



NTNU – Trondheim
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Science and Technology



Meta-evaluation of road projects – *lessons learned from 14 projects*

Concept International Symposium on Project Governance

Holmen Fjordhotell, 18-20 September 2024

Morten Welde

Concept Research Programme

Norwegian University of Science and Technology

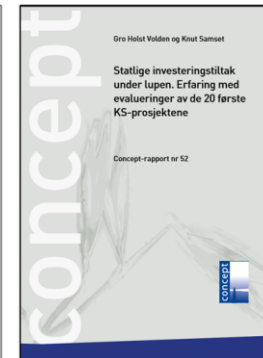
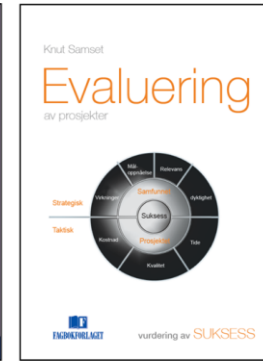
Unbalance between ex-ante and ex-post efforts

- We spend huge resources on planning and estimating impacts that we think will happen
- Our knowledge of actual impacts is much more limited
- Very few projects are evaluated ex-post
- And the interest in and use of evaluation results are limited



What did we say would happen, and what happened?

- Ex-post evaluation is a central part of Concept's research activities
- A standardised evaluation framework used since 2012
- 2-5 evaluations per year
- 41 evaluations as of September 2024



Measuring efficiency and effectiveness through ex-post evaluation: Case studies of Norwegian transport projects
Morten Welde^a, Gro Holst Volden

1. Introduction
Governments throughout the world expend large amounts on the proposed initiative not only provides value for money but also in its line with relevant policies. Effectiveness measures the ability to achieve a specific goal or output (Forsum, 2017; Yu, 2008). Whereas economic



The wider local impacts of new roads: A case study of 10 projects
Morten Welde^{a,*}, Eivind Tveit^b

ARTICLE INFO
ABSTRACT
This paper investigates the impacts of road investments in secondary markets, which the authors label wider local impacts. The impacts are studied using four indicators: commuting, population, new firms, and employment. We use the synthetic control method to study the counterfactual problem, namely what would have been the results of road investments if no road investments had been made.



Public project success? Measuring the nuances of success through ex post evaluation
Gro Holst Volden^a, Morten Welde^b

ARTICLE INFO
ABSTRACT
Public projects are conducted on behalf of citizens and taxpayers, who may have different views of what success looks like. The authors argue that the definition of success needs to be broad and multidimensional, even more so in



Public project success as seen in a broad perspective. Lessons from a meta-evaluation of 20 infrastructure projects in Norway
Gro Holst Volden

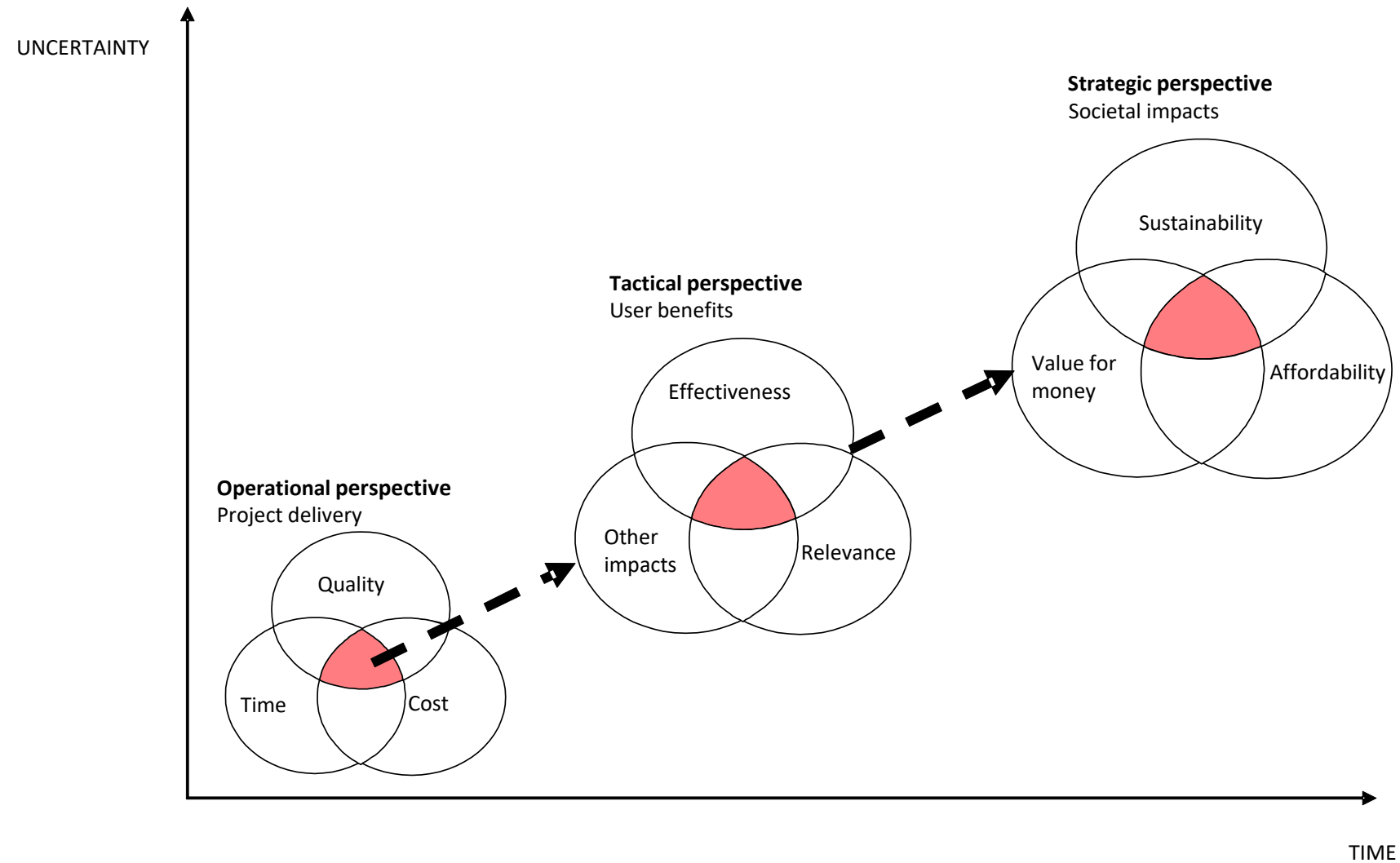
ARTICLE INFO
ABSTRACT
Infrastructure projects in developed countries are rarely evaluated ex post. Despite their number and scope, our knowledge about their various impacts is surprisingly limited. The paper argues that such projects must be assessed in a broad perspective that includes both operational, tactical and strategic aspects, and extended to



