

Critical drivers of mega projects success and failure

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Prof. Dr. Mladen Radujkovic (CROACIA)

- Catedrático (full profesor) de Project Management y Construcción Management en la Universidad del. Zagreb en Croacia
- Presidente del Consejo de Delegados (IPMA CoD Chair) de la International Project Management Association IPMA.
- Consultor de Proyectos, programas y portafolios de proyectos complejos a nivel local y regional.
- Ha publicado mas de 200 documentos y ha hecho presentaciones en mas de 50 eventos internacionales a nivel mundial.
- Dentro de los últimos 30 años ha estado comprometido en actividades profesionales y ha hecho supervisión y consultoria para multiples proyectos relacionados con temas de investigación, turismo, agua, transporte, inversion y educación.
- Presidente de la Asociación Nacional IPMA en Croacia.





University of Zagreb, Croatia

346 years of tradition

29 Faculties

about 4,000 bachelor students/year

3 Art Academies

about 7,500 masters students/year

University Center for Croatian Studies

about 400 doctors of science/year

65.000 students

7,500 teaching and administrative

staff

1669.

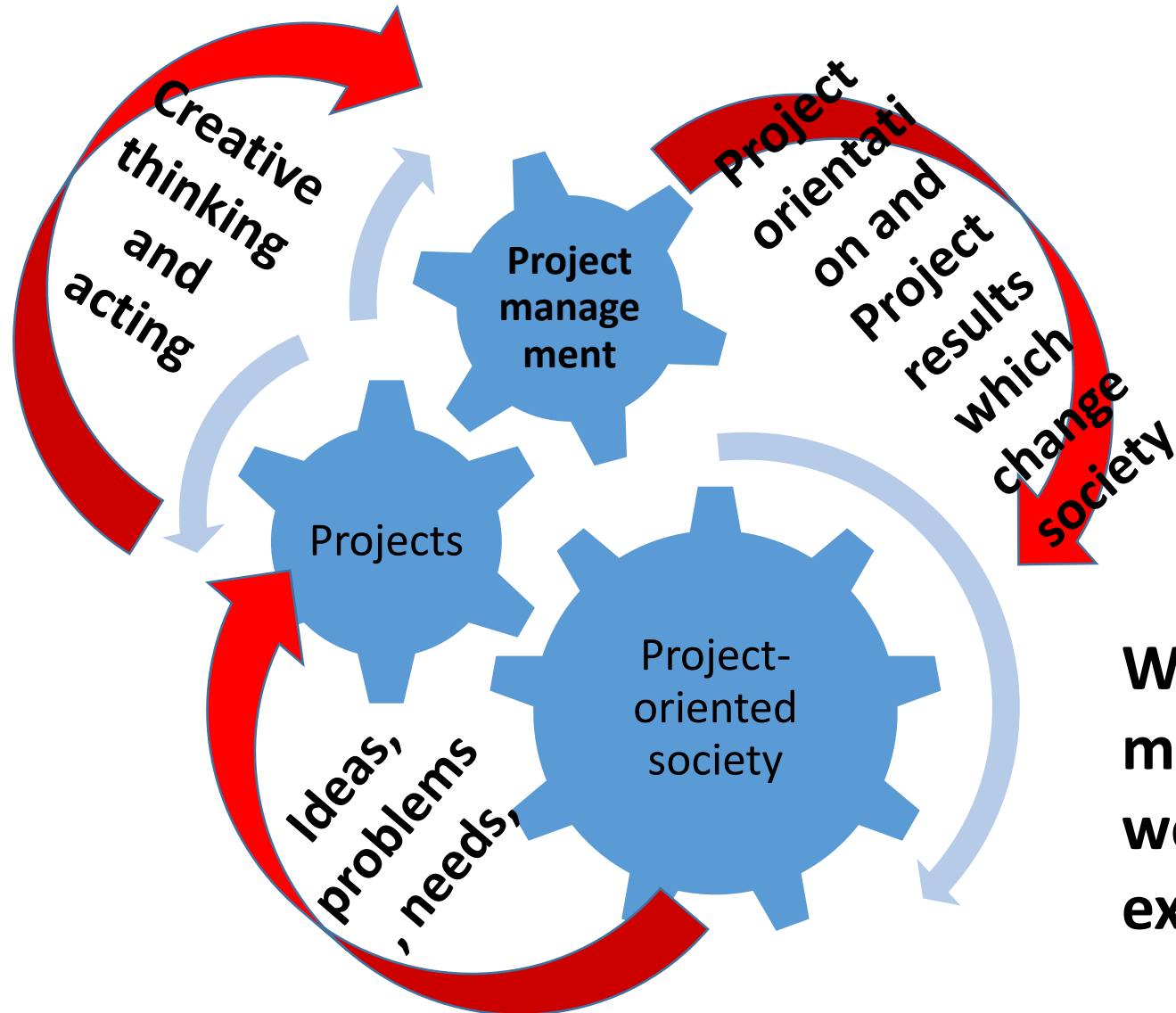
Leopold I Habsburg issued a decree granting the status and privileges of a university to the Jesuit Academy of the Royal Free City of Zagreb

Mega project : Definition & Relevance

- It is not just about money or business, it is much more,....
- The mega attribute can be associated to many features:
 - Mega change
 - Mega spending
 - Mega challenge
 - Mega complexity
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 - Mega shaping the future
- Mega project are key creators or destroyers of the
- Managing many megas'

