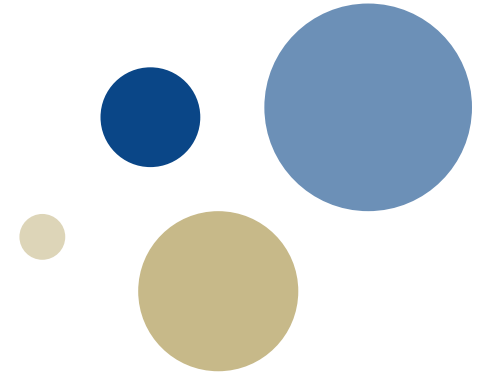




**NTNU – Trondheim**  
Norwegian University of  
Science and Technology



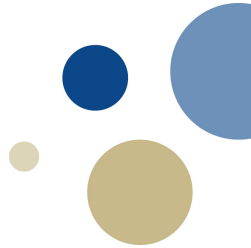
# **Experiences from Innovative Contract and Project Models**

***(Primarily From Northern European Infrastructure Projects)***

Professor Bjørn Andersen

Norwegian University of Science and Technology

# Structure of Presentation



- Background, Ferryfree E39 challenges
- About the study
- Existing project/contract models
- Documented experiences from different countries
- Cross-country analysis
- Findings and recommendations

# Background

- This study triggered by the Ferryfree E39 project in Norway:
  - Owned by the Norwegian Public Roads Administration (NPRA)
  - Existing route that runs along the western coast of Norway, a distance of almost 1100 km
  - Plan to replace eight ferries with fjord crossings
    - Example: The Sognefjord, about 4 km wide, depths of up to 1,300 m and 200-300 m of bottom deposits above the rock, is considered a most difficult and challenging fjord to cross
  - Additional challenge: Aim to utilize bridge infrastructures for producing energy from the renewable sources solar, tide currents, waves and winds
  - Total costs estimated at appr. 268 billion NOK (currently)