In search of success: Ex-post evaluation of a Norwegian motorway project
Morten Welde

ARTICLE INFO
ABSTRACT
Project success is a heterogeneous measure. Different stakeholders may have different definitions of successful project. Ex post evaluation can and should be used to demonstrate whether a scheme has performed as intended and to assess its success from different perspectives. The paper demonstrates the use of a multidimensional

Three evaluation perspectives



From the «iron triangle» to wider perspectives of project success

A meta-evaluation of 14 road projects

*The systematic description and valuation of
one or more evaluations*

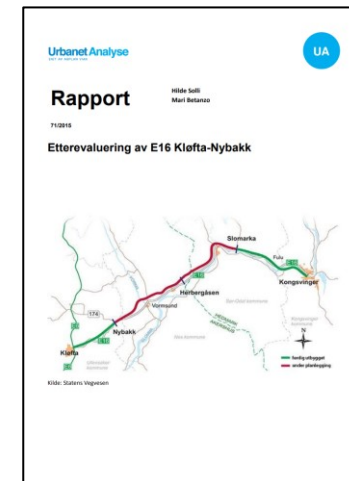
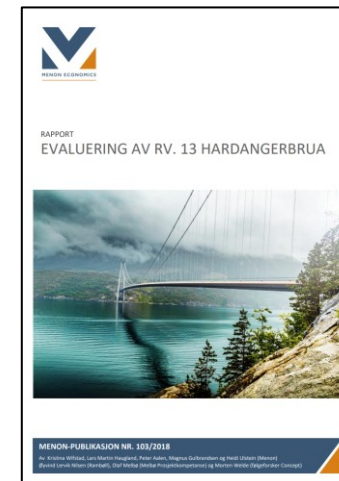
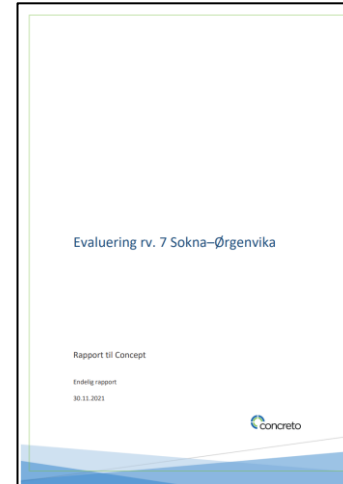
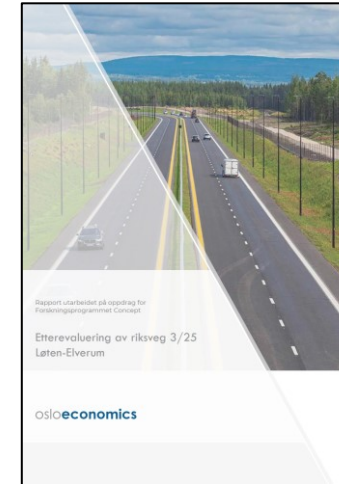
The evaluated projects

