Essays on Infrastructure Asset Management



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PROBLEM STATEMENT



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How can a country improve the efficiency of its infrastructure asset management over the whole life cycle, considering the challenges on the demand and supply side?

PROBLEM STATEMENT



A Strategic Asset Management Framework for Improving Transport Infrastructure

Problem?

- Changing and increasing demands
- Low investment levels

- Large attention for technical IAM
- Too limited for SIAM

> Need for a sound strategic asset management framework

How?

Literature review, cross case study in BE, interviews in BE and secondary sources.

A Strategic Asset Management Framework for Improving Transport Infrastructure

Eight key success factors



A Strategic Asset Management Framework for Improving Transport Infrastructure



Problem?

- More projects
- Importance of stakeholder involvement

- Project interconnectivity
- Project uncertainty
- Current way of project evaluation: SCBA = Social Cost Benefit Analysis
 - compares social costs with benefits of one project at one point in time
- Need for a long-term investment guide and integrated approach

How?

Conceptual paper and case study

> SEMI:

Rather than **deciding on one project now (SCBA)**, we keep **options open** in the future and **monitor** them based on **new information**.



Conclusion & recommendations:

- SEMI provides answer to need for a dynamic, holistic approach with attention to stakeholder involvement
- Supports policy makers in making decisions and maintaining a long-term vision

Cost overruns of Belgian transport infrastructure projects: Analyzing variations over three land transport modes and two project phases

Problem?

Limited budgets

Cost overruns = Final cost > initial estimation

More projects need to be realized

> Need for in-depth analysis of these cost overruns

How?

Analysis of 36 Belgian projects

Cost overruns of Belgian transport infrastructure projects: Analyzing variations over three land transport modes and two project phases

Cost deviations for three transport modes infrastructure in Belgium: total sample



Conclusions

- Average CO = 10.3% (significant)
- Large variation
 (almost -50% to 110%)
- No difference over type and size
- No improvement over time

Problem?

Persisting cost overruns even with technical/legal improvements

Need for more insights in causes of cost overruns

How?

Case study, literature review and survey

- 1. Poor quality of technical documents and studies
- 2. Poor estimation of scope, time and cost
- 3. Permit risks
- 4. Conflicts on trust between partners
- 5. Conflicts on scope, time and cost
- 6. Increased prices of raw materials, labor and juipment
- 7. Delays in execution
- 8. Inadequate project governance
- 9. Poor stakeholder manageme
- 10. Lack of coordination

INSIDE PROJECT CORE

MANAGEMENT

OUTSIDE PROJECT CORE





Conclusion & recommendations:

- Issues on the soft side need more attention
- Lower cost overruns with more involvement of the private partner indicates importance of collaboration

How can a country improve the efficiency of its infrastructure asset management over the whole life cycle, considering the challenges on the demand and supply side?

Releasing extra resources by doing things differently



- Implement LT strategy to improve infrastructure management
- Allow room for variation in objectives, use key success factors as guidance
- Implement SEMI as support tool
- Be open as an agency for long term planning
- Keep your budget under control, even when cost is not your objective because budget is restricted
- Additional attention to relationships and collaboration
- Work with the experience of private partners in PPP

Short-terms of politicians ↔ need for long term strategy for efficient IAM

= highest value for society

Thank you! Questions?

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General conclusion



Strategies for IAM

- Different objectives and interpretations of IAM → no "one-fits-all strategy", but general guidelines
- Efficient infrastructure management only with strategic plan on the longterm

Decision framework for infrastructure investments

- Challenges in the interdepency of projects, demand uncertainty and stakeholder involvement
- SEMI as decision support tool to monitor the feasibility of project options on the LT

Efficient spending of resources and project execution

- CO's are significant
- CO's have been worsening over time
- Main causes in Belgium are related to relational issues
- PPP projects better for project cost performance

Limitations and further research paths

1. Scope

- Extend research to other infrastructure types (ex. underground public infrastructure)
- Research on maintenance and end-of-life phase (ex. circularity)

2. Methodology

- Additional case studies to strengthen the results
- More datapoints will increase significancy (ex. projects, respondents...)
- Apply SEMI to other infrastructure types

3. Results

- Further research into these infrastructure type-specific strategies
- Focus on project performance improvement in the broad sense (not only cost)



Academic contributions

- Expanding theory on (strategic) infrastructure asset management, project management, project selection, public spending and public management
- Two conceptual developments (SIAM and SEMI)
- Importance of New Public Governance perspective on PM (involvement of stakeholders and communication)
- More country-specific research for cost overruns and explanations
- Address issues related to project development in developed countries (decentralized responsibilities, additional challenges because of increased welfare and blurred boundaries with other countries)

Practical contributions

- Recommendations to improve infrastructure management countries and cross-national regions (ex. EU).
- Support countries with solving mismatch between demands and supply
- Releasing extra resources by doing things differently



CASE: HINTERLAND CONNECTION PORT OF ZEEBRUGGE

- Part of TEN-T project: Seine-Scheldt connection
- Complex and expensive project
- Cross-country collaboration



Tool required to determine optimal configuration and timing of investments to increase Zeebrugge's hinterland port capacity

CASE: HINTERLAND CONNECTION PORT OF ZEEBRUGGE

Result of SEMI: best approach is phased



Use strategies as step up to make other strategies more profitable





