CBA of Mega projects: some teachings from the MOSE project

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Summary

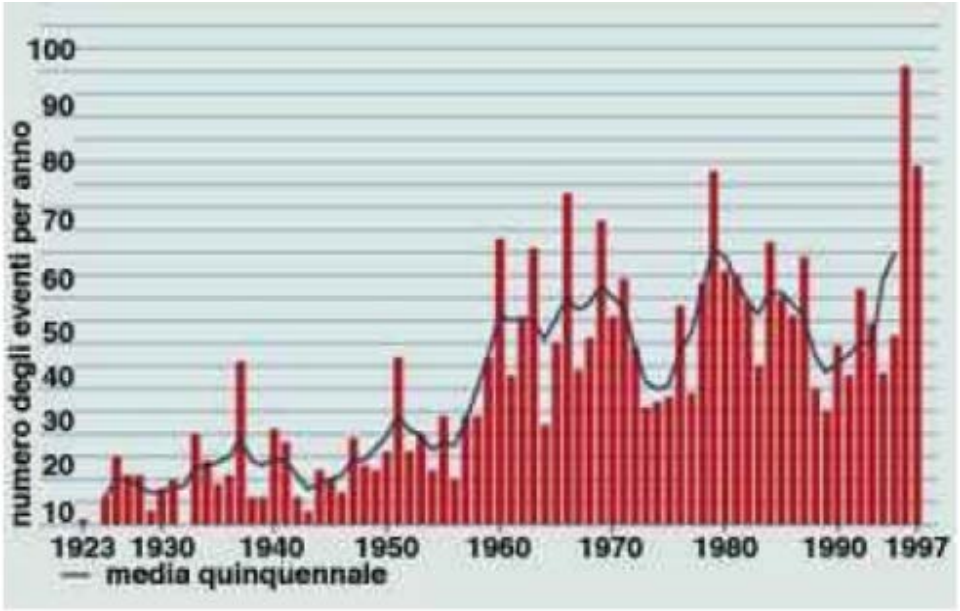
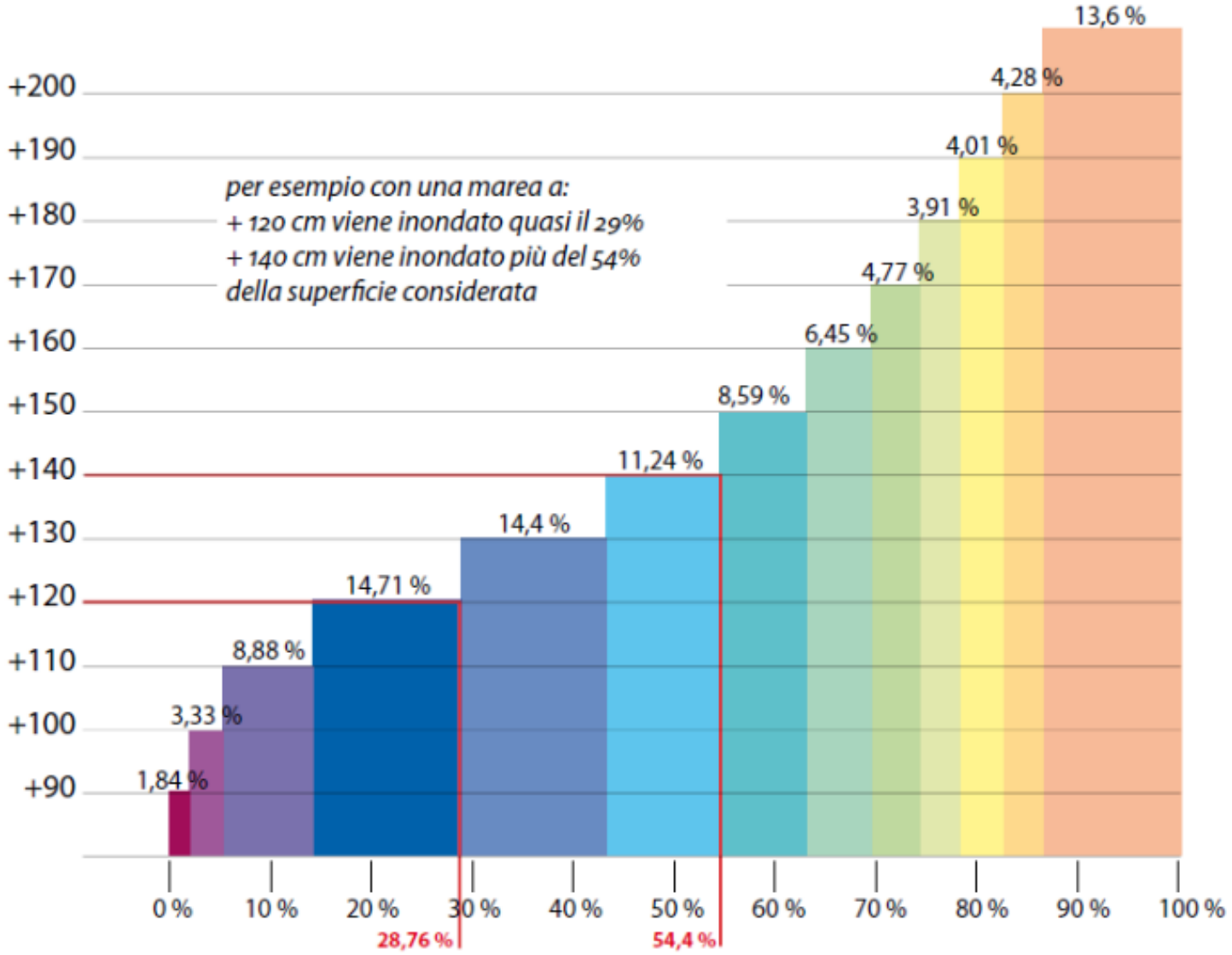


