decision-making process with different uncertainty levels

Public Debate regulation in Italy (*Art.22 Dlgs 56, 2017 and DPCM n.76, 2018*)

Mandatory public debate: projects, with a cost equal to or greater than 100 million euros, which concern the construction of e.g.: motorways, railway lines, port and airport infrastructures, hydroelectric dams, cultural/ sporting/scientific,/ tourist infrastructures, dumps, incinerators, landfills

3. A model of Cognitive and participative decision-making process with different uncertainty levels

Public Debate regulation in Italy (*Art.22 Dlgs 56, 2017 and DPCM n.76, 2018*)

I° step	Design (3 months)	The project of the decision-making process, drawn up by the person in charge of the public debate, is approved by the proponent of the work after consulting the National Commission
II° step	debate (4 months)	<p>The debate formally begins with the publication of the project dossier prepared by the proponent, on the website of the debate. Typically, the debate is characterized by:</p> <ul style="list-style-type: none"> • information meetings • thematic in-depth meetings • work tables and discussions <p>At the end of the debate, the commission presents a report containing:</p> <ul style="list-style-type: none"> • the description of the progress of the debate • the description of the themes • the description of the open and most problematic issues
III° step	Conclusion (3 months)	<p>A following the final report of the public debate, the proponent of the project presents his own report in which he specifies:</p> <ul style="list-style-type: none"> • whether to carry out the project or renounce it • what are the possible changes made to the project • which proposals were not accepted and why

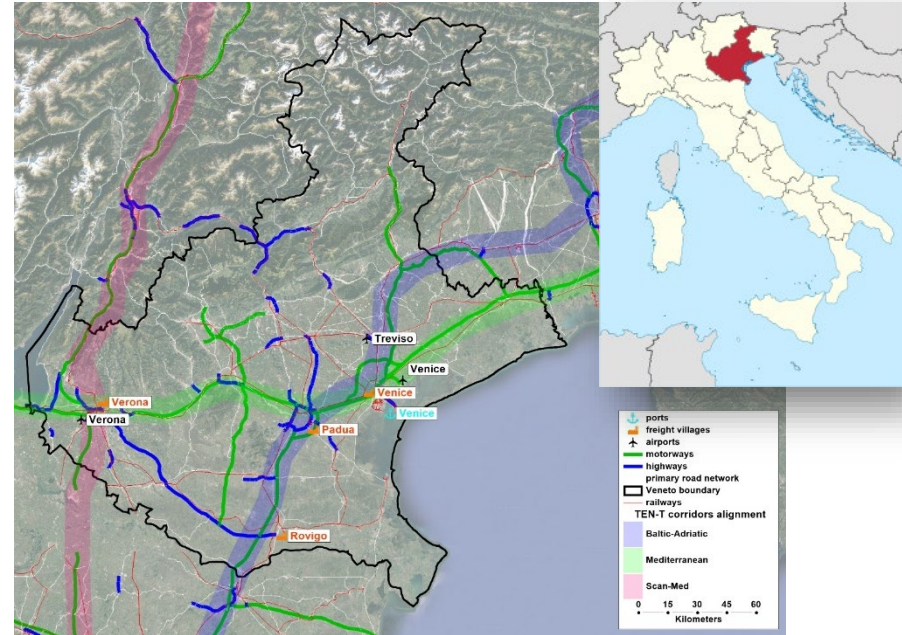
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4. An application to the Regional transport plan of Veneto (Italy)

An **application** of participated cognitive planning to the Regional transport plan of Veneto :

all three components of the proposed process (technical assessment, decision-making process, and stakeholders' engagement) were implemented, without any significant drawbacks.



4. An application to the Regional transport plan of Veneto (Italy)

Planning decisions

long-term invariants and options, subdivided into two further categories:

- project/policy reviews: interventions (projects or policies) interventions inherited from past transportation planning, not implemented or still under construction (invariants)
- feasibility studies/analyses: related to actions stated in the new regional transport plan, still without a corresponding project

short-term invariants and options: most actions falling within this category are i policies,

4. An application to the Regional transport plan of Veneto (Italy)

An **application** of participated cognitive planning to the Regional transport plan of Veneto :

The lesson learned (1/2)

1. the overall process was promoted and supported by a very efficient and committed regional administration which was an absolutely necessary condition for the implementation of the proposed decision-making model.
2. Regional community used to public debate (e.g. Venice lagoon protection barriers , big ships etc)
3. stakeholders' engagement (also via internet/media with feedback) useful also in managing uncertainty (e.g. stakeholders were able to identify additional uncertainty sources in future scenarios related to not easily recognizable social, economic, and environmental "local" variables influencing projects dealt with in the plan).

4. An application to the Regional transport plan of Veneto (Italy)

An **application** of participated cognitive planning to the Regional transport plan of Veneto :

The lesson learned (2/2)

4.the objective distinction between invariants and options was very useful in defusing conflicts about specific choices, especially infrastructures, postponing related decisions after agreed feasibility studies while recognizing the request (whenever consistent with overall strategies) as needing to be addressed.

5.the invariant/options and long-term/short-term framework enabled Veneto Regional administration to be flexible and robust with respect to medium –to –high uncertainty levels explicitly recognized and, at the time of the plan (2019)

Conclusions and recommendations

The new role of quantitative methods for design and evaluation in participated processes : from normative to cognitive

The traditional roles of quantitative methods is to support the analysis of the current system , the design of possible action scenarios ,the simulation of their impacts and their comparaison

Conclusions and recommendations

In cognitive planning there are new requirements :

- identification and modeling of **impacts relevant to stakeholders** and decision-makers;
- processing and presentation of **results for non-experts**;
- assessment methods allowing the evaluation of **quantitative and qualitative impacts for different actors** (e.g. vertical and horizontal equity, levels of consensus);
- **ex-post** analyses as **case studies** ;
- new assessment **tools for high uncertainty levels decisions under** (scenario discovery , minimal regret etc;)
- estimation of responses to **nudging policies**.

Conclusions and recommendations

Indications for policies

- Define transport planning explicitly as a decision-making process
- Introduce public engagement in planning and design regulations
- Introduce and regulate the “feasibility project” as the connection between planning and design
- Enlarge the scope of plans/project evaluation to include qualitative variables such as equity and consensus measures

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