Our World is the Project World

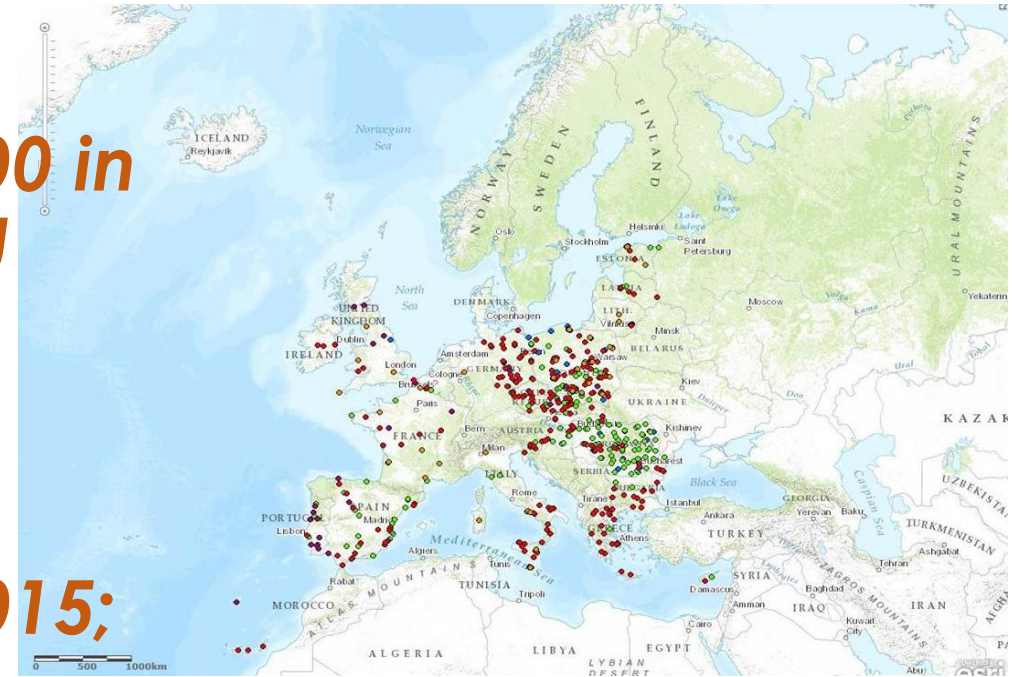
- 18,6 % of GDP or EUR 15,9 trillion, was invested in major projects (AEIS, 2010)
- 20% of gross GDP is spent on capital projects worldwide (McKinsey, Quarterly, June 2008)
- **The expectation is that it will grow to 20.7% of the GDP or 22,3 trillion in 2016. (8.600 EUR /year/person included all from newborn to senior) (AEIS, 2010)**
- 2006: 24.4 million project-oriented employees in projectized industries and 2016: 32.6 million (31% of them new employees since 2006). Equates to **1.2 Million jobs annually** (Anderson Economic Group, 2006.)



Without large and mega projects society we know would not exist

EU Megaproject policy 2007-2013 – increase in supporting

- ✓ over 1000 major projects in total;
- ✓ 850 major projects (650 approved, 200 in approval) with total cost: 173 bn € (EU grant: 85 bn €, <50%)
- ✓ 20% global economy is in projects
- ✓ 90 projects withdrawn/rejected
- ✓ still over 100 projects to come until 2015;
- ✓ (The private and locally financed megaproject are extra)



Megaprojects : The money and the society for mega change

- Mega project (industrial) - project with the final capital cost of more than 1 billion USD (cost of materials, construction, labour) (Merrow, 2011)
- Mega project (transport) - infrastructure investments with construction costs over \$ 1 billion USD (OMEGA, 2012)
- Mega project - an extremely large investment project that cost more than 500 million EUR or USD 1 billion (mega projects EU COST Action)
- **financial aspect is not the only one to be considered, because megaproject involve many stakeholders and influence millions of people within particular community**

Drivers for large projects and megaproject development

Type of driver	Characteristics
Political	To have evidences of politics in charge
Financial	To employ the capital
Social	To advance the society
Economic	To employ people and business
Technological	To develop and test new technology
.....

What differs mega project from the “standard” project

- Many **stakeholders and interests** involved, it influences the life many people
- **Lengthy duration**, especially at the beginning of a project
- The preliminary phases are **non-linear and iterative processes** through a series of episodes
- **Unpredictable risks** and problems arise in successive episodes
- **Complexity**, interest, significance, value at stake, uncertainty and ambiguity **require a different management approaches**
-

Mega project : The Failure Reporting

- **The PM profession is still in dilemma how to manage mega project and how to focus priorities.**
- **There are numerous reports dealing with mega projects, including those dealing with evaluation of success**
- **The most of reports provide evaluation based on short term perspective (time and cost)**



Megaprojects Cost Overruns

Project	Cost Overrun (%)
Suez Canal, Egypt	1,900
Scottish Parliament Building, Scotland	1,600
Sydney Opera House, Australia	1,400
Montreal Summer Olympics, Canada	1,300
Concorde Supersonic Aeroplane, UK, France	1,100
Troy and Greenfield Railroad, USA	900
Excalibur Smart Projectile, USA, Sweden	650
Canadian Firearms Registry, Canada	590
Lake Placid Winter Olympics, USA	560
Medicare transaction system, USA	560