| No. | Project | Evaluated | Investment decision | Opened | Final cost EUR, 2023-prices | Road length (km) | Project type |
|-----|--------------------------------------|-----------|---------------------|--------|-----------------------------|------------------|--------------|
| 1 | Rv 3/ Rv 25 Løten-Elverum | 2024 | 2016 | 2020 | 675 | 26 | M |
| 2 | Rv13 Ryfast/ E39 Eiganestunnelen | 2024 | 2012 | 2020 | 1 375 | 27 | M/ST |
| 3 | Rv7 Sokna-Ørgenvika | 2022 | 2010 | 2014 | 215 | 18 | A |
| 4 | E136 Tresfjordbrua/Vågstrandtunnelen | 2021 | 2012 | 2015 | 230 | 11 | A/T |
| 5 | Fv64 Atlanterhavstunnelen | 2019 | 2005 | 2009 | 120 | 10 | ST |
| 6 | Rv13 Hardangerbrua | 2018 | 2005 | 2013 | 330 | 6 | B |
| 7 | E6 Åsgård-Halmstad | 2017 | 2003 | 2005 | 65 | 11 | M |
| 8 | E6 Svingenskogen-Åsgård | 2017 | 2005 | 2008 | 380 | 34 | M |
| 9 | Rv519 Finnfast | 2016 | 2006 | 2009 | 85 | 8 | ST |
| 10 | E16 Kløfta-Nybakk | 2015 | 2004 | 2007 | 115 | 11 | M |
| 11 | E6 Riksgrensen-Svingenskogen | 2014 | 2002 | 2005 | 150 | 4 | M |
| 12 | E10 Lofoten fastlandsforbindelse | 2014 | 2003 | 2007 | 210 | 29 | A |
| 13 | Rv653 Eiksundsambandet | 2014 | 2003 | 2008 | 160 | 19 | ST |
| 14 | E18 Momarken-Sekkelsten | 2012 | 2005 | 2007 | 95 | 7 | M |

* M = Motorway, ST = Sub-sea tunnels, A = primary A-roads (dual and single carriageway), B = Bridges

Main source of data: 14 evaluation reports

- Scope of work normally c. 400 hours
- Report length 50-110 pages
- Qualitative and quantitative information
- Additional data sources
 - Mini-seminar with the roads administration (*August*)
 - Workshop with evaluators (*planned*)

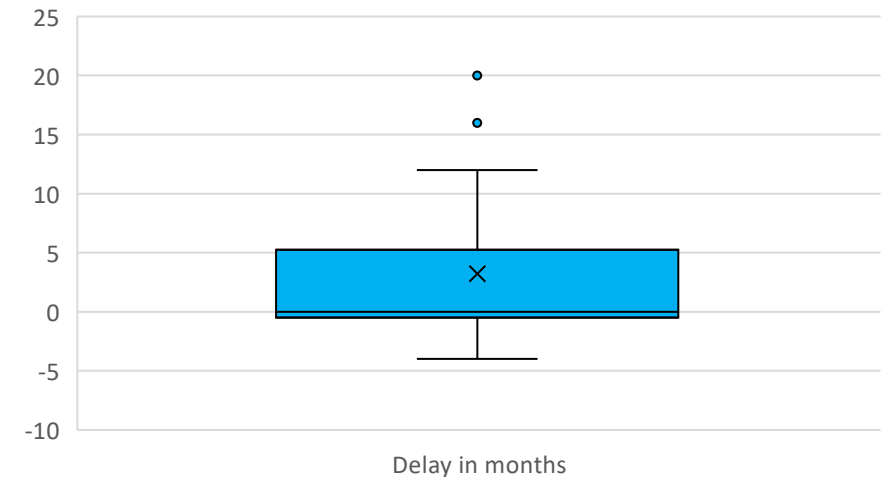
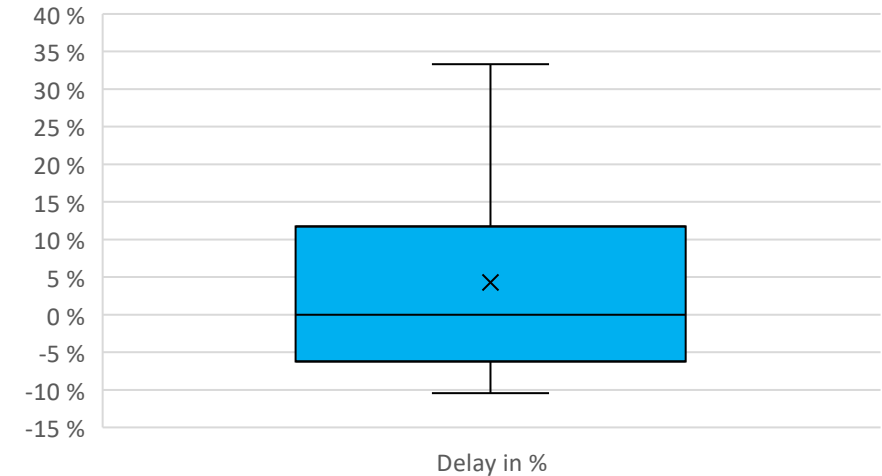


Results

Most projects were completed on time

| | Months | Percentage |
|----------------|--------|------------|
| Mean | 4 | 4% |
| Median | 0 | 0% |
| St.dev. | 7 | 13% |
| Min | -3 | -10% |
| Max | 20 | 33% |

| Project no. (delay) | Causes of delays |
|---------------------------|--|
| 6 (20 months, 27%) | <ul style="list-style-type: none"> Over-ambitious schedule. Higher tenders than expected, with subsequent need for retendering. |
| 2 (16 months, 24%) | <ul style="list-style-type: none"> Over-ambitious schedule. Postponed start-up after government approval. |
| 5 (12 months, 33%) | <ul style="list-style-type: none"> Over-ambitious schedule. Postponed start-up due to insufficient resources with the contractor. Demanding geological conditions (landslide and tunnel leakage). |