***Figura 2**: eventi di marea uguali o maggiori di +80*
(fonte: Comune di Venezia - Ufficio Maree)

Acqua Alta



Various levels of Acqua Alta

Venezia altimetria
Comune di Venezia
Istituzione centro previsioni e segnalazioni maree
In collaborazione con Insula spa
a cura di Leonardo Boato, Paolo Canestrelli, Luisa Facchin e Rudj Todaro
aggiornamento 2009 Altimetria Insula

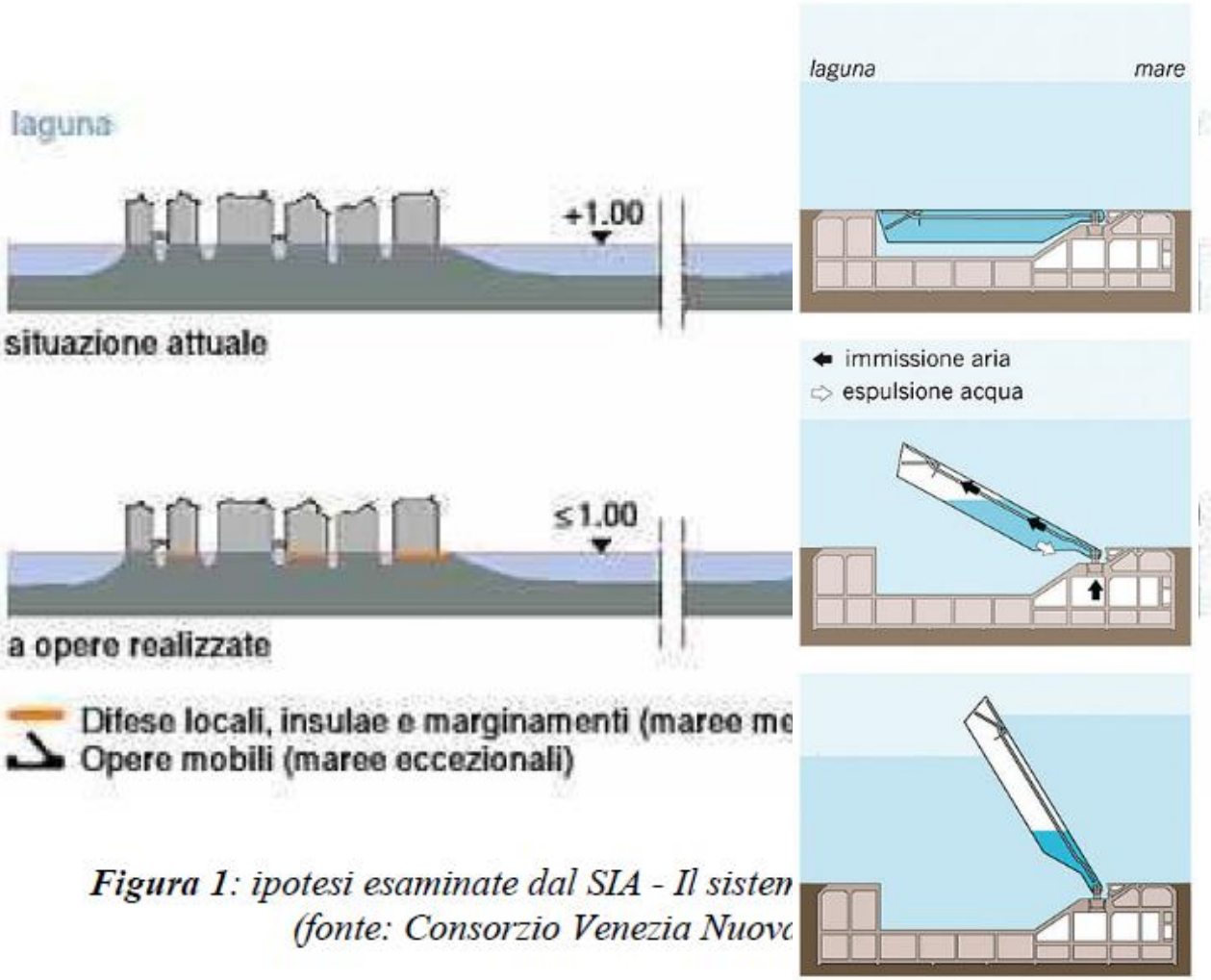


Figura 1: ipotesi esaminate dal SIA - Il sisten
(fonte: Consorzio Venezia Nuov

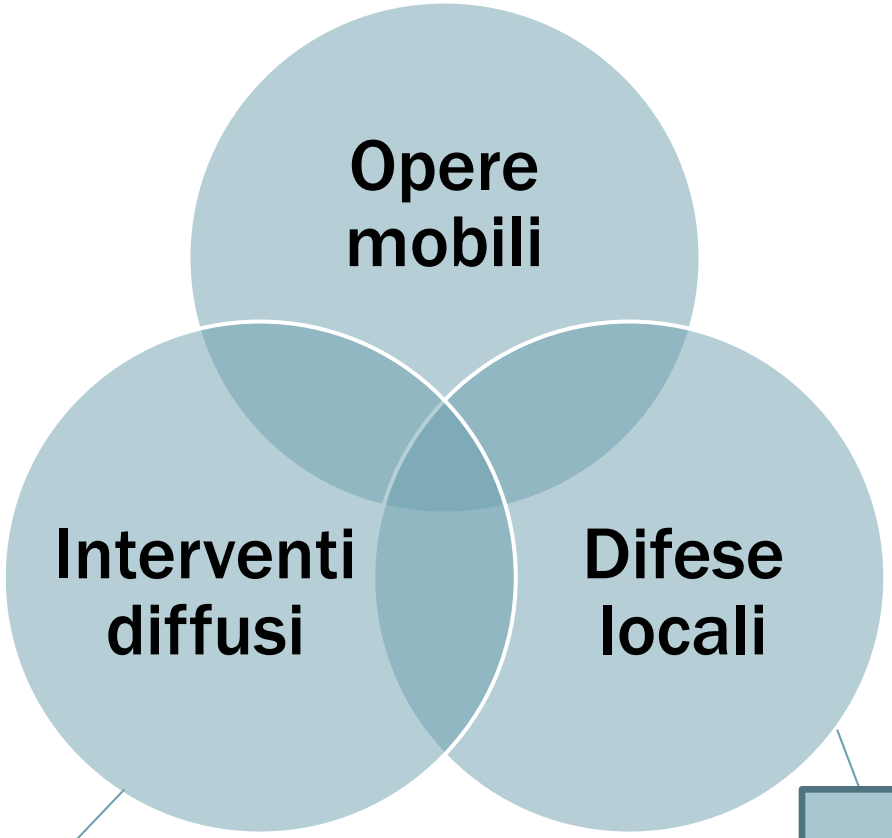
MOSE : principle

Mobile gates + Local defences

A set of interventions

- Opening of the fish farms,*
- Reduction of water depth -10, -12, -8 at the inlets LMC*
- Reconstruction of velme, barene e dossi*
- Closing of the straight section of the Malamocco Marghera canal and reopening of the Fiesolo canal
- Changes in the orientation of the external dikes in the inlets.

Comune di Venezia 1998, p.II 168



110 cm