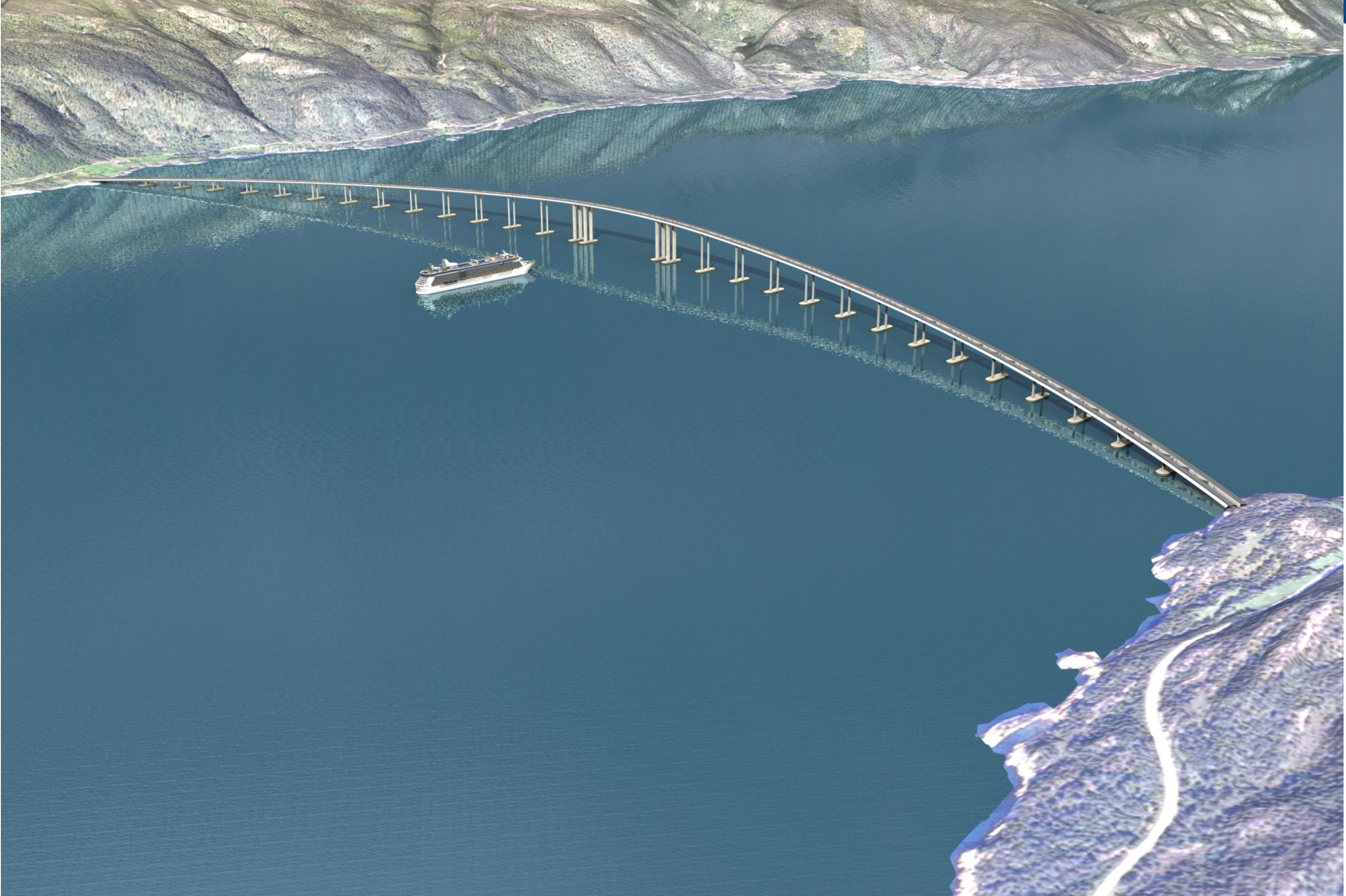


# Some Concepts



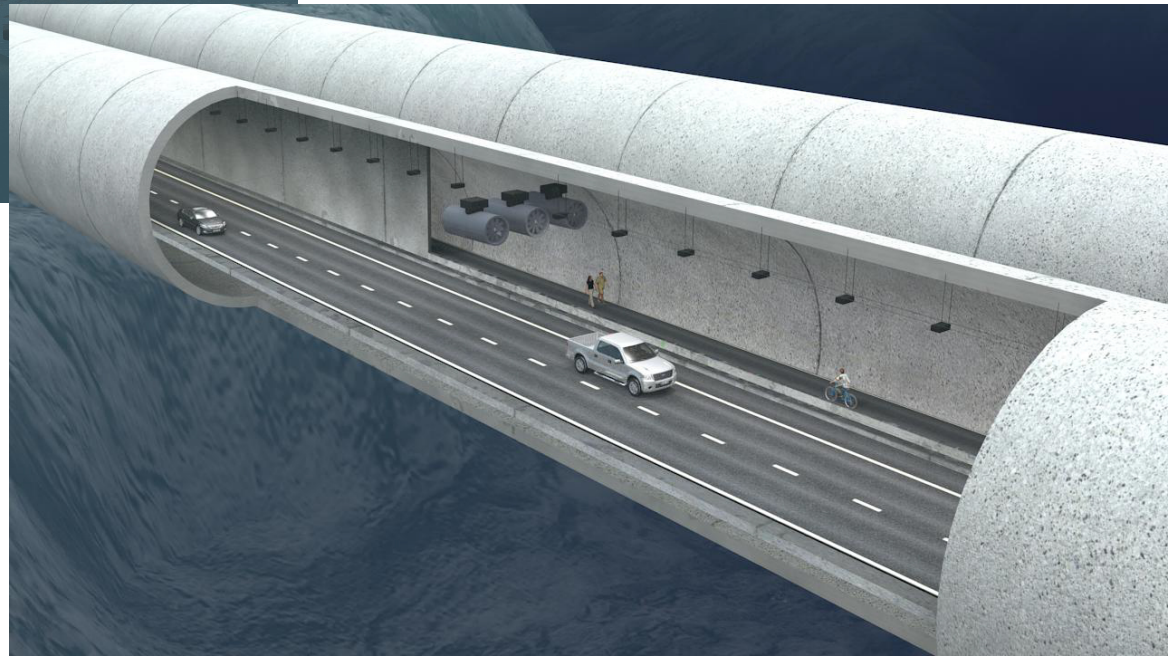
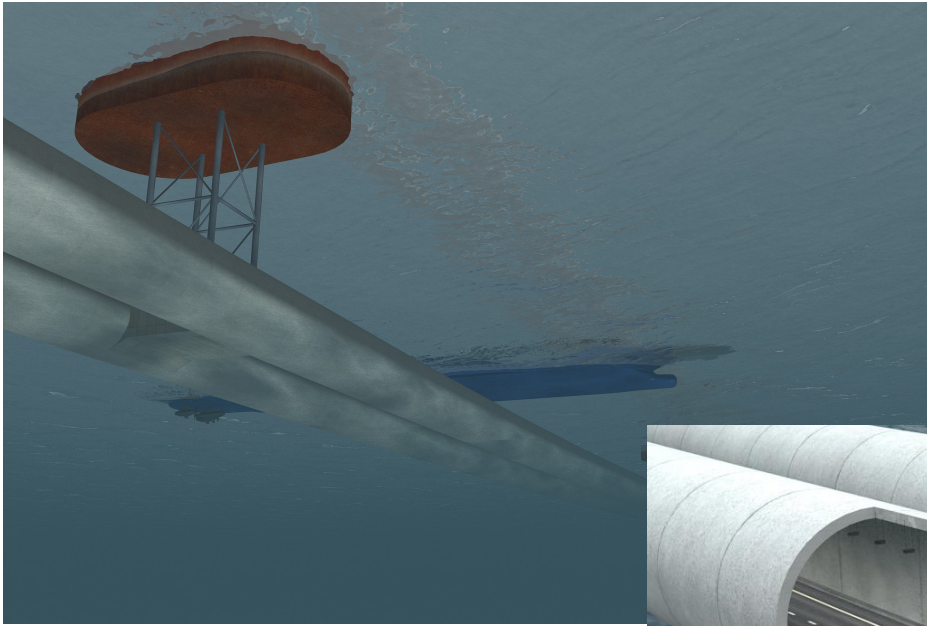
One-span suspension bridge