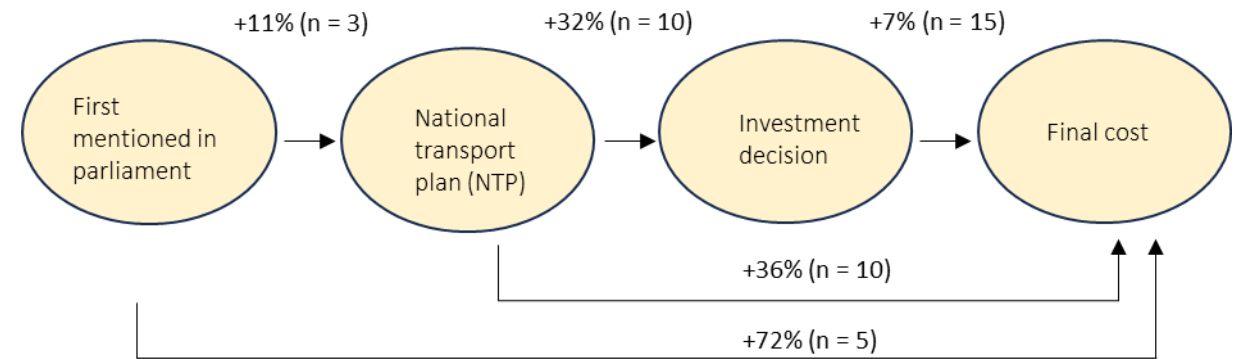


Most projects delivered within budget

29% of projects had a final cost above the budget (P85) and average deviation from the target cost (P50) was +7%.

| Project (overrun) | Causes of cost overruns |
|---|--|
| E39 Eiganestunnelen (33 %) | <ul style="list-style-type: none"> Poor competition in the market when the contract was tendered Inadequate design Standard creep due to new standards and regulations Demanding geological conditions |
| E136 Tresfjordbrua/ Vågstrandtunnelen (26 %) | <ul style="list-style-type: none"> Demanding geological conditions Deposit of surplus materials not properly prepared Demanding cooperation with the contractor |
| Fv64 Atlanterhavstunnelen (12 %) | <ul style="list-style-type: none"> Demanding geological conditions Delay Underestimation |

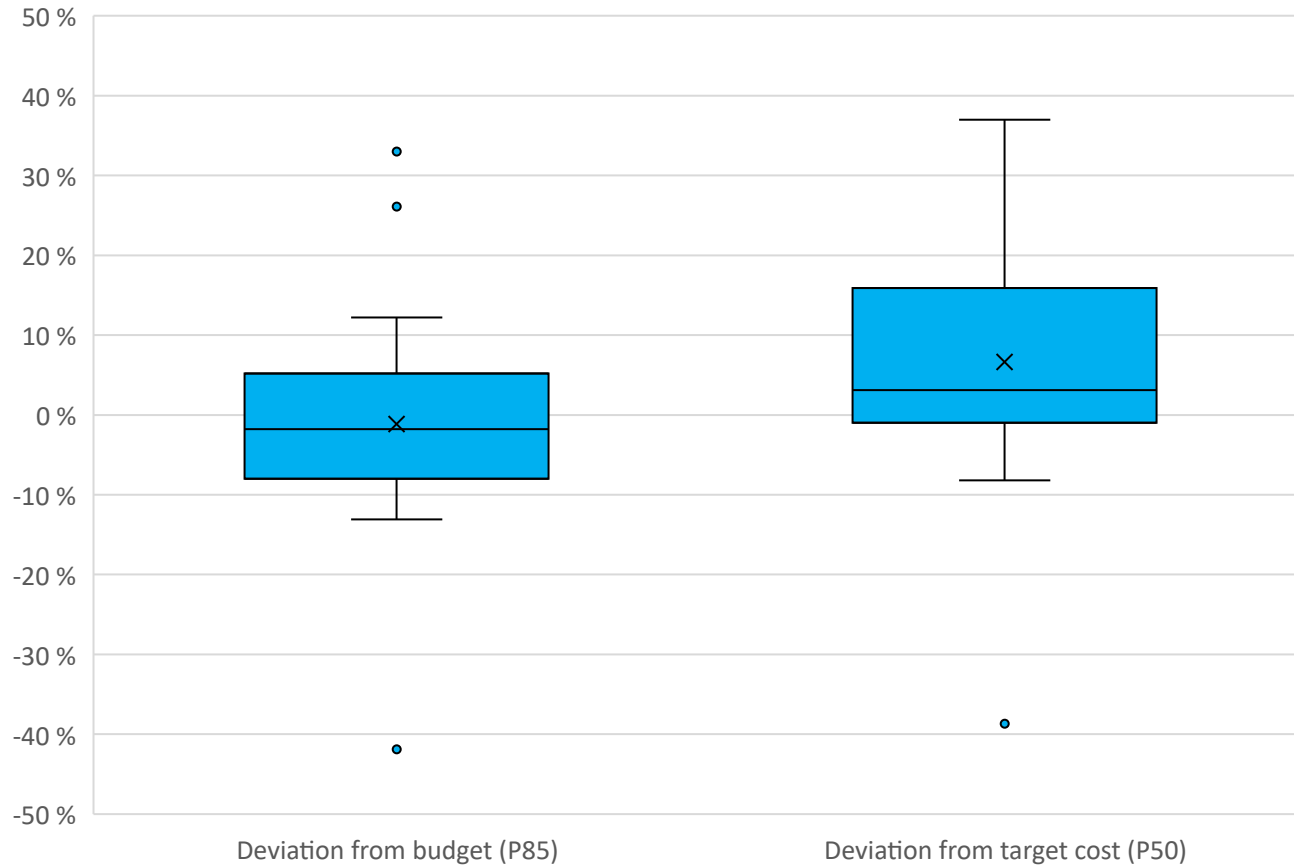
| | Min. | Max | Mean | Median | St. dev. | Proportion above |
|-------------------|------|-----|------|--------|----------|------------------|
| Target cost (P50) | -39% | 37% | 7% | 3% | 17% | 67% |
| Budget (P85) | -42% | 33% | -1% | -2% | 17% | 29% |