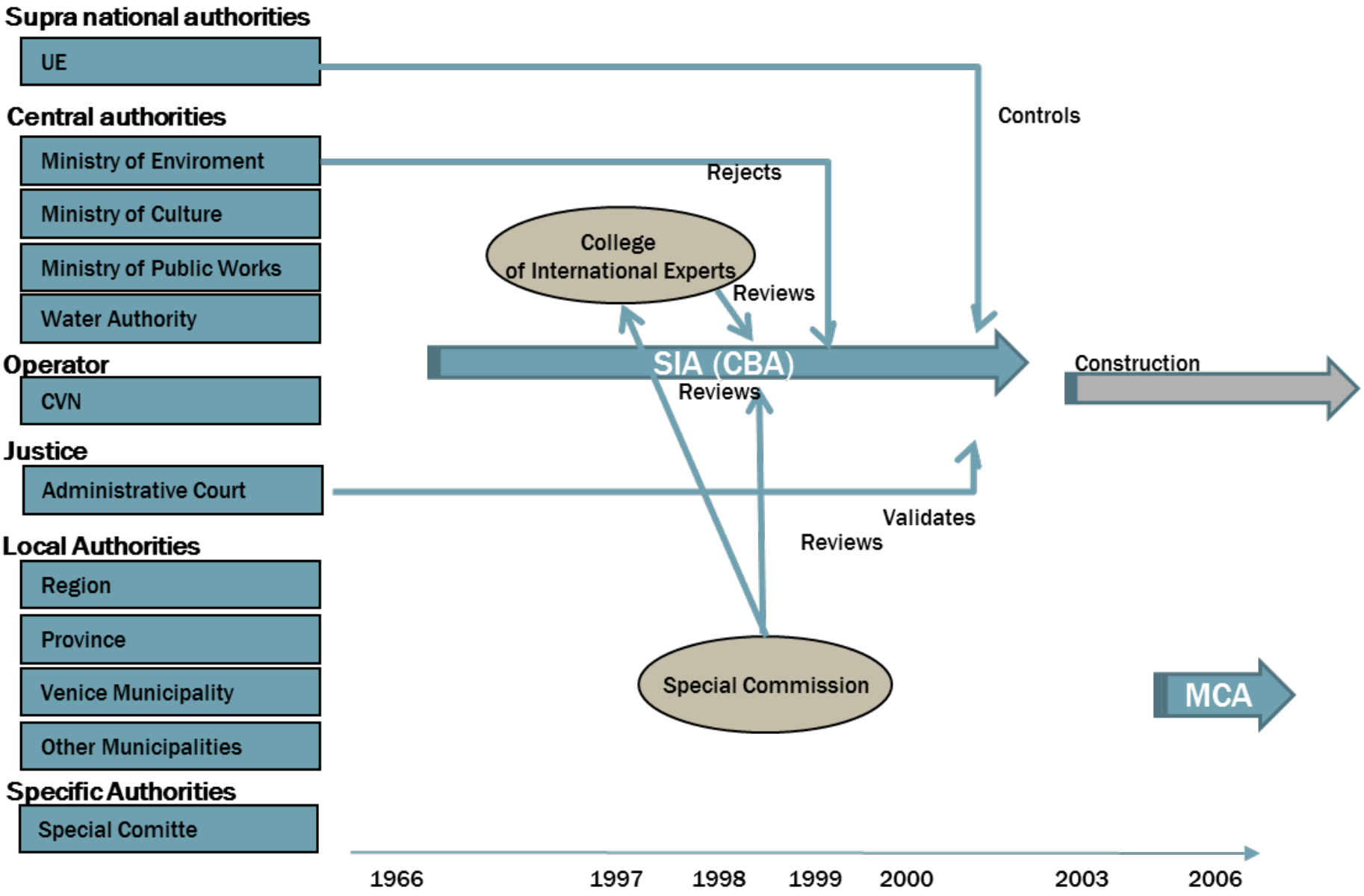
Fonte : Nostra elaborazione su base Comune di Venezia p/162

Summary

I. Introduction: high tides and MOSE project

II. Extrinsic limitations

III. Intrinsic limitations


Supra national authorities
UE
Central authorities
Ministry of Enviroment
Ministry of Culture
Ministry of Public Works
Water Authority
Operator
CVN
Justice
Administrative Court
Local Authorities
Region
Province
Venice Municipality
Other Municipalities
Specific Authorities
Special Comitte
Controls
Rejects
College
of International Experts
Reviews
SIA (CBA)
Reviews
Construction
Validates
Reviews
Special Commission
MCA
1966
1997
1998
1999
2000
2003
2006

The search for an independent evaluation

limits

- CBA made by promoter
- Lack of publicity

warranties

- External experts
- Scrutinized by
  - Colleggio internazionale
  - Commissione del commune di Venezia
  - Ministero
  - Tribunali

Anchoring bias

CBA legitimized ???

- Institutionally : yes
- General public : ?