# Some Concepts



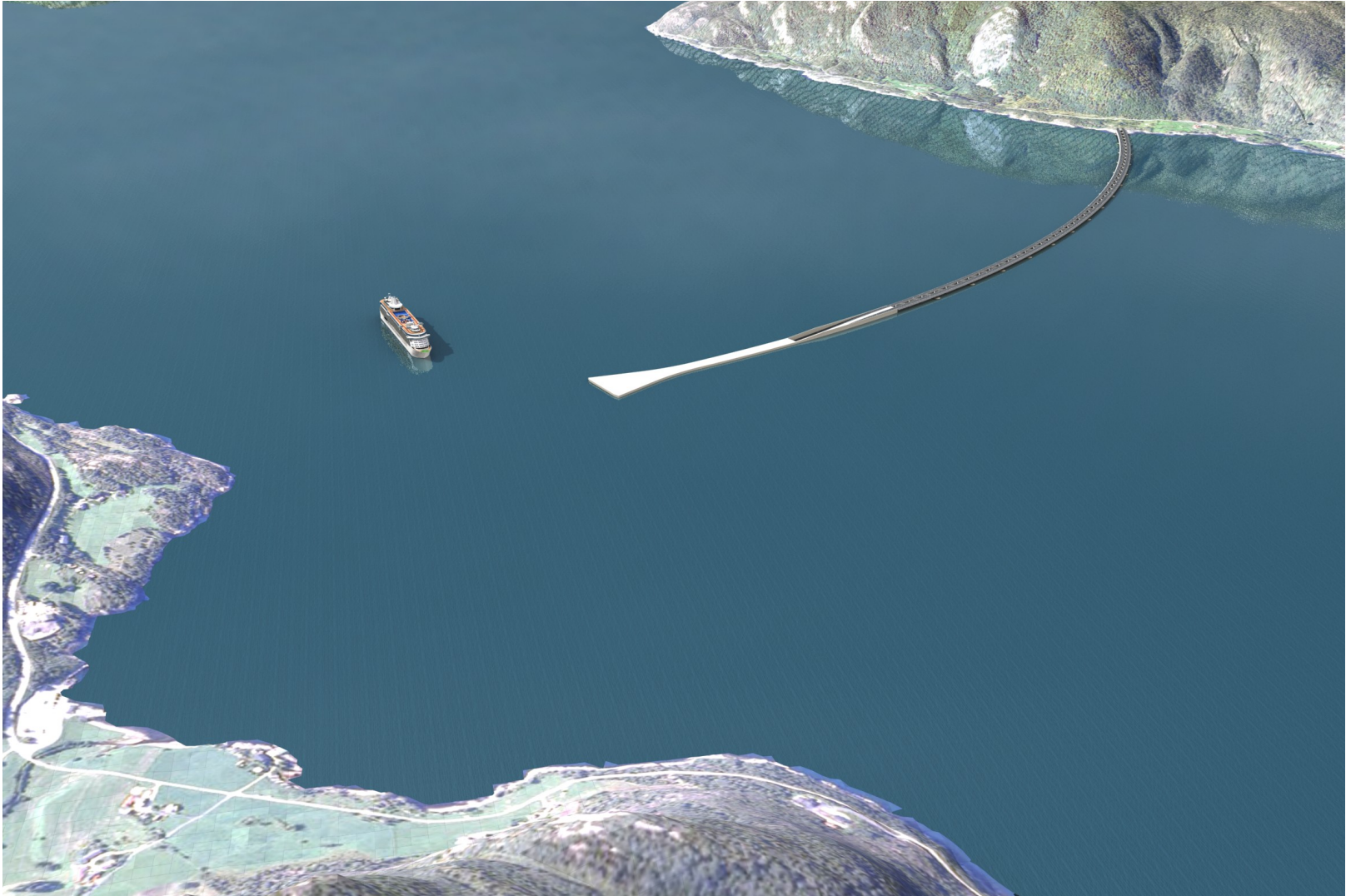
Floating bridge with opening for ships

# Some Concepts



Pipe bridge with pontoons

# Some Concepts



Combination of floating bridge and pipe bridge

# Ferryfree E39 Challenges



- NPRA has mostly relied on traditional design-build contracts
- But also experimented with PPPs and some form of partnering contracts
- This project will take things to a new level:
  - Easily the largest project ever undertaken by the NPRA
  - Contracts will most likely be so large that they will attract global players
  - Need for extensive technical innovations to be able to build the project
- This will require a revised contracting strategy
- NTNU given the task to investigate experiences with innovative project/contract models in different relevant countries



# The Study

- Team of researchers at NTNU (Ola Lædre, Olav Torp, Nils Olsson, Ali Hosseini, Bjørn Andersen)
- Research methods:
  - Literature review
  - Data collection from selected countries/case projects through semi-structured interviews
- Countries targeted (data collection still in progress):
  - Sweden
  - Finland
  - Denmark
  - Holland
  - UK
  - Australia

# Project/Contract Model Evolution

- This has been under development for a long time...
- ... and is far from completed!
- Many different terms used, regional differences
- With overlap and significant confusion about what each term entails
- Could spend a whole day...
- Will give some highlights