Cost increase in the front-end

- Projects typically experienced a 30-40% cost increase during their planning stages
- Cost increase from first announcement was significant

The results are skewed

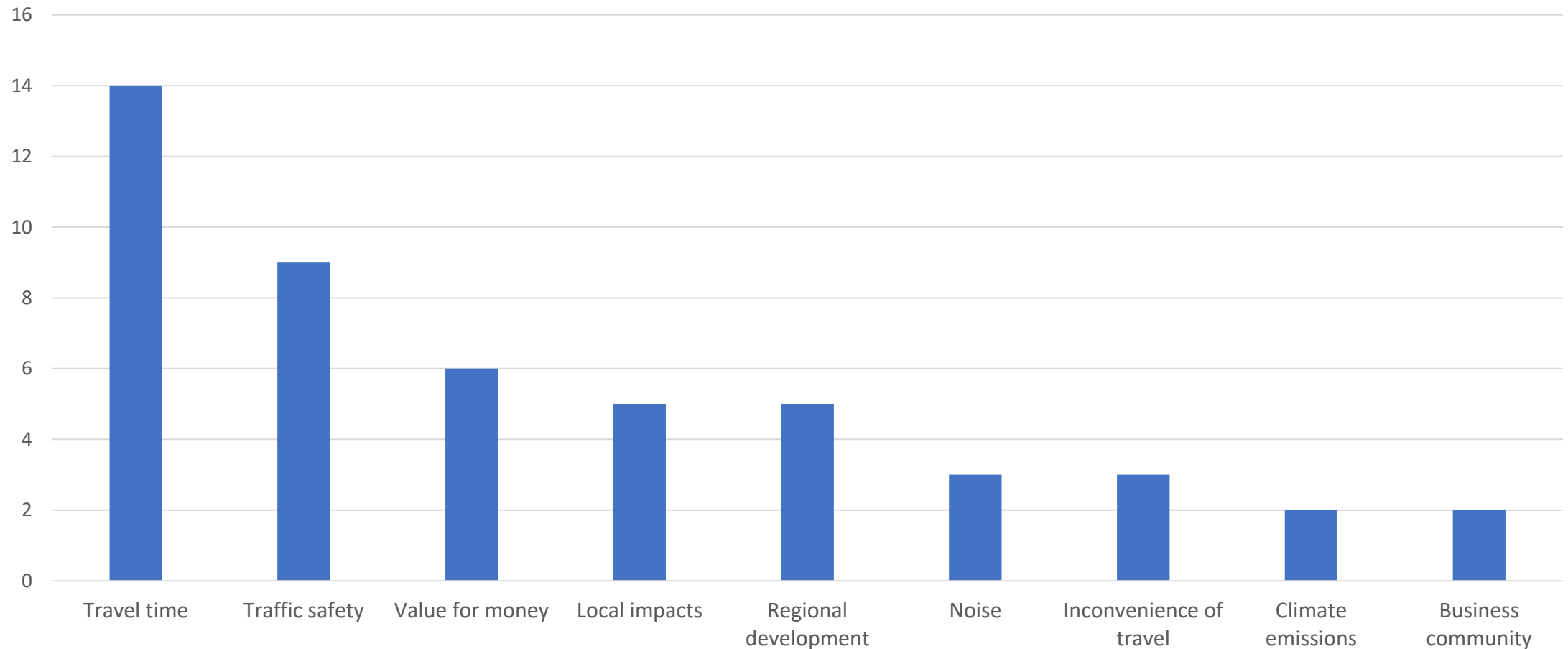


- 29% above budget
- 67% above the P50 estimate
- Only 53% of projects have final costs within +/- 1 standard deviation