CBA outcome (mrd Lire 1998)

	Discount rate = 5%			Discount rate = 3%		
	Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C
Costs of the project	**3400**	**3400**	**3400**	**3900**	**3900**	**3900**
Benefits (avoided high water costs)	**2980**	**3550**	**4480**	**4050**	**5000**	**6650**
Avoided short-term costs	390	660	1200	670	1200	2200
Avoided long-term costs	2590	2890	3280	3380	3800	4450
Lagoon shoreline	*230*	*280*	*340*	*380*	*480*	*580*
Low water after flooding	*330*	*330*	*490*	*400*	*400*	*620*
Salt aggression	*1780*	*1830*	*1890*	*2300*	*2400*	*2550*
Drainage system	*200*	*370*	*460*	*230*	*420*	*550*
Others	*50*	*80*	*100*	*70*	*100*	*150*
Net Present Value	**-420**	**150**	**1080**	**150**	**1100**	**2750**
Benefit/cost ratio	**0.88**	**1.04**	**1.32**	**1.04**	**1.28**	**1.71**
High water costs without project	**3530**	**4170**	**5200**	**4660**	**5680**	**7450**
Percentage high-water costs avoided by the project	**85%**	**85%**	**86%**	**87%**	**88%**	**89%**

Table 6. Costs and benefits of the mobile gates project. The costs are the sum of the present value of the construction costs of the mobile gates, of the maintenance costs and of the costs of the "insulae" project

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III. Intrinsic limitations

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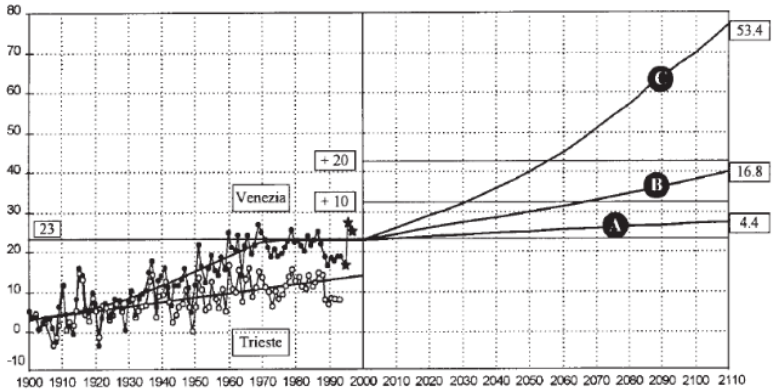
- General modelling approach
- Some visible limitations
- “Conventional” and “banalist” use of CBA
- Defocalisation

Discretisation

- **Discretisation**

1 - Sea rise

Figure 1. Sea-level rise scenarios and comparison with measured levels in the past century (reproduced from EIS, Section C, Vol.1, Figure C3.1.2.1, page 187).The star marks in the record of Venice indicate the most recent measures (from Cecconi, Canestrelli, Corte and Di Donato, 1998)



