Shaping the future of model-based delivery in Iceland

Insights from Borgarlínan

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- National significance
- Long life-cycle
- Complexity

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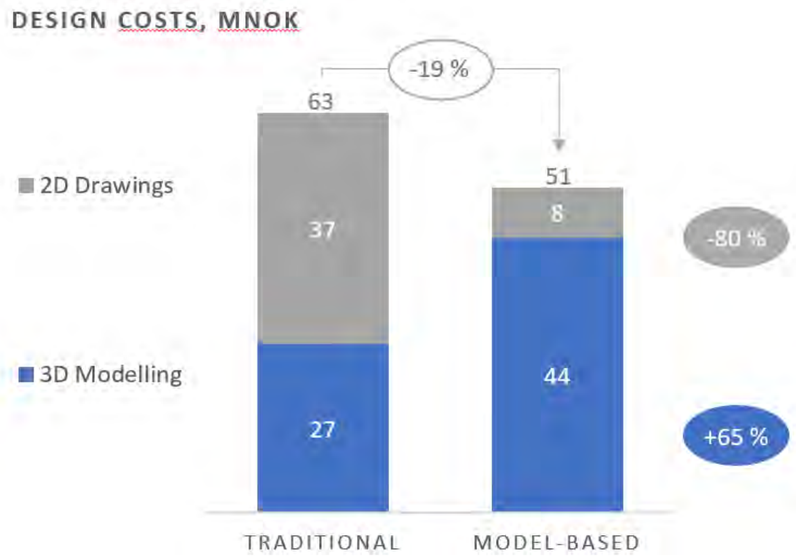
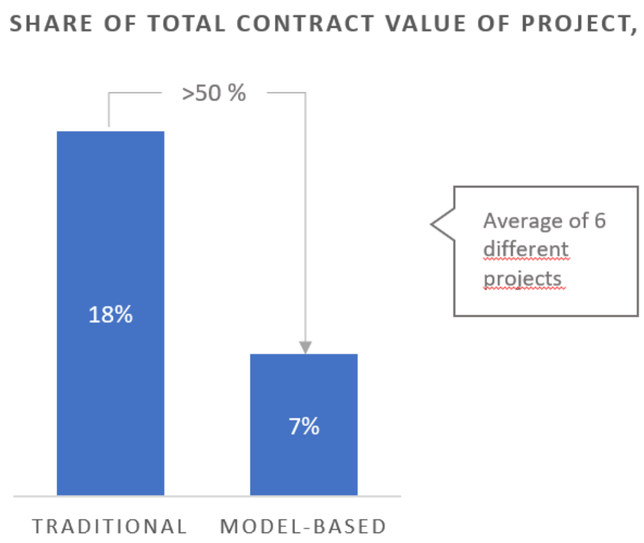
Design costs with model-based design

BaneNOR reduced design costs by 19 % with model-based design on Ringeriksbanen project



Statens Vegvesen reduced change orders by 11 pp with model-based construction on E16



Source: ”Modellbasert prosjektering i detaljplan og digitalisering av prosessene rundt grunnundersøkelser”, Fellesprosjektet Ringeriksbanen og E16, BaneNOR and Statentvegvesen