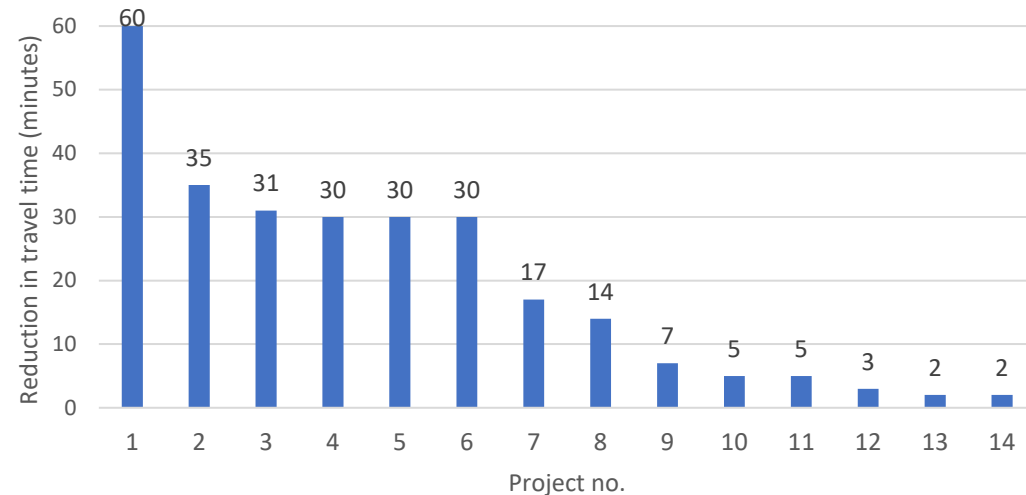
These results are not as good as those of previous studies of cost performance (which have included the projects in this study):

https://www.ntnu.no/documents/1261860271/1262022437/Open+Access+proceedings+Journal+of+Physics_+Conference+series.pdf/2b8a8e15-1a0f-dea1-a387-e9b71611219b?t=1726074544666

Ex-ante goals are typically on accessibility and travel time savings



First-order goals largely achieved



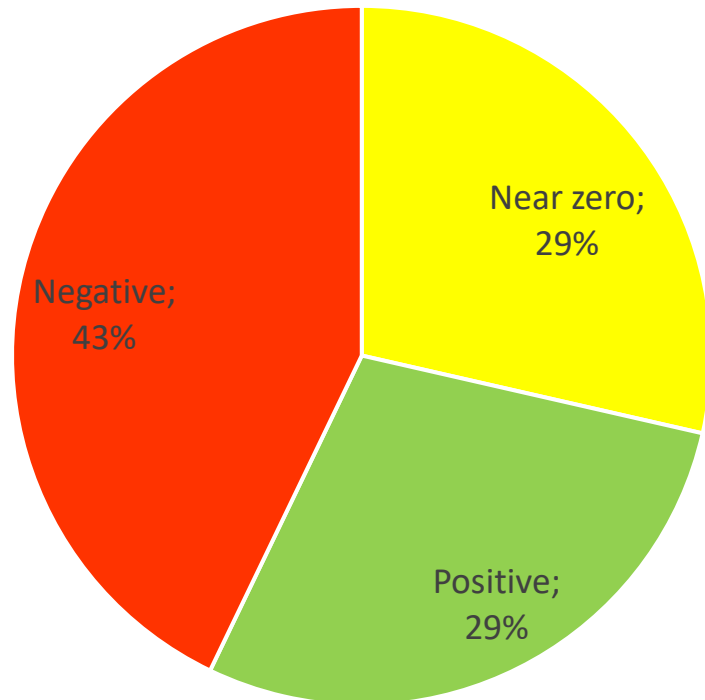
But....

- Lack of ex-ante baseline makes ex-post assessment difficult
- No prioritization between goals
- Lack of consistent programme theory
- No benefits management

| Project | Travel time | Traffic safety | Other goals |
|---------------------------------------|-------------|----------------|-------------|
| Riksveg 3/25 Løten-Elverum | Green | Green | Yellow |
| Rv13 Ryfast | Green | Red | Green |
| Rv7 Sokna-Ørgenvika | Yellow | Green | Yellow |
| E136 Tresfjordbrua/ Vågstrandtunnelen | Green | Green | White |
| Fv64 Atlanterhavs-tunnelen | Green | White | White |
| Rv13 Hardangerbrua | Yellow | White | White |
| E6 Åsgård-Halmstad | Green | Green | White |
| E6 Svingenskogen-Åsgård | Green | Green | White |
| Rv519 Finnfast | Green | White | White |
| E16 Kløfta-Nybakk | Green | Green | Green |
| E6 Riksgrensen-Svingenskogen | Green | Green | Green |
| E10 Lofoten fastlandsforbindelse | Green | White | White |
| Rv653 Eiksundsam-bandet | Green | White | White |
| E18 Momarken-Sekkelsten | Green | Green | Green |