2 - Impact on mobility

3 - Damages to stored goods

- **Dose response function**

1 – *Natura non fecit saltum*

2 – Arbitrarietà

3 – Fuorviante

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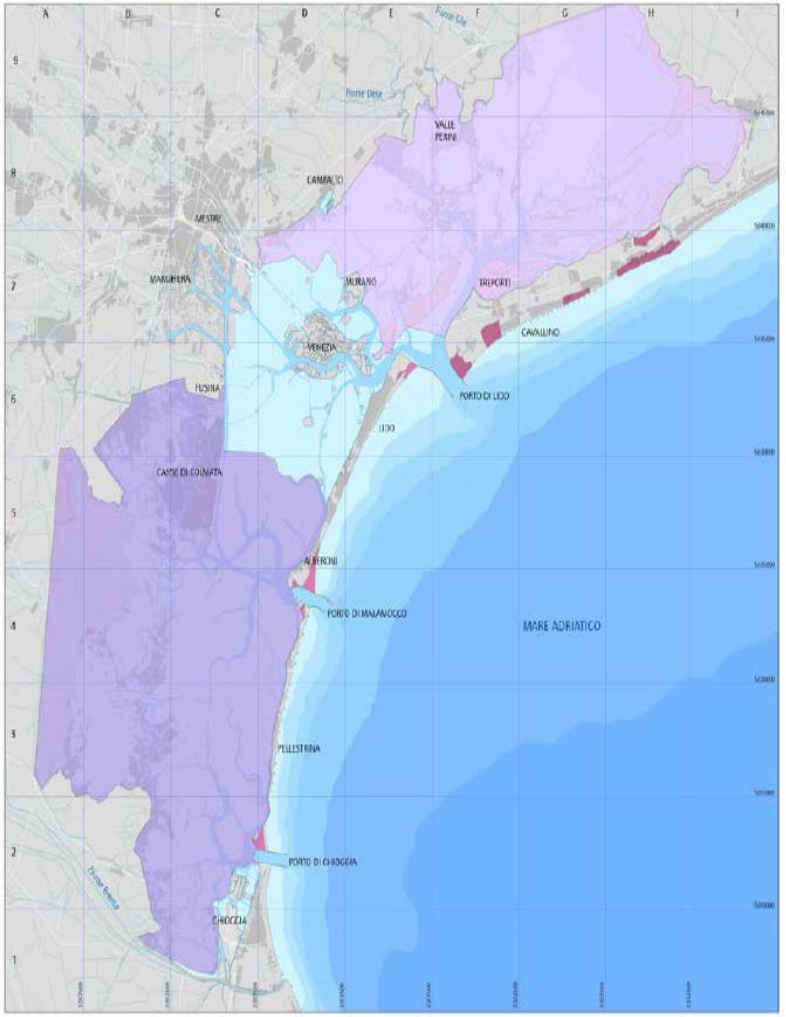
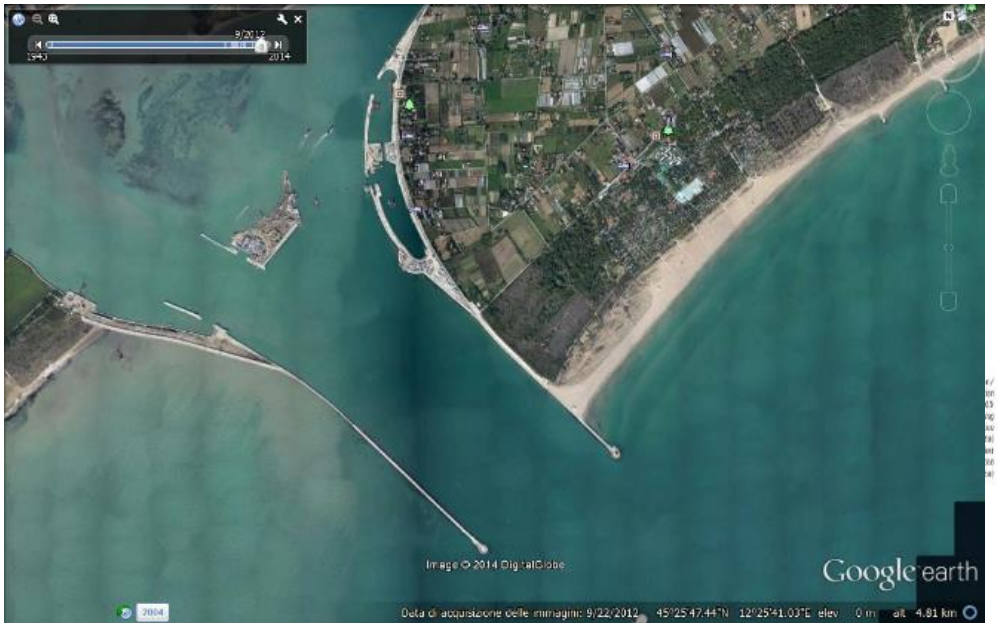
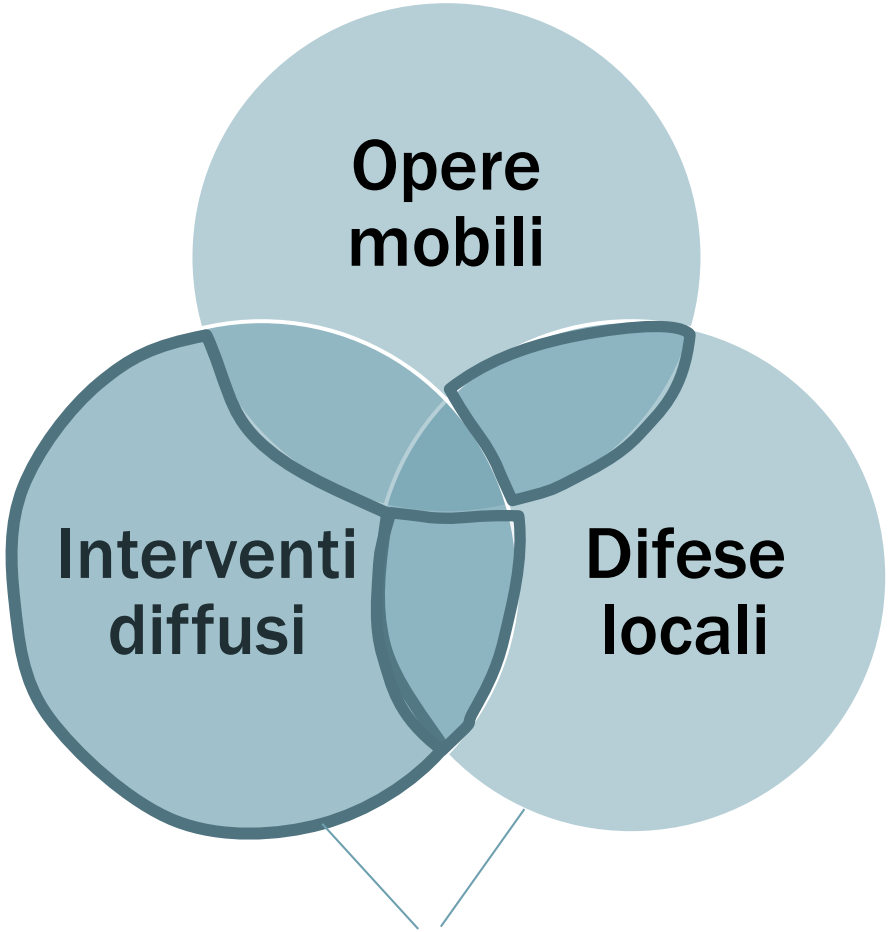
Some items missing

- Costs for harbour activity
- Costs for reduced touristic incomes
- Tourist
  - Fontini et al 2010
  - AA > 120 cm reduces presence of tourists in Venice by 3516 units. (t=1,68 R2 = 0,58, months used as controls)
- Cost of damages to ZIC





