

Model-based cost estimation for infrastructure projects: a case study

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Digitalization



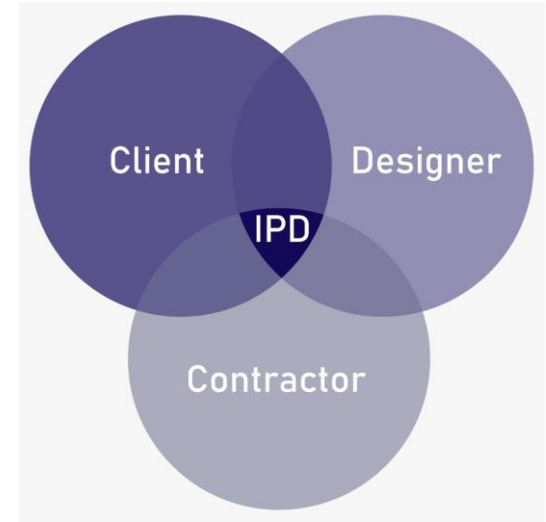
Cost Estimation



- Manual
- Time consuming
- Error-prone
- Based on Human interpretation

Case Study

Norwegian road project



High Digital Ambitions
Model-based design and construction process

Research questions



RQ1 : How is cost estimation practiced in infrastructure projects?

RQ2 : What is hindering automated cost estimation?

RQ3 : How can automated cost estimation be further developed?

Research Methodology

- Literature study
- Case study
- Semi-structured interviews :

Three project managers from all three parts.

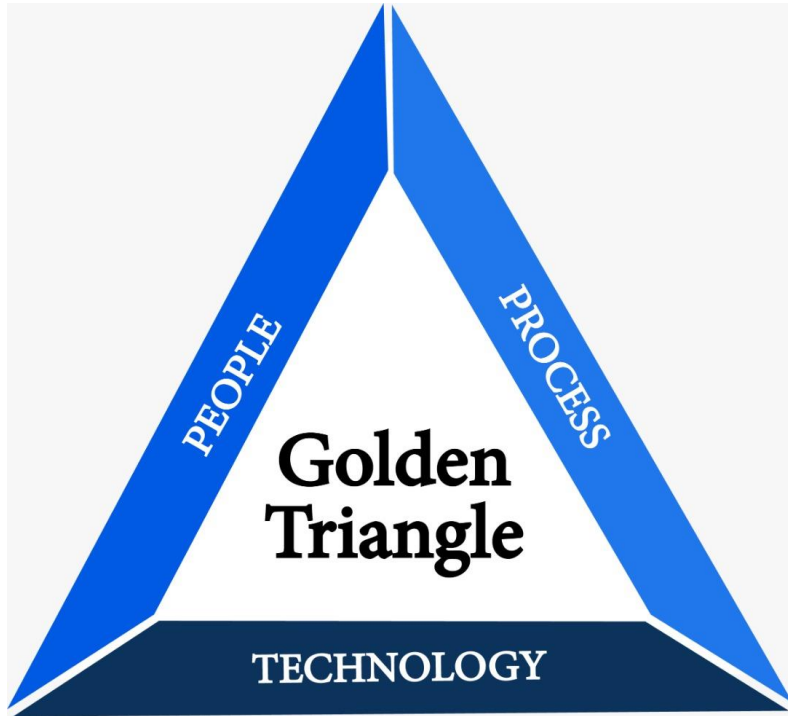
A BIM manager.

Two discipline leaders (road, construction).

Two quantity surveyors from the client-side.

Four discipline BIM coordinators (road, construction, electrical, and water and sewer)

- Document study



- **Digital Triangle**
- **Golden Triangle**

People

RQ 1: Semi-automated Cost estimation

However, ...

RQ 2:

- little experience with model-based quantity takeoff
- lack of a digital mindset

process

RQ 1: Semi-automated Cost estimation

RQ 2:

Time pressure

Unprecise mapping of prescribed cost classification codes for model objects

Technology

- The accuracy of the software used

Discussion

- Little experience with BIM
 - Traditional Mindset
- »»»
- Unmature and simple models
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- Early involvement of contractor due to IPD
 - Allocating more time during early phase
 - Importance of education and training to benefit from 5D BIM.
 - A change in mindset

Conclusion

- A huge potential for fast evaluation of alternative solutions
- The main challenges :
 - People
 - Process
- Resistance to change the way of working
- Missing the necessary digital mindset
- Increased workload
- Time pressure
- Problems with attaching correct classification codes from standard specification

Suggested improvements

- Concerning People and Process and not only concentrating on Technology
- Persistent relevant training
- A better alignment between object-oriented BIM and standard specification for infrastructure projects

Further work

- Projects with different project delivery method
- Considering unit pricing
- Considering life cycle of the projects including detailed design

Thank you for your attention!

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