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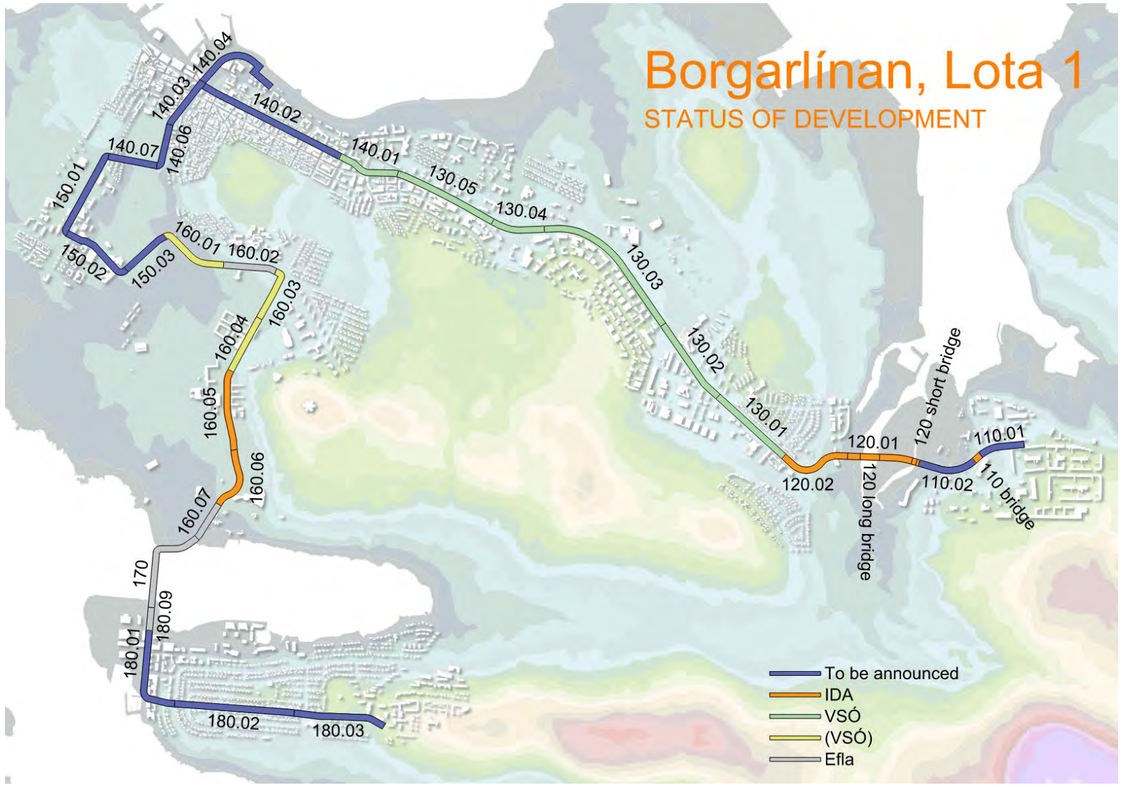
- Design split into several design and contruction contracts
- Several stakeholders including Vegagerdin, 6 municipalities, several utilities owners
- Framework agreement with 4 street contractors



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Borgarlínan project

Ongoing construction works for Fossvogsbru

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Digital delivery ambitions

- BIM Level 2 compliant design and construction project.
- Smooth handover to the facility management team for the in-use phase of the asset.
- Lifecycle approach to optimize the cost and asset management of the scheme.
- Improve co-operation between team members and design coordination.
- Reduce build cost, improve cost certainty and reduce waste.
- Optimize the construction program with phased, sequenced delivery aligned to the financial profile.
- Handover of an AIM that can be maintained throughout the life of the infrastructure.
- Enable smooth transfer of relevant and accurate data into the client’s facility management system.
- Promote BIM to improve safe project delivery and provide safety information for operation.
- Deliver the project in line with the soft landings approach.

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What was actually applied?

- Model-based design review
- Clash detection
- Quantity take-off
- Visualizations

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Challenges of model-based delivery in the project

- Lack of measurable goals & direction
  - Disconnect between strategic goals, BIM requirements and practical implementation
  - Unclear use cases
  - Unclear requirements for operation & maintenance phase

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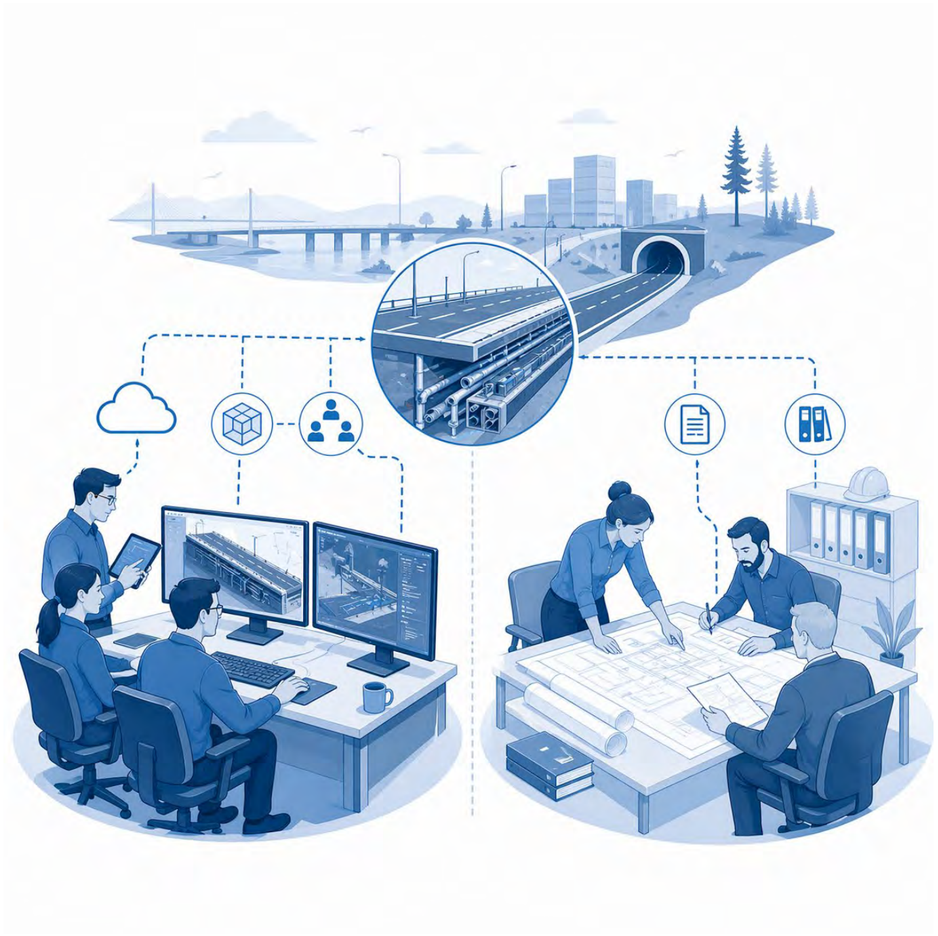
Challenges of model-based delivery in the project