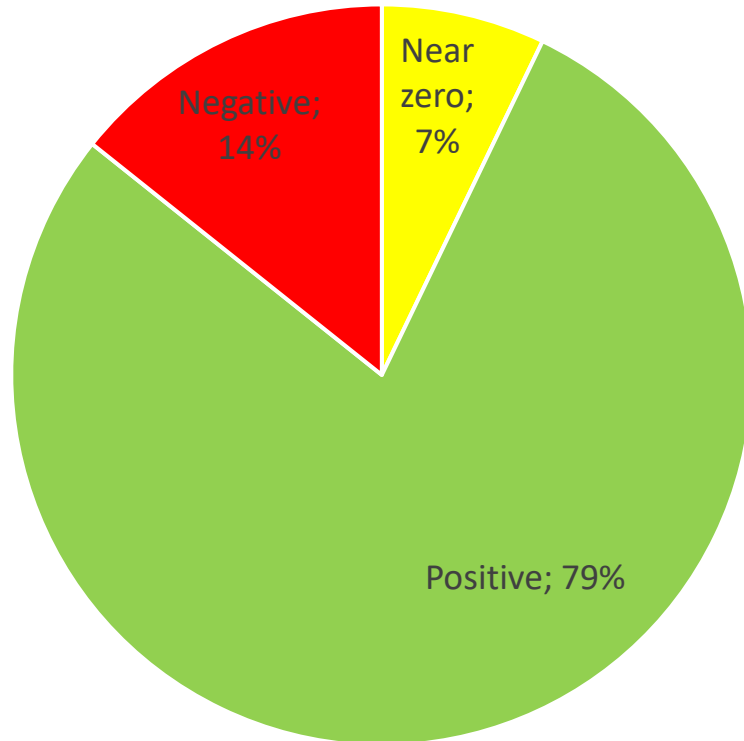
Poor estimated value for money ex-ante

Estimated net BCR ex-ante



- Only four projects with a positive net BCR
- Total NPV: EUR 25 million

Significantly higher value for money ex post



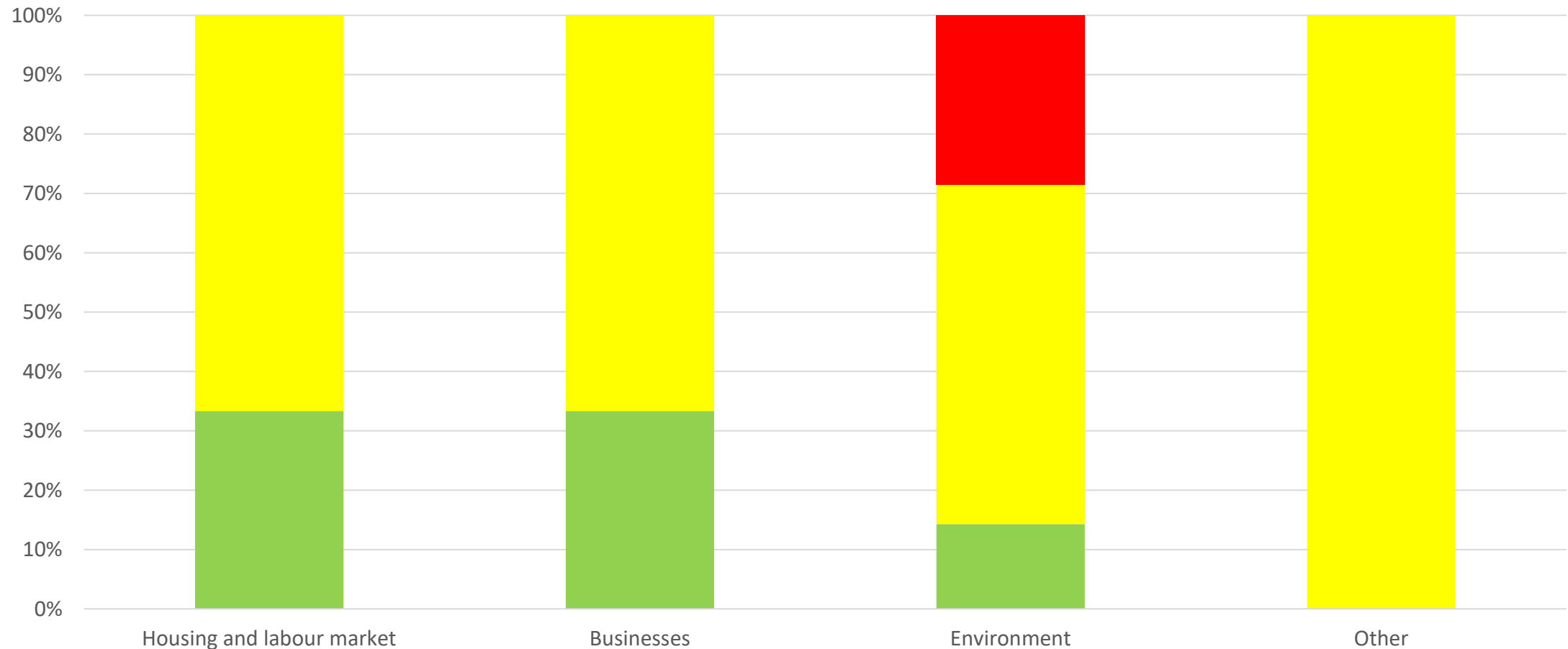
- Only two projects with a negative net BCR
- Total NPV: EUR 1 650 million
- Average increase in NPV (between projects): +2 300% (!)