Scenario definition



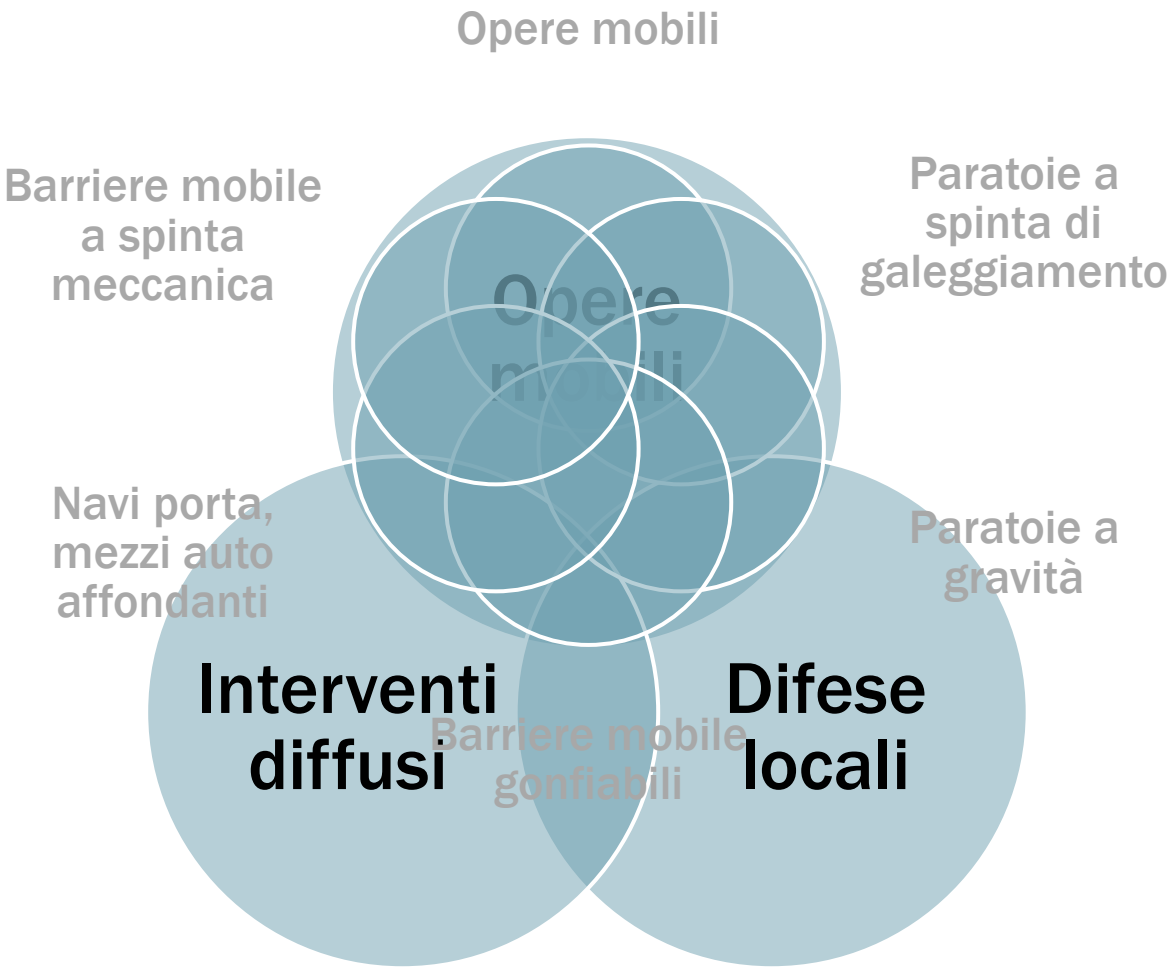
Dovrebbero essere nello sc. di riferimento

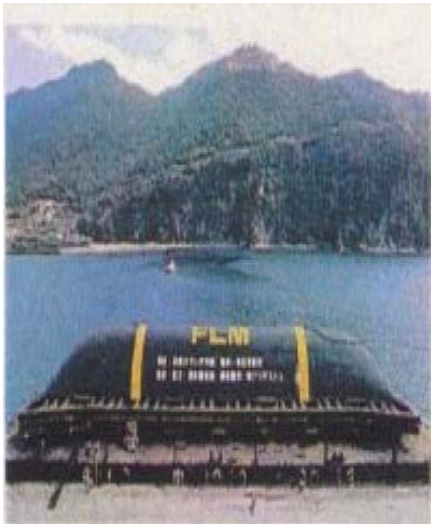
Vs.

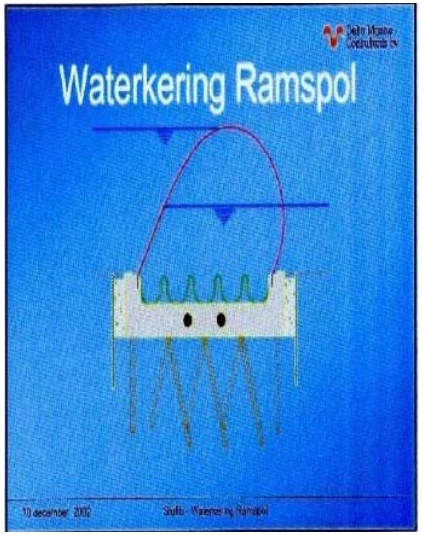
"Situazione attuale" (p. 162)
o
"opzione 0": "solo interventi in corso" (p. 165)

Fonte : Nostra elaborazione su base Comune di Venezia p.162 e 168

Definizione of alternative scenarios







- Nagasaki e Ramspol (NL)

Risk and uncertainty

- Failure or catastrophe
  - (Jonkmann, et al. 2004) NL : evaluation incl. probability of dike failure
- Discrete representation of uncertainty
  - Limits technical possibilities of analysis

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“Conventional”, “banalist” use of CBA

- GE vs. PE
- Modern CBA (Drèze and Stern) neglected
- Arbitrary set of markets
  - No known definition of “standing”
- Old fashioned view of actualisation