- Scaling BIM across organizations
  - Different maturity levels
  - Varying tools, workflows and expectations



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Challenges of model-based delivery in the project

- Cultural and organizational challenges
  - BIM seen as ”extra work” at the end
  - Transition from drawing-centric thinking to model-based collaboration
  - Laws and regulations are written with the assumption of drawing based delivery

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Challenges of model-based delivery in the project

- The current BEP template in the project is:
  - Long and hard to read
  - Mixes requirements (EIR) and execution (BEP)
  - One document for design, construction and as-built

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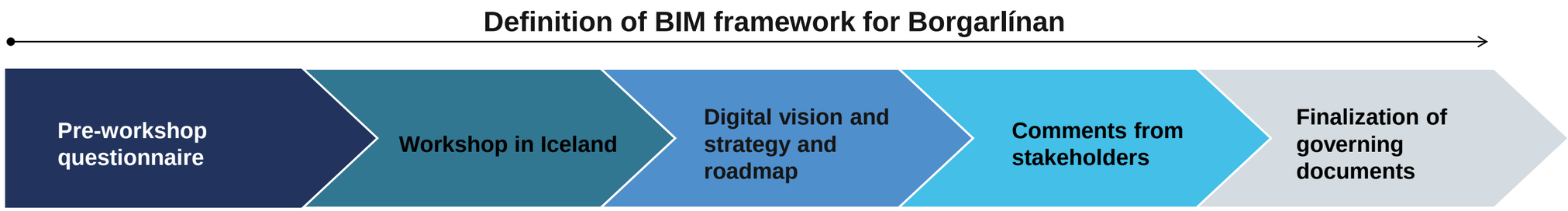
Digital vision and strategy

Workshop participants:

- Betri Samgöngur: Project director, conceptual design manager & project controls
- COWI: PM, section managers, design- and construction management, project controls (11 people)
- Designer: 4 participants, one per design company
- Contractor: bridge contract (1 contractor) and framework agreement for streets (4 contractors)



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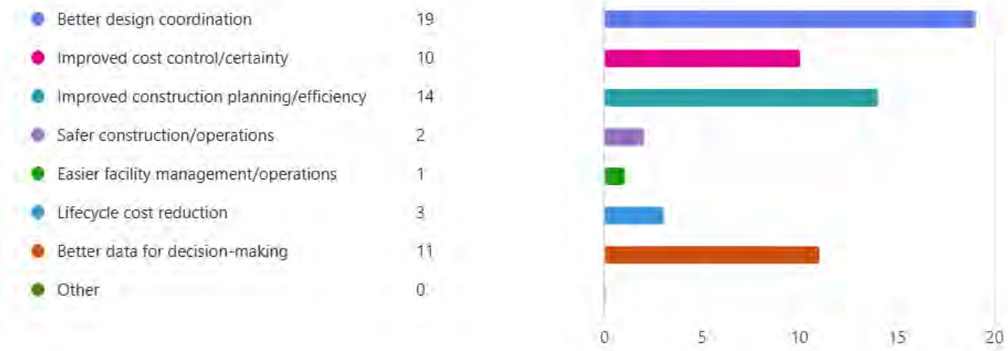
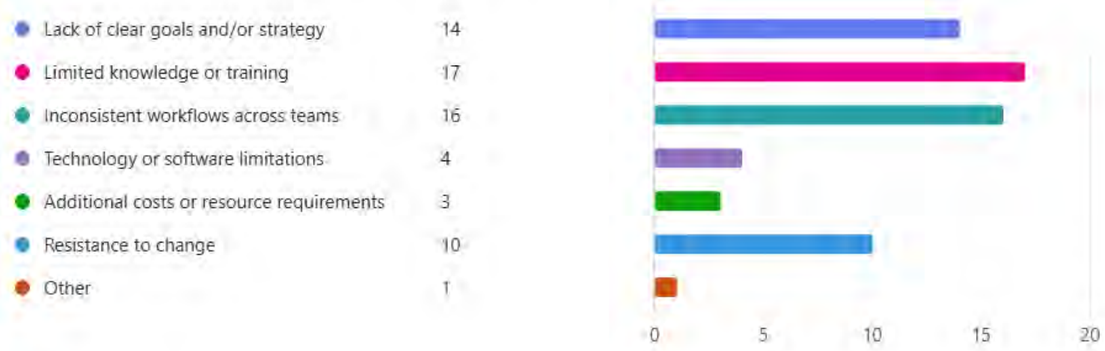
Pre-workshop questionnaire