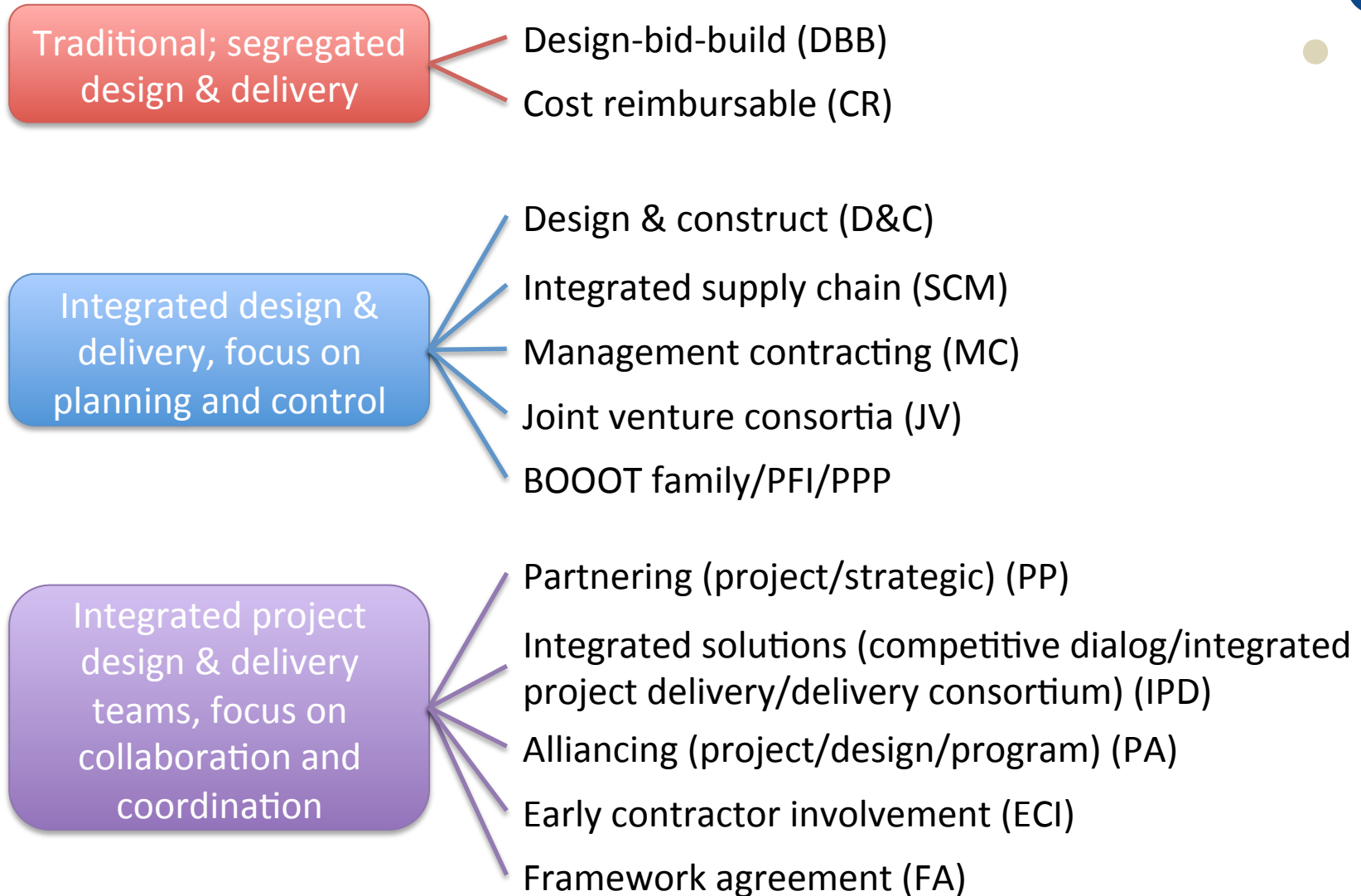


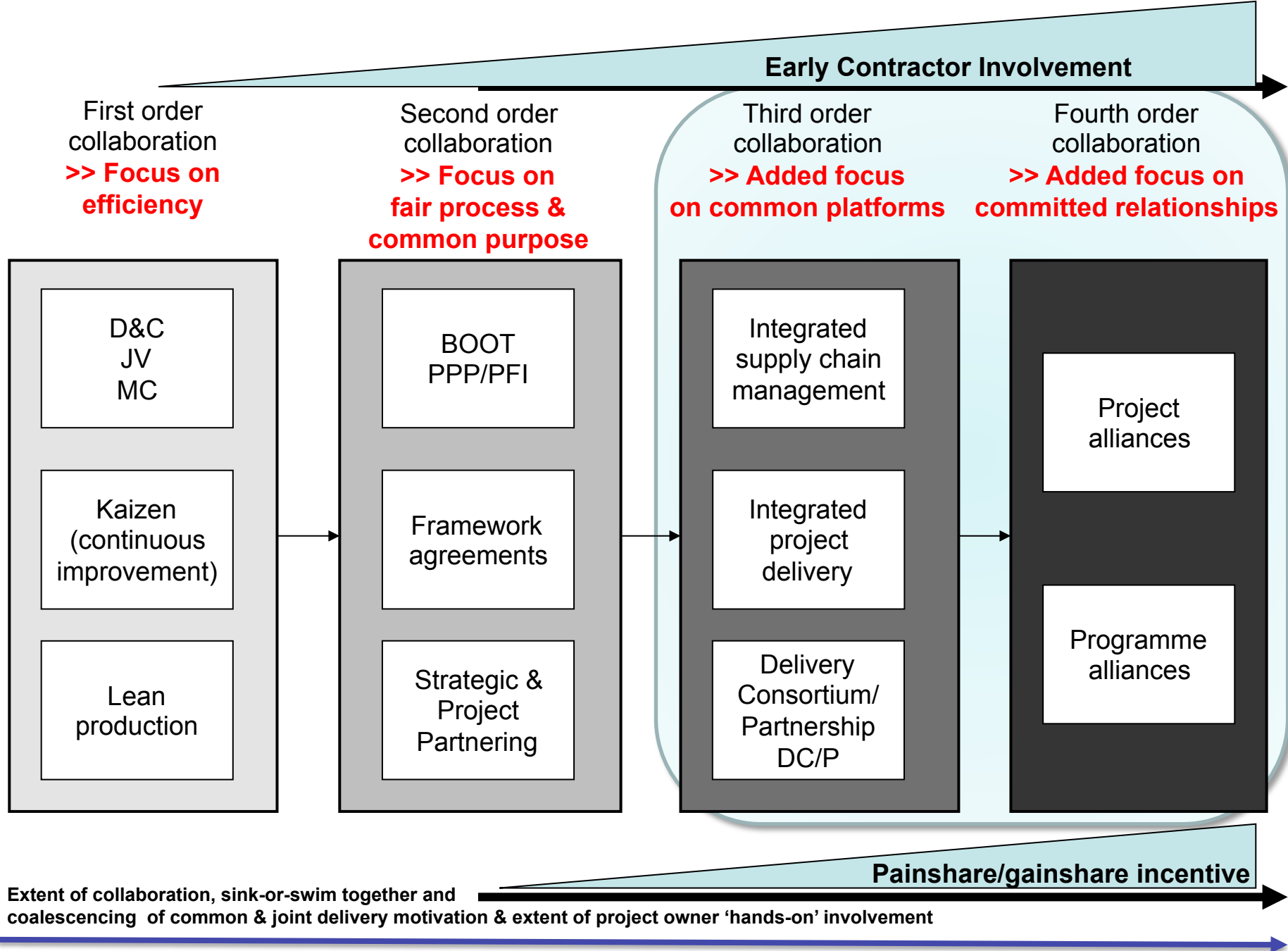
# Watershed: Transactional vs. Relational

- Transactional procurement forms:
  - Usually arms-length relationship between client/owner and design/delivery team
  - Risk is **shifted** from the project owner to the delivery team
- Relational forms (our focus):
  - Usually the client/owner and design/delivery team collaborate either through non-enforceable protocols or through formal agreements
  - Risk is **shared** between client/owner and design/delivery teams
  - Governance arrangements are designed to support collaboration



# One (Very Recent) Overview of Models





# Experiences from Norway



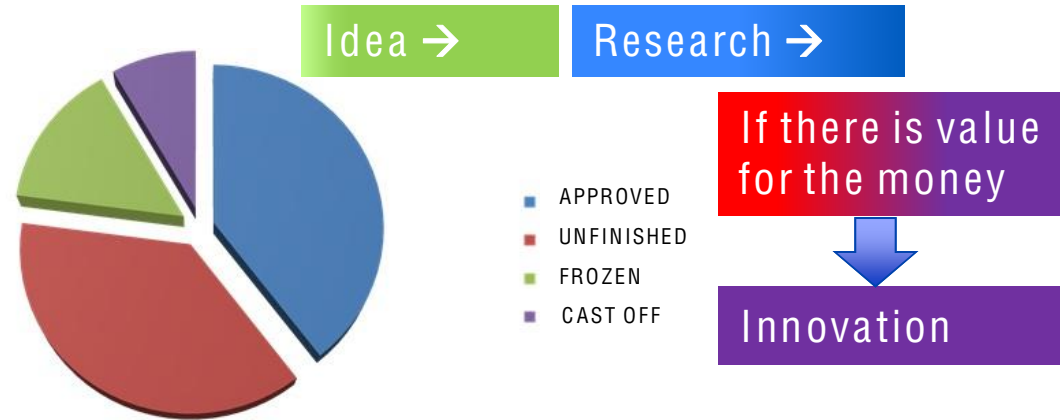
- Infrastructure, two-stage development:
  1. Early 2000s, 3 PPP road projects (evaluation next slide), PPP abandoned by labor government, being revitalized
  2. From mid-2000s, partnering has been widely used in road and rail projects, termed partnering, but in reality mostly traditional contracts with short phase of “getting to know one another”
- Other large, public projects:
  - St. Olavs Hospital, comprehensive partnering bordering on alliancing, very positive results
  - Statsbygg, four partnering pilots, mainly positive results, but some challenges