Megaprojects Cost Overruns

Bank of Norway headquarters, Norway	440
Furka Base Tunnel, Switzerland	300
Verrazano Narrow Bridge, USA	280
Boston's Big Dig Artery/Tunnel project, USA	220
Denver International Airport, USA	200
Panama Canal, Panama	200
Minneapolis Hiawatha light rail line, USA	190
Humber Bridge, UK	180
Dublin Port Tunnel, Ireland	160
Montreal Metro Laval extension, Canada	160
Copenhagen Metro, Denmark	150
Boston–New York–Washington Railway, USA	130
Great Belt Rail Tunnel, Denmark	120



Megaprojects Cost Overruns

London Limehouse Road Tunnel, UK	110
Brooklyn Bridge, USA	100
Shinkansen Joetsu high-speed rail line, Japan	100
Channel Tunnel, UK, France	80
Karlsruhe–Bretten light rail, Germany	80
London Jubilee Line extension, UK	80
Bangkok Metro, Thailand	70
Mexico City Metroline, Mexico	60
High-speed Rail Line South, The Netherlands	60
Great Belt East Bridge, Denmark	50

The Reports on Mega Project Performance

Research EY (2014):

- 365 mega projects in oil and gas industry
- Mega projects: proposed investment > US\$1b
- 64% of the projects are facing cost overruns
- 73% of the projects are reporting schedule delays
- 35% of the mega-projects: made on time, and only 2% in the budget (EU COST, 2013)
- 65% of the mega-projects not achieving its objectives (Merrow, 2011)

Managing the infrastructure projects

- Flyvberg, Bruzelius and Rothengatten (2002)
 - **costs** were **underestimated** in **90%** of **projects**
 - the cost underestimation exists across 20 nations and 5 continents as **a global phenomenon** and has not decreased **over the past 70 years**
 - values of **overrun** are from **20% to 45%**
- **45.6%** of projects with **time overrun** and **31.5% cost overrun** on average (KPMG & PMI, 2013)
- Oil and gas **costs** approx. **grew by 46%** more than was estimated at the project start (Merrow, 2011)

Why mega projects fail ? (If they fail)

- Megaprojects are inherently risky due to long period of project cycle (idea – execution)
- There is no adequate PM competences in a particular mega-projects
- Stakeholders and interests in megaprojects are extremely complex and strong
- The influence of (scope, technology, ...) changes prevent to fix initial concept, and participants do not have balanced approach how to deal with
- There is strong tendency to hide data on particular megaproject performance, so no learning from past
- At the pre project phase there is strong optimism not based on facts, but rather on perceptions

Megaprojects : Dealing with Pitfalls

- Summary of Pitfalls (H. Priemus, European Planning Studies, Vol. 18., No. 7, July 2010)
 1. **Absence of adequate problem analysis** – favorization of particular solution
 2. **Lack of alternatives** – no options considered
 3. **Ambiguiities about the scope of the project** – finding the bestfit between inputs and output
 4. **Flawed process architecture** – no agreement about the process
 5. **Absence of functional program** – seldom there is well-organized functional program to set out needs (performance, values,..)

Megaprojects : Dealing with Pitfalls

5. **Cost benefit analysis problems** – i.e. indirect effects and impacts calculation in
6. **Contested information** – information that is explained in different way by different players
8. **Problems with land aquisition** –
9. **Nature of technology** – important choice, innovative, proven, new, ?????
10. **Changing market** – so many changes and influnces at the market, not predicted
11. **Political discontinuity and inconsistencies** – frequent changes done by party in power change
12. **Legislation change** – problem over long period

Mega project : Succes or Failure ?

- What is the proper ground for judgment of mega project success or failure ?
- There are many perspectives on that topic, not always coherent and sometimes disonant, despite dealing with the same project.
- The key challenge for mega projects:
 - Who is authorised to announce success or failure?
 - What is the ground for declaring success or failure?
 - Should we use the same approach for each mega project evaluation ?
 - ...????

And what is success ? A four perspectives

- 1. Management by the book: *iron triangle, controllability***
- 2. Product-oriented management: *end-result, fit-for-purpose***
- 3. Parent-oriented management: *project specific political or social factors***
- 4. Client-oriented management: *balancing between the needs of stakeholders***

So, which perspective the proper ground for evaluation ?

Each mega project should have own “formula” for success, and each formula includes all four perspectives, but

Management by the book: <i>iron triangle, controllability</i>	yes	Rank 2
Product-oriented management: <i>end-result, fit-for-purpose</i>	yes	Rank 1
Parent-oriented management: <i>project specific political or social factors</i>	yes	Rank 3
Client-oriented management: <i>balancing between the needs of stakeholders</i>	yes	Rank 4

Example

The direction for moving to success

➤ **All elements aligned :**

➤ vision, alliance, government, approval, management, ...

➤ **3D approval approach :**

➤ **Business – Society – Environment**

- Underestimated costs and Overestimated revenues (B),
- Overvalued development effects, (C)
- Underestimated environmental impacts (E).

➤ **Balanced stakeholder approach** : Balance of project pushing and controlling processes (better-bigger-cheaper vs. risk-change-constraint control)

➤ (Prof. Mladen Radujkovic – at Panama Canal Congress 2012.)