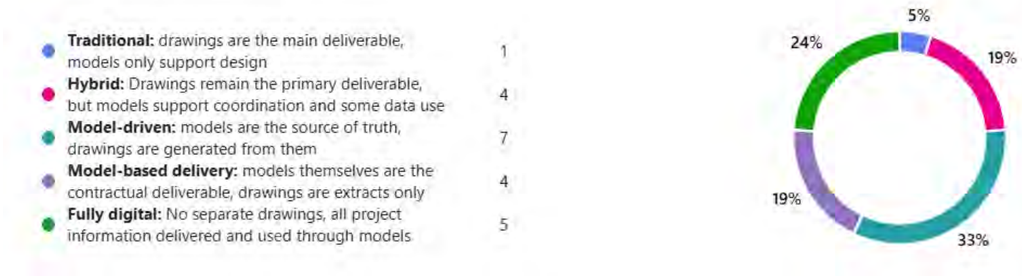
3. From your perspective, what are the top benefits BIM should bring to this project?



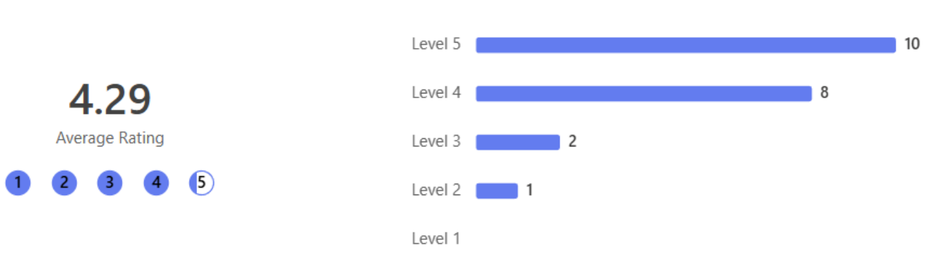
6. In your opinion, what are the biggest risks or barriers to using BIM effectively in this project?



4. What should be the ambition level for model vs. drawing use in this project?



10. How important do you think it is that this project acts as a driver for developing model-based project delivery practic es in Iceland?



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Workshop findings

PMO (CLIENT)
Intent, outcomes, and control

- **Strategic outcomes**
  Cost, time, predictability, value for money
- **Governance & decision support**
  Standards, assurance, accountability
- **Transparency & overview**
  Visibility across project and portfolio
- **Long-term asset value**
  Information for operations and lifecycle
- **Management instrument**
  Reduce uncertainty and support decisions

SUCCESS LOOKS LIKE
Predictable delivery, control, value for money

ADVISORS (DESIGNERS)
Quality, collaboration, and lifecycle logic

- **Buildability & constructability**
  Design intent aligned with reality
- **Information quality & validity**
  Accurate, coordinated, reliable
- **Clear interfaces between disciplines**
  Reduce clashes and gaps
- **Lifecycle-oriented information**
  Design → Build → Operate
- **Collaboration across organizations**
  Shared source of truth

SUCCESS LOOKS LIKE
Correct, coordinated, buildable information

CONTRACTORS
Execution, clarity, and risk reduction

- **Information availability & timing**
  Right info, right time
- **Clear deliverables & responsibilities**
  Defined inputs, outputs, ownership
- **Tool synchronization**
  Interoperable tools and data flow
- **Lean workflows**
  Plan, coordinate, reduce waste
- **Cost, budget & client satisfaction**
  Financial performance and value
- **Reliable handovers between phases**
  Smooth transitions, fewer surprises

SUCCESS LOOKS LIKE
Clear, reliable inputs that enable efficient production

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What does this mean for the future?