# Experiences from Finland

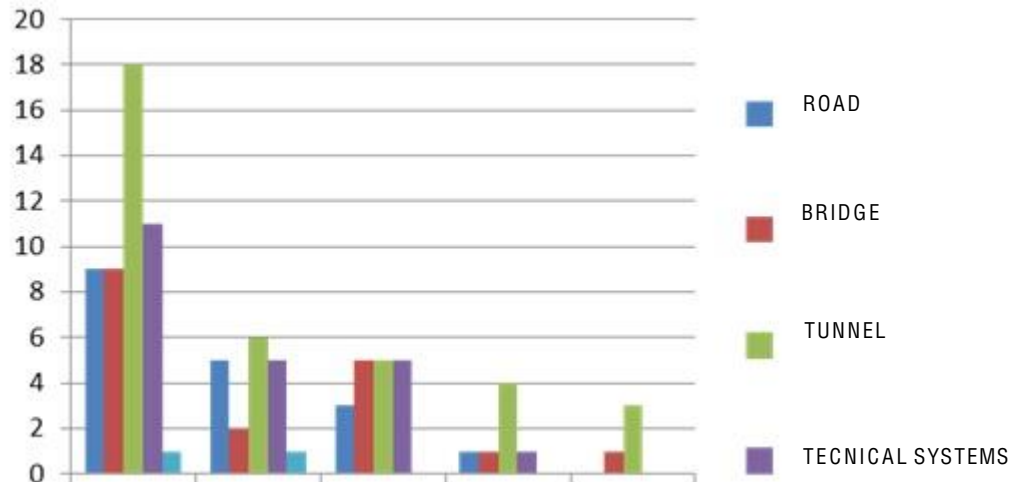
- Finnish Transport Agency (FTA) motivated by low productivity
- Two-stage development:
  1. 1997 and onward, PPP road projects (attempted rail), primarily motivated by access to financing, good execution performance, but front-end/contracting phase demanding, FTA not likely to use PPP again unless politically instructed to do so
  2. From 2010, 3 alliance projects (so far), strongly inspired by the Australian model:
    - Lielahti-Kokemäki rail renovation (completed), “easy” suitable first pilot
    - Tampere Rantatunneli road tunnel (in construction)
    - Taavetti-Lappeenranta road project (in project development)
    - Aim to improve productivity, change to a more open and trusting culture, improve the customer satisfaction with end products, and develop innovativeness and knowledge
    - Initial issues with EU legislation

# Rantatunneli Experiences

- Managed to elicit many (183 in total) innovations from the design/ construction contractors through systematic process
- Necessary to achieve acceptable target cost, saved >20 mill. €
- “Big room” for alliance team positive, best for project attitude
- Prediction to complete >6 months early, below budget



More than 70 ideas → More than 30 innovations





# Experiences from Holland

- Actively implemented the Best Value procurement model (originally developed at Arizona State University)
- Motivated by long duration of projects and “over-management” of contractors
- Handled by Rijkswaterstaat, agency under Dutch Ministry of Infrastructure and the Environment, responsible for roads and waterways
- Expected to test the model in 10 projects, now completed 15
- Applied in increasingly more complex projects

# Results in Holland

- Project duration on average reduced by 25%
- Transaction cost and time reduced by 50%, for client and contractor

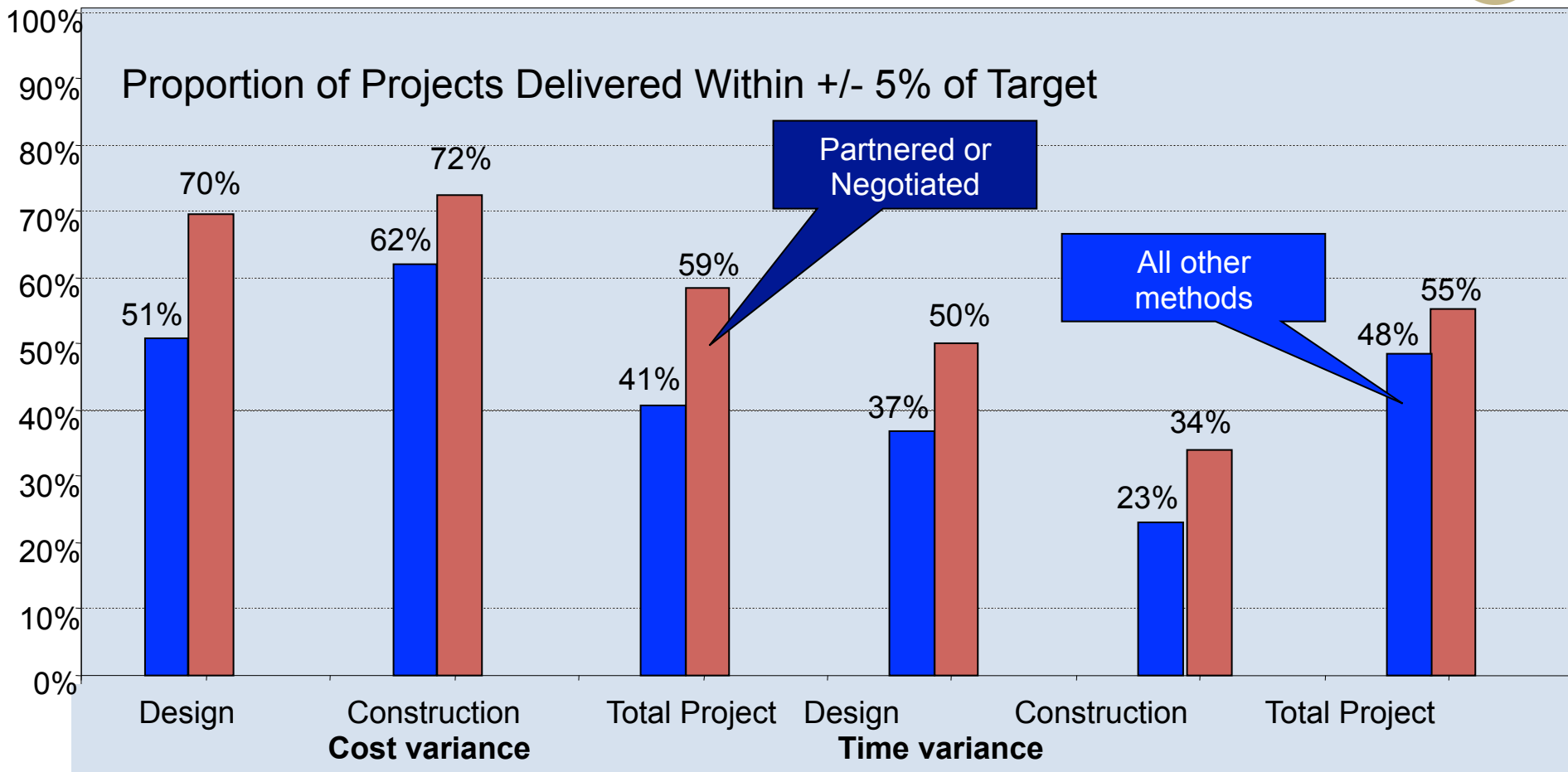
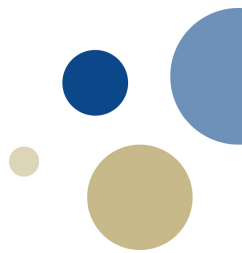