Mega projects in Transport (MTP)

- Decision-making for MTPs should include a **much wider set of complex considerations** than those traditionally associated with the project management criteria of the 'iron triangle'.
- The acceptance of MTPs as **'open systems'** with powerful **'agent of change'** functions necessitates, the need for such projects to be seen as **'organic' phenomena requiring time & space to evolve & adapt in response to changing contextual influences** ('happenstance') that exert themselves over the (often lengthy) project lifecycle.
- Faced with this, it is perhaps **unrealistic to expect that all aspects of project planning and delivery can be tightly controlled**. This implies necessity for decision-makers to adopt more holistic, flexible, robust planning & appraisal procedures **that incorporate periods of engagement with a wide range of project stakeholders from the earliest opportunity**.
- **The treatment of MTPs as 'adaptive systems'**, combined with the changing demands placed on such projects, creates major difficulties for their evaluation, making it *imperative* to ensure the proper framing of MTPs so as to enables appraisals to be based on a broad, fair & transparent foundation.
- **Source : UCL OMEGA CENTRE, A Center for Mega project in Transport and Development**

Mega project : Succes or Failure Factors Tips

- By recognizing factors which facilitate success and those which influence failure, management can focus its own activities, and all stakeholders can benefit from.
- There are several research / professional groups in Europe dealing with the success / failure topic for mega projects:
 - EU COST MEGAPROJECT,
 - NETLIPSE
 - OMEGA
 -
 - So as many from IFIs or local levels

Literature (theory)	Literature (empirical research)	Ω	NETLIPSE	Megaprojects EU Cost Action
<p>Wateridge (1995) – success factors, PM methodology</p> <p>Jugdev and Muller (2005) – stakeholders, success criteria</p> <p>Andersen et al. (2004, first Norwegian edition 1984) – reasons for success and failure</p> <p>Cooke-Davies (2002) – success factors, success criteria</p> <p>Dai, Wells (2004) – success vs PMO implementation</p> <p>Voetsch et al. (2005) success vs practice menadžmenta rizika na projektu</p> <p>Kerzner (2001, 2006) - PM maturity</p> <p>Flyberg (2009) – megaprojects success</p>	<p>Morris and Hough (1987) – success in projects</p> <p>Pinto and Slevin (1987) – critical factors of success</p> <p>Tatikonda, Rosenthal (2000) – success vs innovation</p> <p>PMO (2003) – possibilities vs PPP</p> <p>Kwak et al. (2006) – PM vs Six sigma methos</p> <p>Thomas and Mullaly (2008) – value of PM for organization</p> <p>Merrow (2011) – capital projects</p>	<ul style="list-style-type: none"> - MTP and as agents of change - open systems organic phenomena box - The context of MTF - the role of sustainable development - development of vision - Connection of MTF with stakeholders - lessons learned 	<ul style="list-style-type: none"> - customer and economic benefits of the project - the initial phase of the project - balance control and interaction among participants - open communications - open culture 	<ul style="list-style-type: none"> - Special Purpose Entities - external stakeholders - connectivity and performance characteristics megaproject - New approaches in learning the mega projects

The learnig from literature review

Success factors			
Clear Objectives	Front end review	Political leadership	Charismatic PM
Learning	Risk alocation	Information	Design
Pre-project plannin	External monitor	Communication	Training
Top management support	Plan	Community	Mission
Stakeholder satisfaction	Benefits		
Failure factors			
Strategy	Ineffective risk allocation	Closed communication	
Result	Closed-system decision making		Culture
Mission	Post failure reviews		Informations
Internal corporate mechanism	Underestimated context	Innovations	

Which characteristics associated with megaproject success and failure?

Source : EU Cost
action
Megaprojects ,
2015.

 Megaproject

GOOD MEGAPROJECT DELIVERY		BAD MEGAPROJECT DELIVERY	
	% certainty		% certainty
Have no protests from Environmental NGOs or the local population	99	Have delays incurred by a regulatory authority	97
Use SPEs for project governance <i>(to budget and to construction schedule)</i>	98	Have environmental NGOs objecting to them	97
Involve Environmental Activists ex-ante not ex-post	97	Receive fines from a regulatory authority	95
Are renewable energy projects	95	Use SPEs for project governance <i>(are late in planning schedule)</i>	90
Have the same nationality of client and contractor	92	Are nuclear energy projects	89

Key drivers for improving megaproject delivery performance : A stakeholder perspective

Source : EU Cost
action
Megaprojects ,
2015.

 Megaproject

Stakeholder groupings having a positive influence on megaprojects	Stakeholder groupings having a negative effect on megaprojects
<ul style="list-style-type: none">• principal contractors• national government• client/owner• financiers• project team• local government	<ul style="list-style-type: none">• principal contractors• local residents• environmentalists• regulatory agencies• suppliers• local government