The main reason for improved value for money is changes in appraisal assumptions

- Considerable changes in the discount rate (from 8 to 4%), analysis period (from 25 to 40 years), real price adjustment, etc.
- This can significantly impact appraisal results (see Concept-report no. 66)

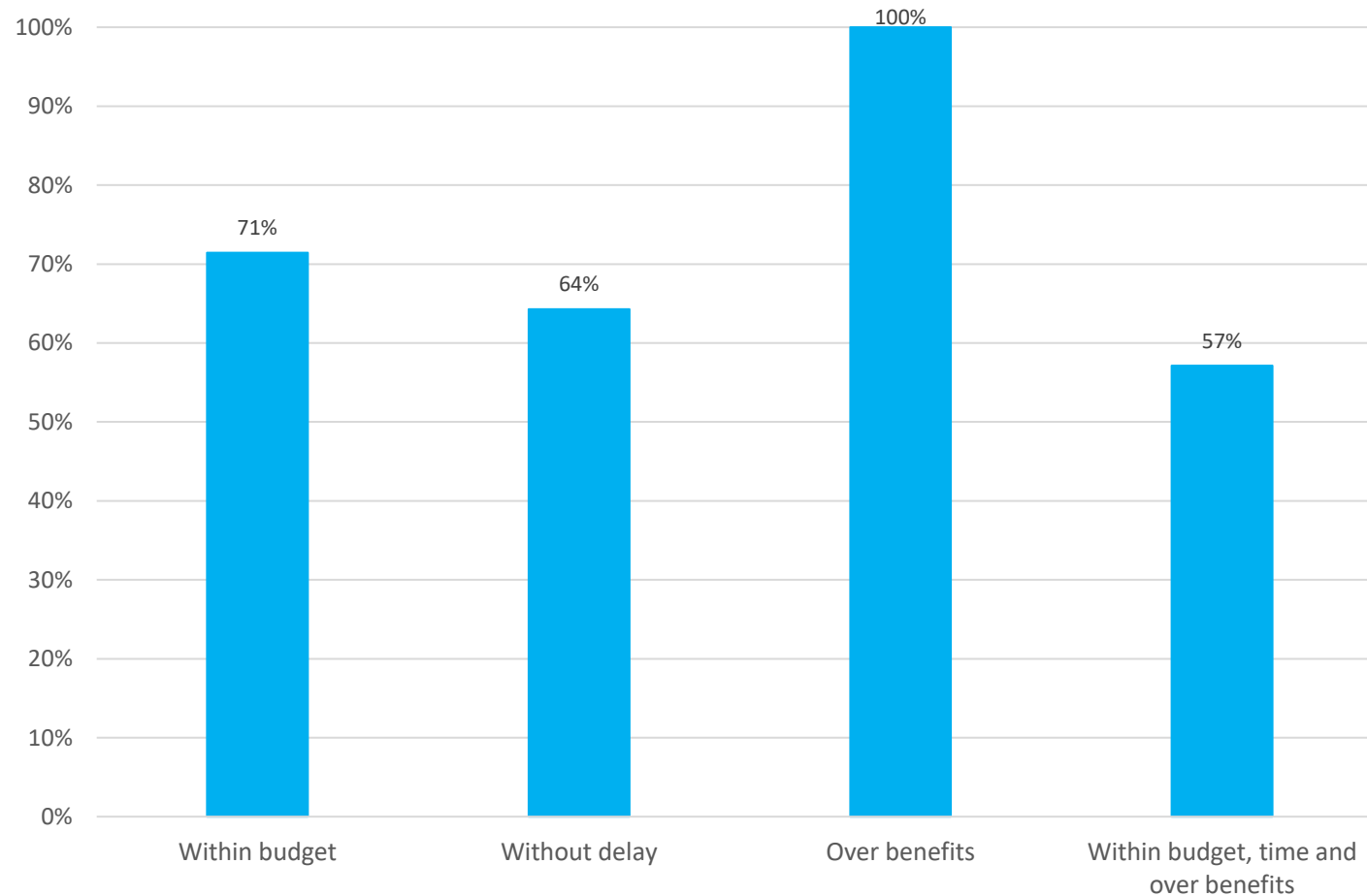
=> CBAs are uncertain, and an estimated net BCR may merely be a snapshot in a constantly changing world

Few projects have significant (positive or negative) wider impacts



Summary

“The iron law of project management”?



The Norwegian results do not match those by Flyvbjerg and associates.

Concluding remarks

- Room for improvement, but Norwegian road projects deliver well on short-term targets and goals
- No one owns long-term ambitious objectives – no sign of wider economic impacts
- No sign of apparent bias (no iron law...)

- Ex-post evaluation is useful for improving ex-ante planning and appraisal
- But only if the evaluation results are known and used in future projects

Some relevant references

- “Lessons from ex-post evaluation of government investment projects”:
<https://iopscience.iop.org/article/10.1088/1755-1315/1389/1/012025>
- “Cost and schedule performance in large government projects”:
<https://iopscience.iop.org/article/10.1088/1755-1315/1389/1/012027>
- “Learning through evaluation: the missing link in governance of projects”:
<https://ntnuopen.ntnu.no/ntnu-xmlui/handle/11250/3122283>
- “Public project success? Measuring the nuances of success through ex post evaluation”:
<https://www.sciencedirect.com/science/article/pii/S0263786322000862?via%3Dihub>
- “Measuring efficiency and effectiveness through ex-post evaluation: Case studies of Norwegian transport projects”:
<https://www.sciencedirect.com/science/article/pii/S2210539518300014>

The meta-evaluation will be published, in December, as a working paper here:

<https://www.ntnu.no/concept/arbeidsrapporter>, and hopefully published in a scientific journal later

Thank you!

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<https://www.ntnu.edu/concept>



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