# Experiences from the UK

- One of the countries where different relational models have been applied most extensively, especially partnering
- Alliancing less used, Heathrow Terminal 5 agreement pioneer in integrated SCM
- Wide variety of experiences, good and bad, from different models in different types of projects and contexts
- Seems highly dependent on motivation, skills in implementing the chosen model, external factors, etc.
- Impossible to summarize results succinctly, but Constructing Excellence has assembled findings from the most comprehensive experiments

# Partnered/Negotiated Contracts vs. All Other Contractor Selection Methods

(Data from 1998-2002)



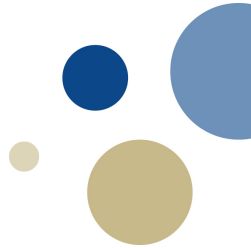
**Traditional projects 18-44% less likely to deliver on cost, 7-15% less likely to deliver on time**

# Experiences from Sweden



- Infrastructure projects have typically relied heavily on traditional execution contracts
- Large infrastructure projects have shown good budget performance
- But seen the need for more innovation, in recent years changed to more EPC-type contracts, Swedish Transport Administration (STA) should be about 50% of this type
- Tried partnering (“utökad samverkan”) in a few projects, with good results, including reduced level of change orders, but STA sees partnering more as a qualification requirement
- Gothenburg West Link project uses Design & Build contracts supplemented by Early Contractor Involvement, key motivation to elicit innovations in the design phase
- Success factors identified; inspirational leadership, total dedication, accept that different parties have different goals, client must let go of control

# Experiences from Germany



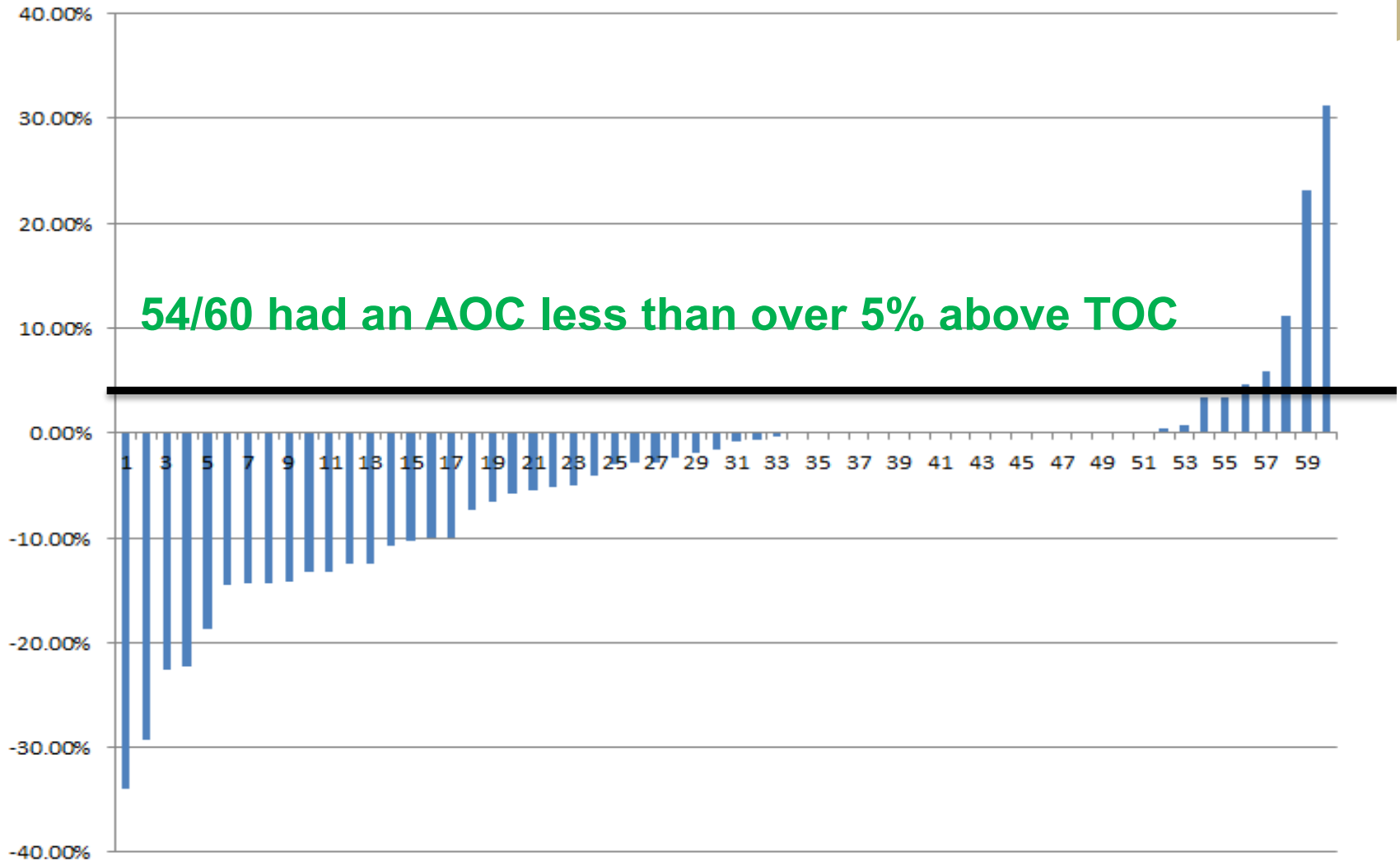
- Procurement rules and regulations strictly prohibit integration of design and delivery, and demands competition between bidders at tendering time, which acts as a barrier against integrated project delivery forms
- Partnering seen as posing a risk for cheating/ camaraderie
- Thus, Germany, partly due to tradition and partly due to legal issues, uses almost only traditional design-build contracts
- Now testing first PPP project, in Bavarian road project, but have seen an extremely long and complex legal tendering process