Mega project : The Front End Phase

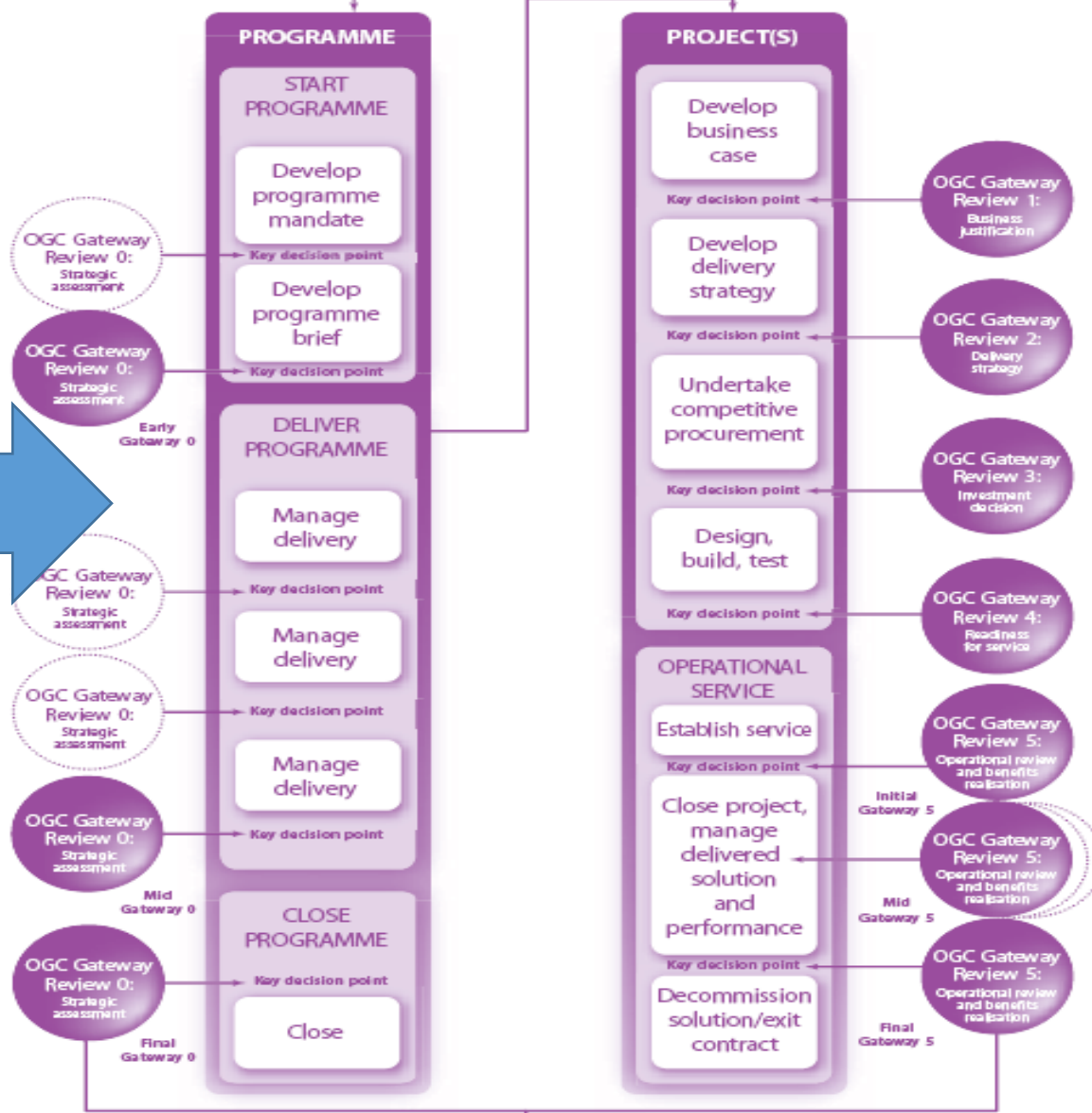
- Significant part of megaprojects are public projects
- There are too many initiatives for initiating such projects, following the needs and interests of different stakeholders, even if there is no proper timing or ground to do so
- It is government responsibility for setting the framework and the process for the each mega project approval
- “The gate model” – each mega project is subject for check in the early phase
- The authorization from the higher authority

Front-End Planning for Mega Project

- Early phase importance
- The UK model, the "**OGC Gateway Review Process** "
- **A similar model** was accepted completely by **Australia and New Zealand** (Crawford, 2009)
- The Norwegian model, "**Quality at Entry**" is compulsory procedure for major projects
- Canada introduced the Framework Policy for the **Governance of Major Public Infrastructure Projects by the Quebec government (2009)**

The wider context of the OGC Gateway™ Process

UK OGC Gateway Process



Programme review : Phase 0

Project review : Phase 1-5

Feeds into subsequent programmes

UK OGC Getway review

- Programme Reviews are carried out under OGC Gateway™ Review 0: Strategic assessment. A programme will generally undergo three or more OGC Gateway Reviews 0: an early Review; one or more Reviews at key decision points during the course of the programme, and a final Review at the conclusion of the programme.
- **Project Reviews are carried out under OGC Gateway Reviews 1-5;** typically a project will undergo all five of these Reviews during its lifecycle – three before commitment to invest, and two looking at service implementation and confirmation of the operational benefits. Project Reviews may be repeated as necessary depending on the size, scope and complexity of the project. A Review of a project must take into account the programme context within which the project is located, and possible inter-dependencies with other projects in the programme. The review will also indicate how far procurements are in alignment with strategic and policy objectives.