Shared foundation:

- Reliable, valid information
- Cost & time predictability
- Collaboration & shared understanding
- BIM as a means, not an end

Key tensions to manage:

- Ambition vs. executability
- Lifecycle value vs. short-term pressure
- Governanace vs. Flexibility

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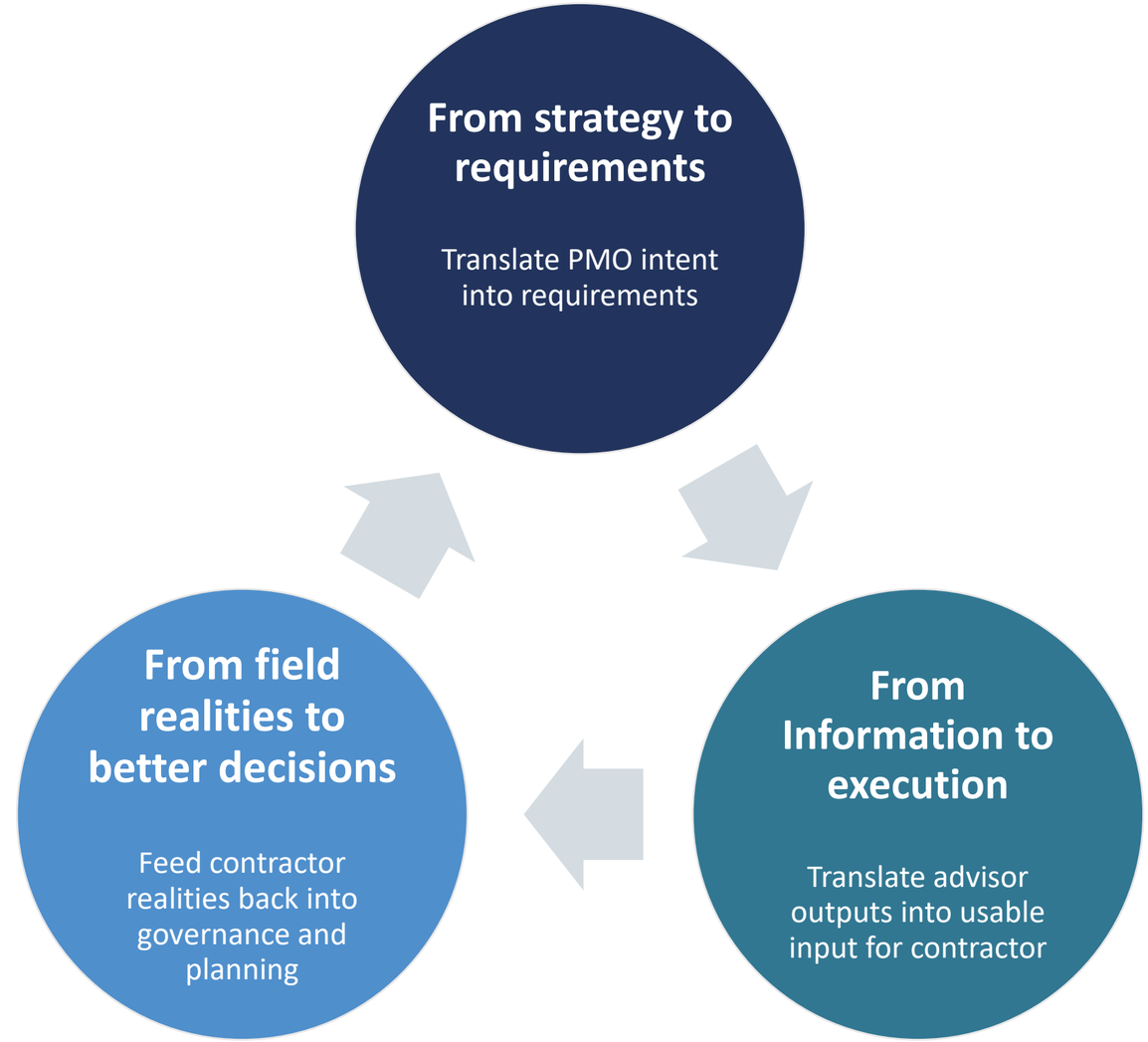
Development of digital delivery

Digital delivery guidelines will be developed continously throughout the project lifecycle, based on experiences from implementation

BIM use cases will be implemented in stages to support the development of the design sector



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Impications for the Icelandic AEC industry

- Borgarlínan as a development project
- Shared challenges across projects and companies
- Opportunity for a coordinated industry development

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