# Experiences from Australia



- Extensive use of partnering and ECI, but alliancing has been the main focus, with several Australian government departments being important promoters of project alliances and how to ensure and pursue Value for Money
- Extensive use of project alliances in different sectors
- Later variants include design alliances and program alliances
- From 2012, a weak trend that the scale and number of projects delivered using an alliance approach is declining, attributed to:
  - State and commonwealth (federal) government changes
  - A perceived "over-use" of alliances
  - Some hint of high levels of fatigue by senior management about the commitment and energy required of alliances

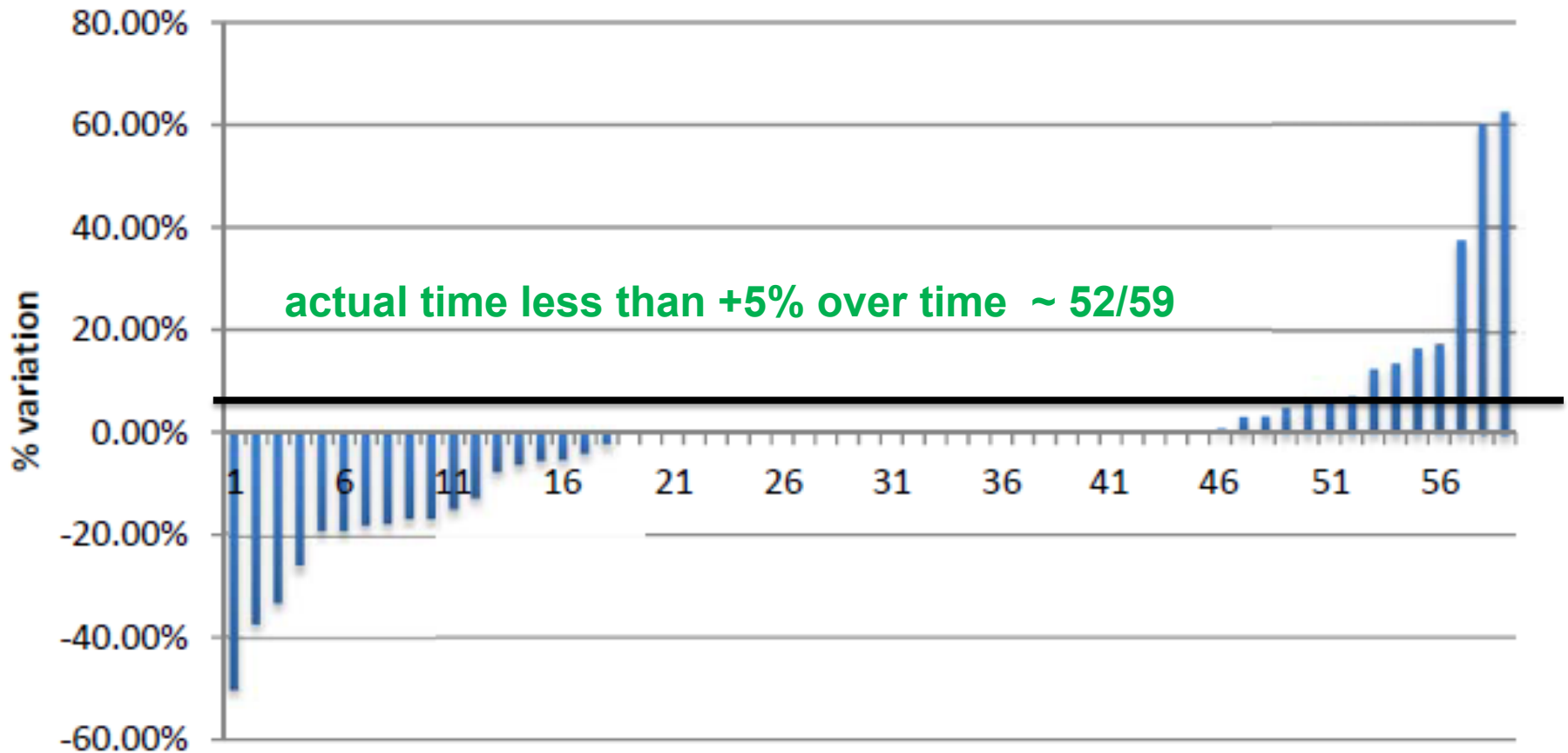
# Alliance Project Cost Performance



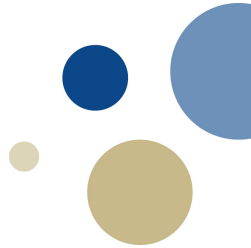


# Alliance Project Time Performance

Delta (actual time compared to proposed time)  
*n=59*

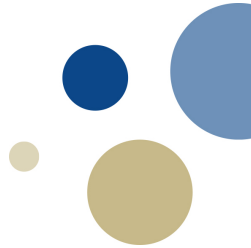


# Cross-Country Analysis



- Very high variation in chosen approaches and maturity in adopting relational models
- Seems to be somewhat random and based on coincidence which model has been tested
- Often determined by chance encounters or sources of inspiration
- Dependent on champions to push pilot projects and possibly permanent usage
- Often facing strong opposition

# Results Achieved



- Most countries have experienced both positive and negative outcomes
- Negative experiences have in some cases led to the abandoning of tested models
- Changes in political power has also triggered changes in usage
- Where one has persisted and “mastered” the model, several countries have demonstrated very positive results