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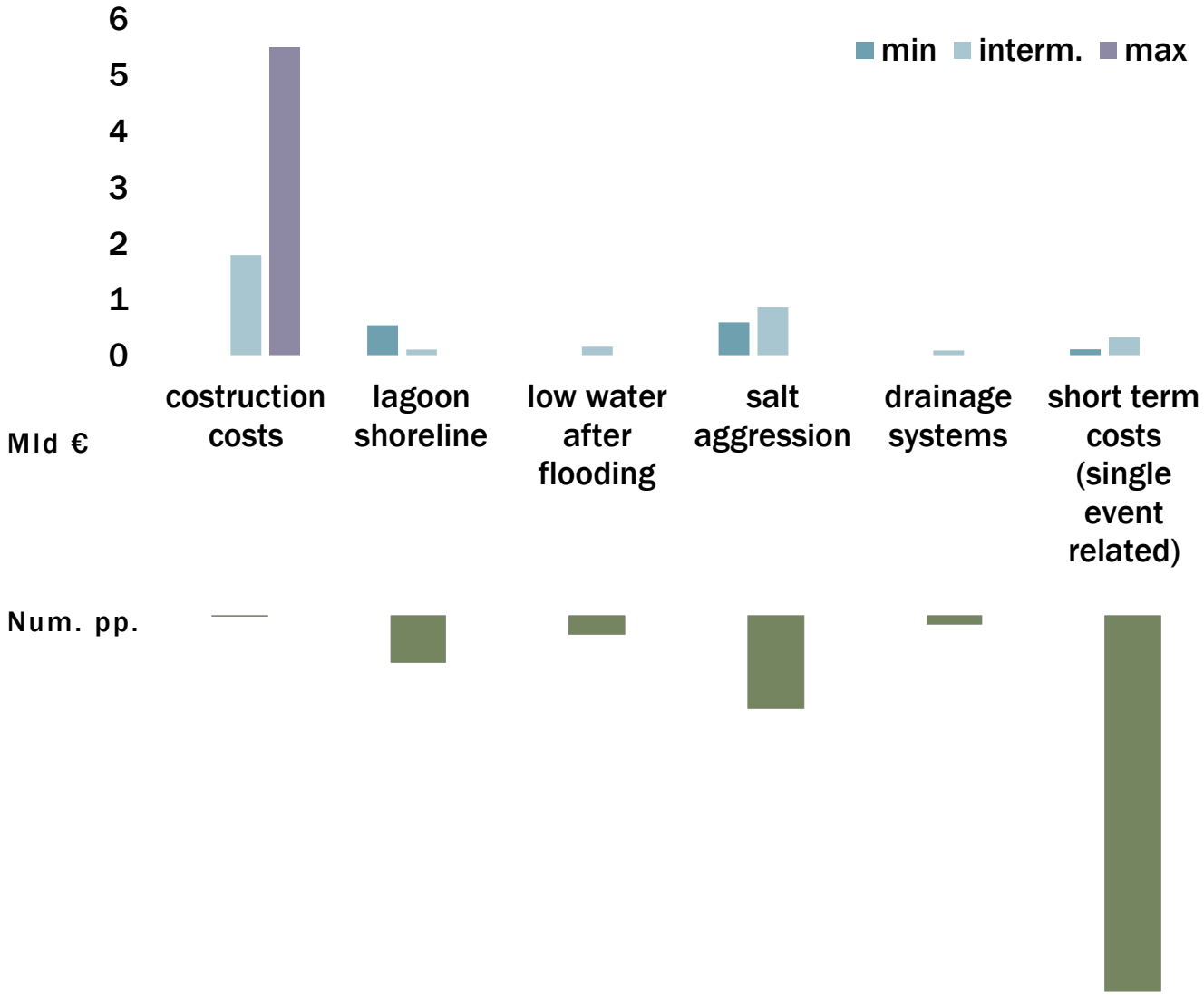
Defocalisation

- Quotidianism
  - Concentrates on tangible
    - Damage to stored goods
  - No evaluation of environmental externalities
    - Compensation measures
  - Close to direct users experience
    - Maintenance costs
    - Mobility hindrances
    - Other techniques neglected : hedonic pricing
- Defocalisation …

Rilevanza valutativa (miliardi €) e sforzo analitico

Risultati provvisori



Cost ingenuity pseudo neutralism

The construction cost of the mobile gates (as reported in the EIS) is 3700 billion lire. The construction phase (including the preparation of the final design

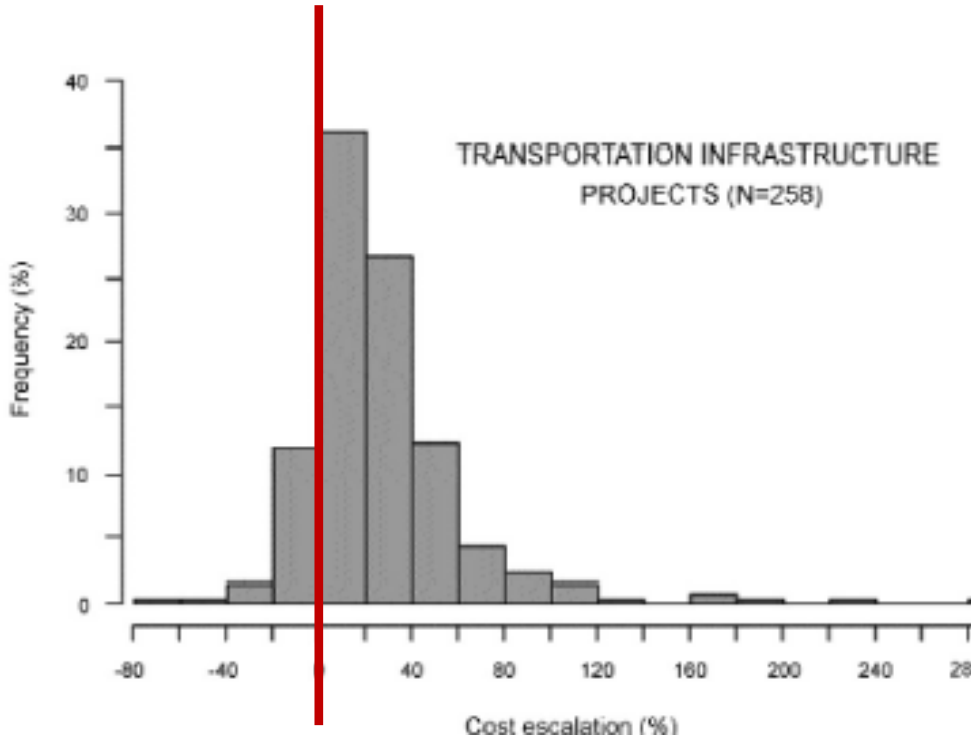
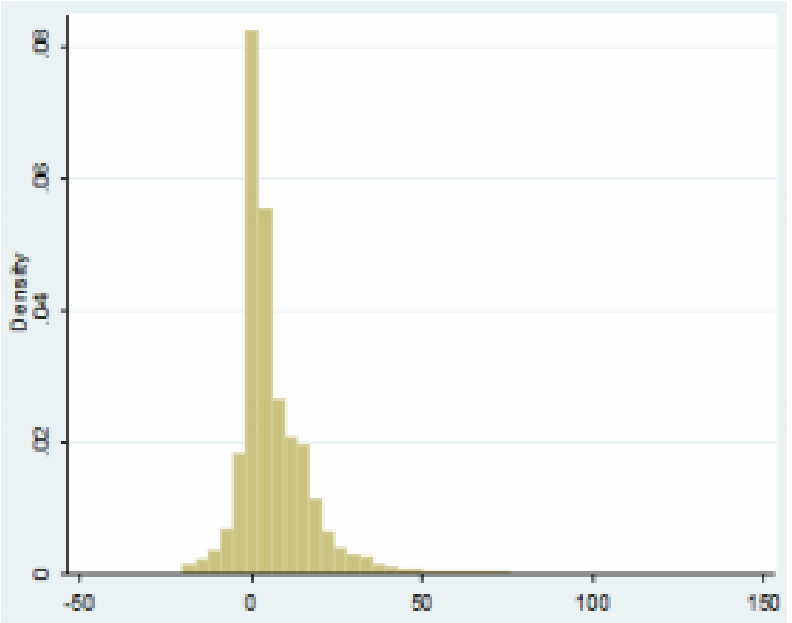