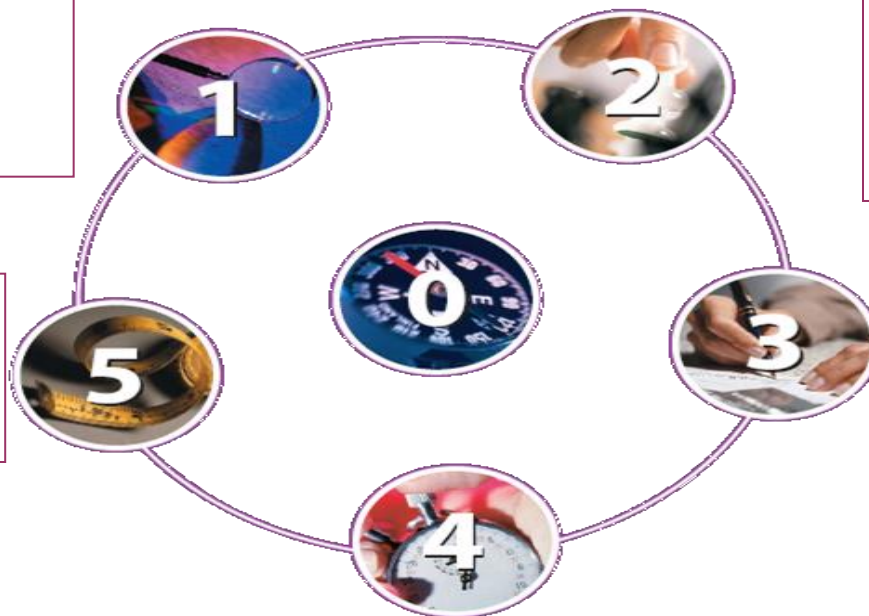
Gateway revision 0
Strategy

Gateway revision 1 :
Business case

Gateway revision 2:
Procurement & Delivery

Gateway revision 5:
Benefits

Gateway revision 3:
Feasibility & Decision



Gateway revizija 4:
Delivery

Norwegian model :The Royal Norwegian Ministry of Finance Quality Assurance Scheme for Major Investment Projects

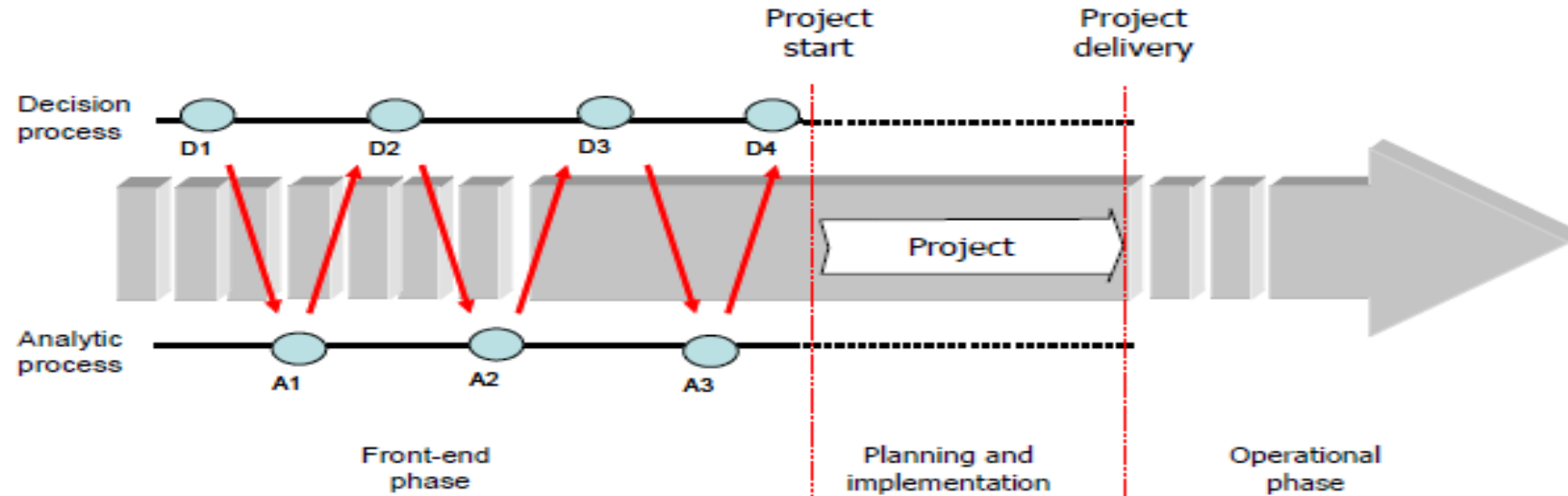
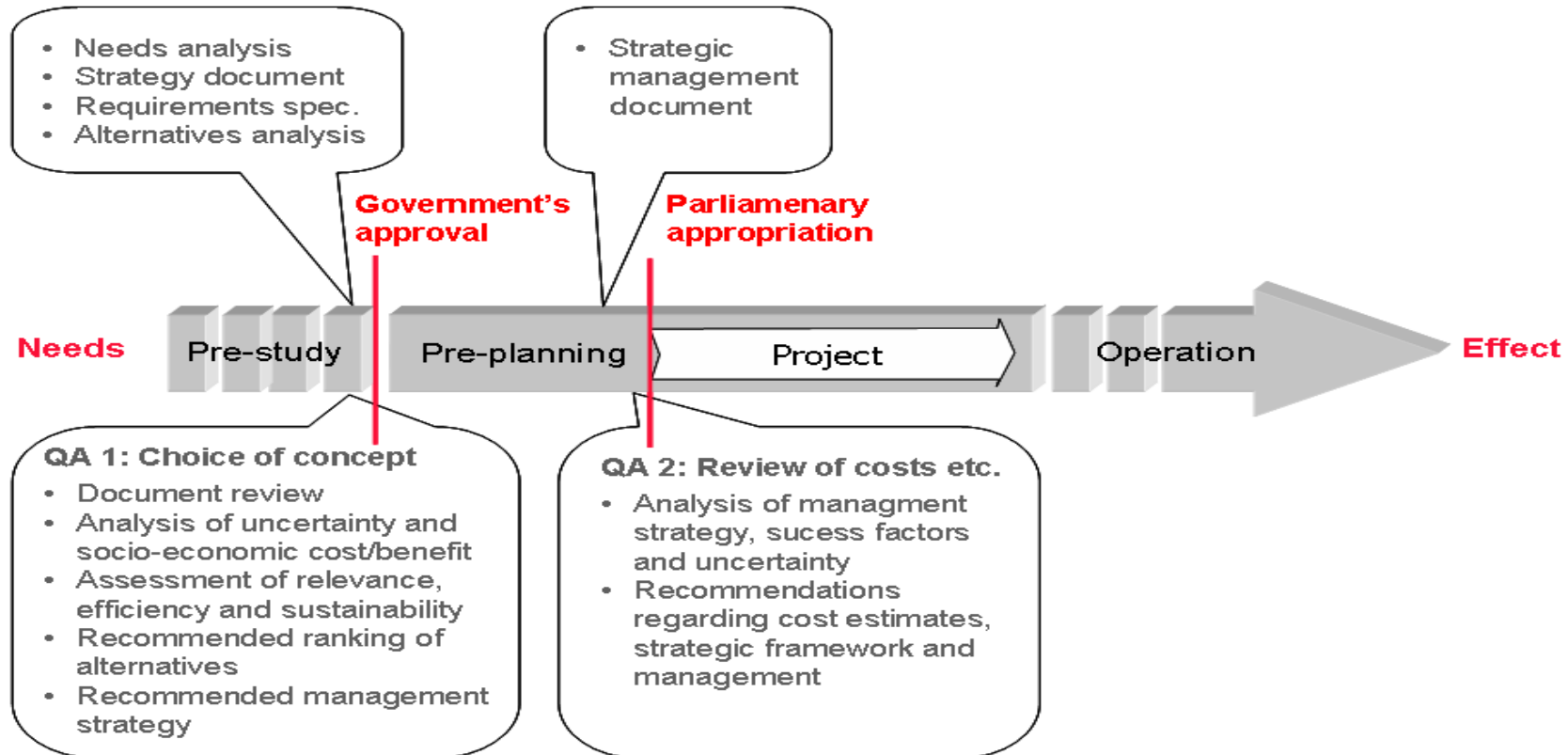