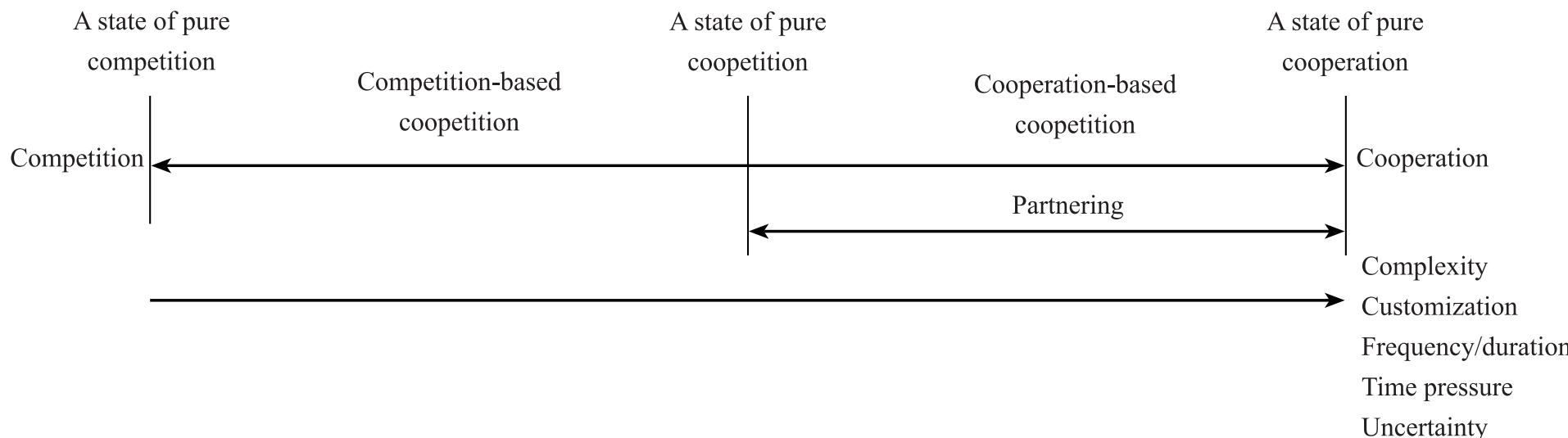
# Problems with Partnering



- Some research efforts have found that cooperation and its benefits are not easily obtained due to various barriers to change
- No universal definition of the partnering concept, causing confusion and ambiguity about what partnering really is.
- Partnering should be implemented in the right situation for the right reasons since implementation requires investments in time and resources the potential benefits must exceed the costs
- Partnering is not easily implemented, even if people know what it is and when to use it
- The transformation from adversarial to cooperative relationships requires a holistic and systemic change in structures, processes and attitudes

# When should Partnering Be Used and to What Extent? (Eriksson, 2008)

- Partnering is not suitable for all kinds of projects
- In small, one-off, less complex projects of low strategic importance, the set-up costs do not justify an extensive collaborative approach
- Achieve **suitable** balance between cooperation and competition (coopetition)
- As complexity, customization, uncertainty, duration (project size) and time pressure increase from low to high levels, the governance form should focus more on cooperation and less on competition

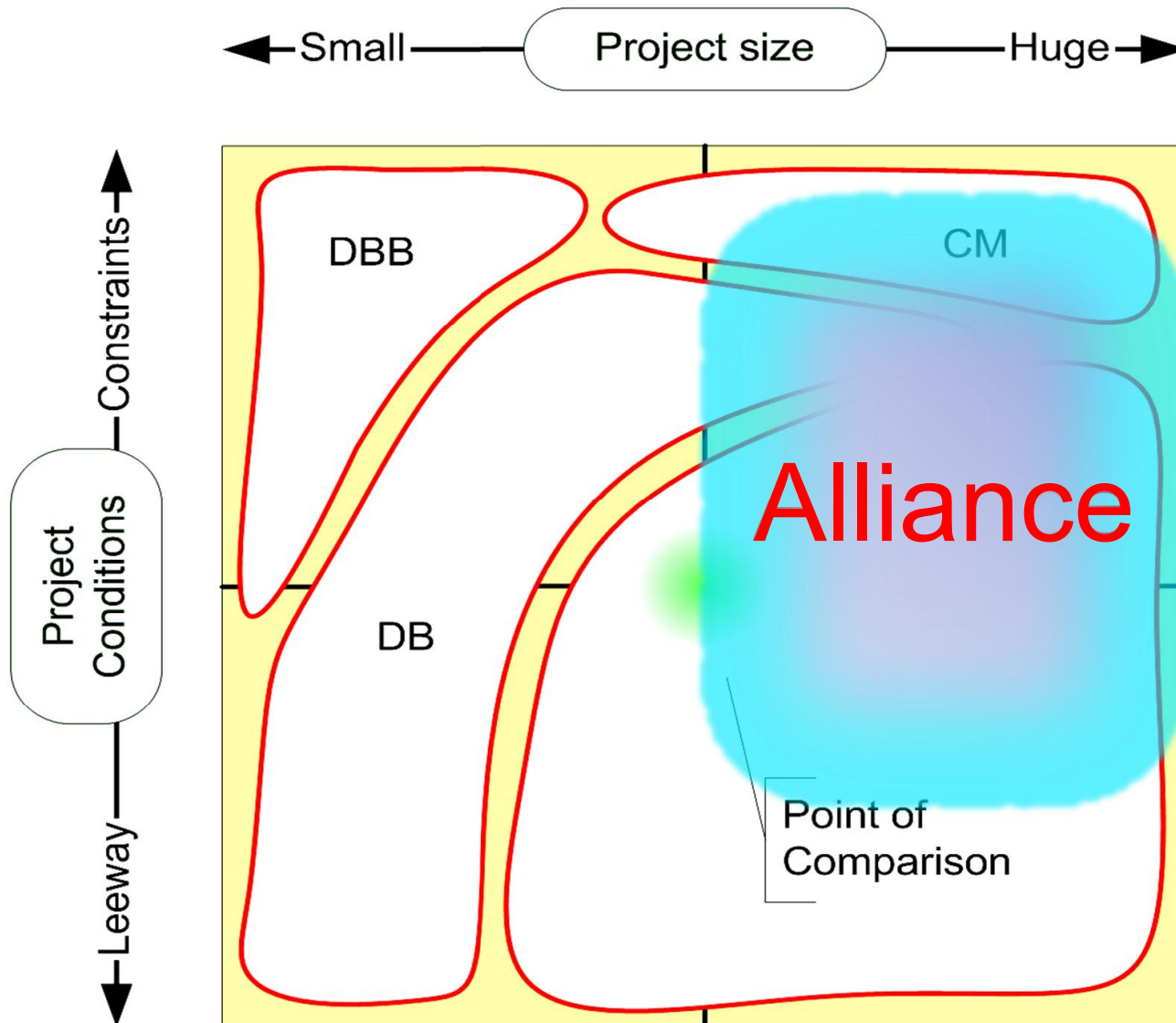


# Possible (Owner) Downsides In Alliancing



- Value for money
- Very limited legal recourse against one another
- Exposed to a range of risks, could be beyond own expertise
- Bear the consequences of each others' performance
- A change in key player can be dramatic
- Requires more involvement by senior people
- No theoretical cap/certainty on the actual cost

# FTA's View on Different Models



# When Is Alliancing Suitable



- Difficult to allocate/unpredictable risks
- Third party risks of operator/owner
- High degree of complexity
- Scope difficult to define upfront or likely to change
- Uncertain timing of access
- Complex external threats/opportunities
- Very tight timeframes
- Owner can add value by being involved