Figure 4.1 – Prevalence of Cost Escalation in Flyvbjerg et al. (2002) Optimism Bias Study
Table 4.2 – Average Cost Escalation by Mode in Flyvbjerg et al. (2002) Optimism Bias Study

1.a Distribuzione degli scostamenti dei costi



Fonte: elaborazioni su dati Avcp, periodo 2000-07.

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Table 0: Applicable capital expenditure optimism bias uplifts

Category	Types of projects	Applicable optimism bias uplifts	
		50% percentile	**80% percentile**
Roads	Motorway Trunk roads Local roads Bicycle facilities Pedestrian facilities Park and ride Bus lane schemes Guided buses on wheels	**15%**	**32%**
Rail	Metro Light rail Guided buses on tracks Conventional rail High speed rail	**40%**	**57%**
Fixed links	Bridges Tunnels	**23%**	**55%**

Correction factors for costs

Source: Flyvbjerg, Bent & COWI (2004), "Procedures for dealing with Optimism Bias in Transport Planning: Guidance Document", The British Department for Transport, London, June 2004.

$$LogY_i = \beta_0 + \sum_{k}^{K} \beta_k LogX_{i,k} + e_i \qquad (3)$$

Y_i = Costs Overrun Ratio of project i

X_1 = Average annual interest rate change over construction period

X_2 = Annual interest rate change

X_3 = Project construction duration

X_4 = Investment ratio of private sector in total project funding

X_5 = Investment ratio of federal government in total project funding

X_6 = Private COR bearing

X_7 = Public-Private COR risk bearing (a dummy variable)

X_8 = Projects' budget

X_9 = Project's duration

e_i = Error terms

K = number of explanatory variables

The dummy variables X_6 and X_7 have the value of 1 if both sectors bear the risk; and the value of 0 if only one sector does so.

Berechman e Wu 2006

Cost overruns Risk Analysis in Transportation Infrastructure Investments

Tavola 8

Scostamenti di costo

	(1)	(2)	(3)	(4)
Procedura aggiudicazione				
Asta AB		-3.023	-3.836	-2.882
		(1.110)***	(1.214)***	(1.256)**
Asta SR		0.874	-1.021	0.742
		(2.692)	(2.859)	(2.943)
Negoziazione	0.034	-2.96	-4.229	-2.917
	(0.416)	(1.192)**	(1.445)***	(1.350)**
Caratteristiche del lavoro				
log(Prezzo di riserva)	0.463	0.382	0.441	0.232
	(0.167)***	(0.171)**	(0.250)*	(0.202)
Manutenzioni ordinarie	1.273	1.287	1.813	0.544
	(0.318)***	(0.317)***	(0.472)***	(0.350)
Restauri opere speciali (OG2)	2.227	2.244	1.930	2.127
	(0.446)***	(0.447)***	(0.783)**	(0.468)***
Strade, autostrade e ponti (OG3)	-0.211	-0.219	-0.406	-0.080
	(0.293)	(0.292)	(0.437)	(0.304)
Dummy per altri OG e OS	SI	SI	SI	SI
Tipologia di appalto				
Appalto integrato	2.583	2.398	1.950	1.440
	(0.532)***	(0.528)***	(0.664)***	(0.609)**
Progetto affidato terzi	-0.190	-0.187	-0.803	0.149
	(0.268)	(0.267)	(0.414)*	(0.297)
Progetto aggiudicato terzi	-0.784	-0.774	-1.699	0.044
	(0.334)**	(0.333)**	(0.475)***	(0.378)
Caratteristiche della SA				
Provincia	-2.422	-2.444	-0.878	
	(0.666)***	(0.666)***	(1.159)	
Comune	-2.452	-2.518	-0.75	1.961
	(0.613)***	(0.612)***	(1.083)	(0.473)*
Concessionario di rete	-3.517	-3.425	-1.464	
	(1.088)***	(1.088)***	(1.53)	
Dummy per ogni tipo di SA	SI	SI	SI	NO
Dummy Valle d'Aosta	11.175	12.192		8.161
	(2.536)***	(1.882)***		(1.507)***
log(Popolazione)				0.693
				(0.100)***
Dummy per ogni regione	SI	SI	SI	SI
Costante	SI	SI	SI	SI
Osservazioni	10468	10468	4973	7844
R^2	0.03	0.03	0.03	0.04

Standard errors robusti in parentesi. Significativita': * 10%, ** 5%, *** 1%.

La rinegoziazione dei contratti di lavori pubblici: un'analisi teorica e empirica,

F. Decarolis e G. Palumbo

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Conclusions for transport economics

- Quotidianism
  - E. Weil
- Use of “conventional” approach
- Risk and uncertainty
- Pseudo neutralism of cost ingenuity main cause of distortion

Thank you for
your attention