Figure 3 A model of technocratic decision making up-front in projects

1. Milestones and decision gates, 2. Political control by go / no go decisions
3. Ensure adequate basis for decisions, 4. focus on decisions in critical points, not details

Norwegian model : Scope of External Quality Review

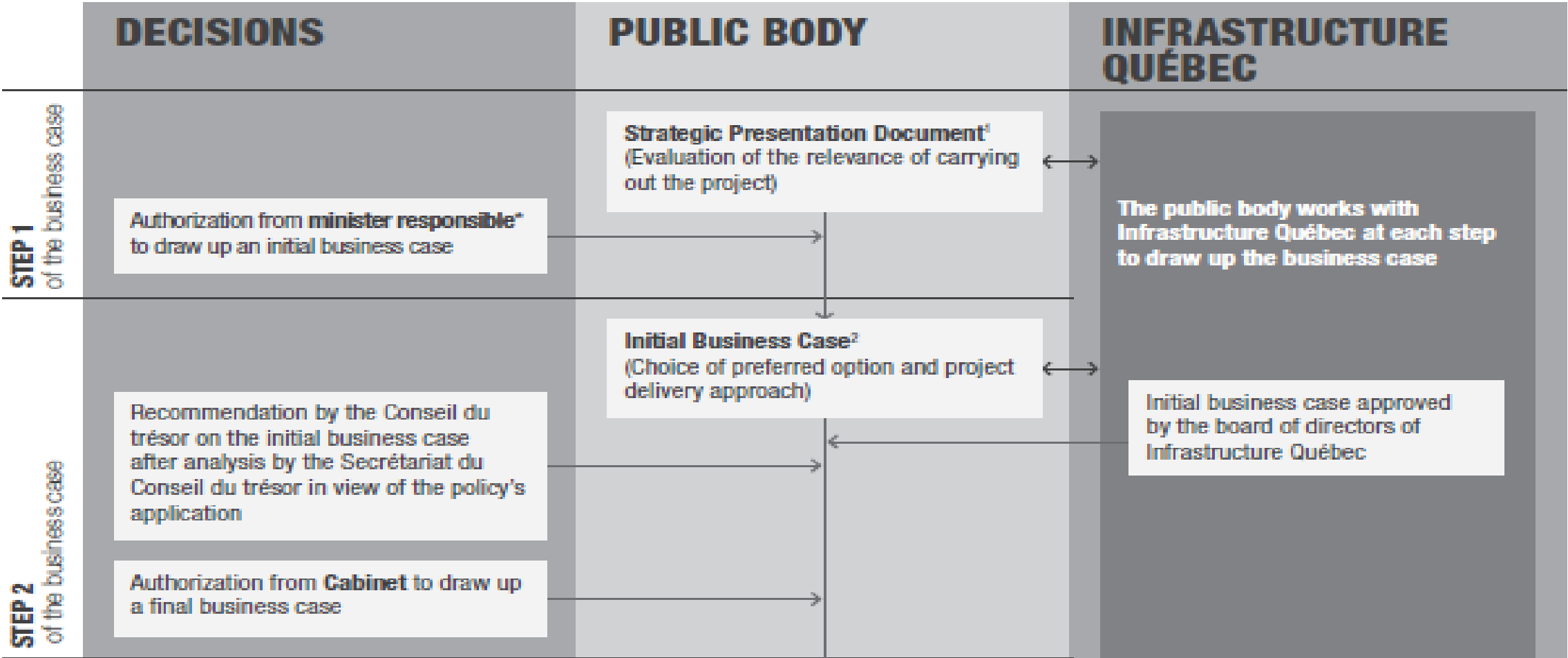
Documents subjected to external quality review



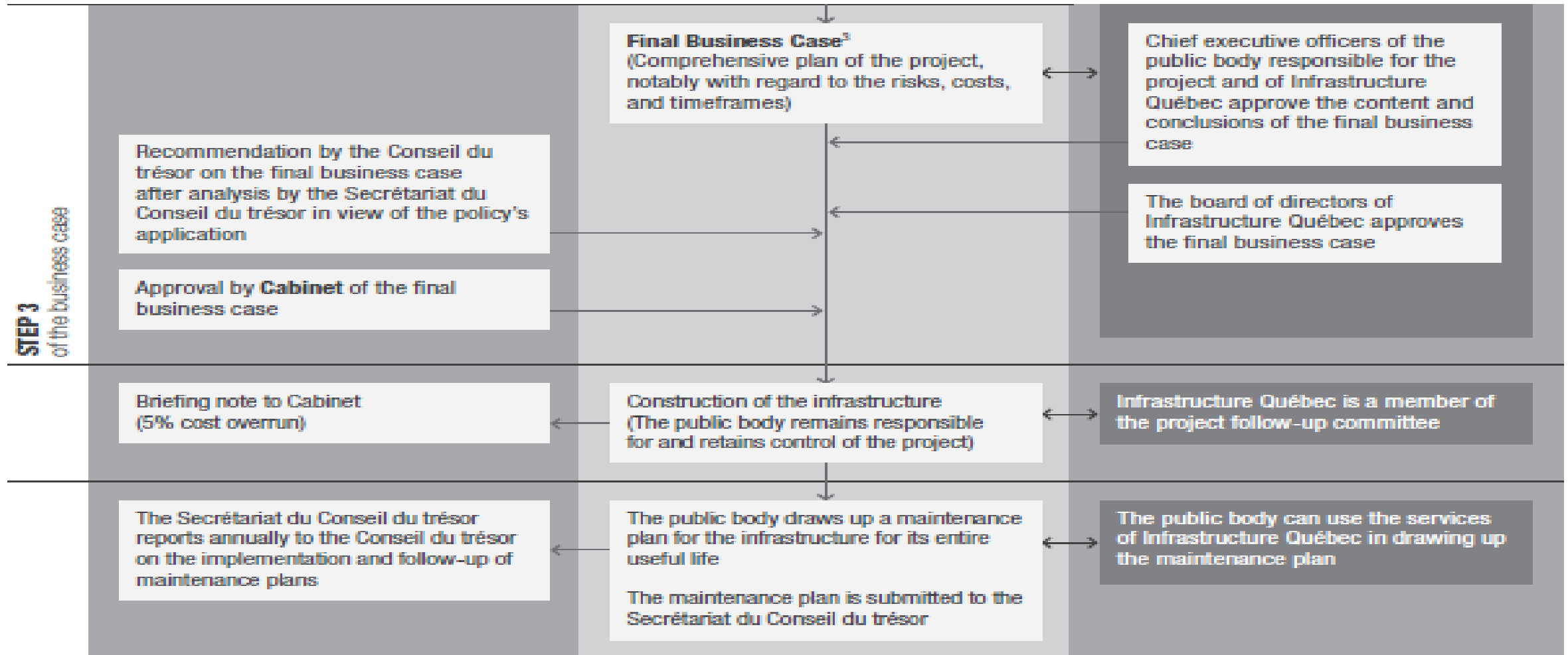
Scope of external quality reviews

Canada Model : The Treasury Board of Canada Secretariat

INFORMATIONAL OUTLINE OF THE FRAMEWORK POLICY



Canada – cont.



¹ In the first step, the estimated capital cost of the project can have a margin of error of 20 to 100%

² In the second step, estimated capital cost of the project can have a margin of error of 15 to 30%

³ In the third step, estimated capital cost of the project can have a margin of error of 0 to 5%.

* For a project possibly involving an architecture competition, the Conseil du trésor is the body that authorizes the drawing up of the initial business case.

Overview of the gating model

Gate 1—Strategic assessment and concept

For confirmation of the project's objectives—both what is to be done and why—and the identification of key stakeholders

Gate 2—Project approach

For confirmation of how the project's objectives will be achieved

Gate 3—Business case and general readiness

For confirmation of funding and business outcomes

Gate 4—Project charter / project management plan

For confirmation of resources, support, and governance

Gate 5—Detailed project plan and functional specifications

For confirmation of readiness to proceed with construction

Gate 6—Construction complete and deployment readiness

For confirmation of readiness to deploy for both business and IT domains

Gate 7—Post-implementation review

A post-mortem and final step to gather lessons learned.

Mega project : Conclusions

- **With no mega projects we would not have society we know nowadays**
- **It is not possible to develop, manage and evaluate mega project by using standard approach for standard project**
- **Megaproject success or failure is not as simple as small and medium projects. There are at least for perspectives for evaluation.**
- **.....**



Moving forward

IPMA: Moving society forward

**Thank you
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Lima, June 20th 2016.