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Over time or on time? A study of delays in large government projects

Concept report no. 69



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Concept-report no. 69

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ISSN: 0803-9763 (paper version)

ISSN: 0804-5585 (web version)

ISBN: 978-82-8433-018-1 (paper version)

ISBN: 978-82-8433-019-8 (web version)

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DATE: December 2022

PUBLISHER: Ex Ante Academic Publisher

Concept Research Programme

Norwegian University of Science and Technology

7491 NTNU – Trondheim

Norway

www.ntnu.no/concept

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English summary

Delays are unfortunate in that positive user effects and societal benefits occur later than planned. Due to faster technological development, delays can also reduce the lifetime of infrastructure, materials and software. Delays can also entail an additional cost for both client and supplier and be a source of conflicts. That is the research focus of this study.

Chapter 2 reviews some empirical previous literature on time use and delays. We refer both to various reports/evaluations and studies from the academic literature. The literature shows a clear skewed distribution where some projects are carried out according to the schedule, some very few in a shorter time and a high number are not completed according to the plan. There are a large number of fairly large delays. Based on the literature, it appears more likely that a project will be significantly delayed than that it will be completed much earlier than planned. There is no universal root cause for delays, and the causes can vary from country to country and between sectors but based on the literature we point to causes related to the planning, project characteristics, overall management/ organization, internal project reasons, reasons related to the contract strategy and the contract award, and reasons related to the supplier. For each of these general causal factors, there are several factors that lead to an increased risk of delays.

In Chapter 3, we describe the empirical strategy for carrying out the study. We first formulate the overall research questions, which are:

1. Do the projects have targets for time, and how binding are these?
2. How do government projects estimate how long it will take to implement a project?
3. What is the extent of delays in total, and are there differences between project types or sectors?
4. What affects the extent of delays?
5. Why are some projects carried out on time?

We use both quantitative and qualitative sources to answer the research questions. The database mainly consists of information obtained from open sources such as parliamentary proposals and some management documents and information obtained directly from the state agencies. Altogether, this gives us a data set of 113 projects with, among other things, information on the planned time for completion and the time for opening/commissioning. We do basic statistical analysis and simple regression. We also interview 11 resource persons from various sectors.

Chapter 4 presents the results. We find that the majority of the projects in the sample had formulated time targets when the investment decision was made. The time targets are normally not very specific. Time targets that contain a concrete month or date rarely occur. We point out that there has been little attention paid to time performance compared to cost performance perhaps because the cost is normally prioritized over time among the performance targets. This may have led to a less binding attitude towards this result target.

Scheduling is generally based on less developed estimation techniques than cost estimation. The feedback from the respondents is that estimating time is largely based on experience, expert judgments and, in some cases, pure guesswork. As long as deterministic point estimates of time have been accepted, there has been little development of either method or practice in this area.

In the statistical analyses, we arrive at the following main results:

- On average, large government projects are delayed by 11 months, the median is two months. There is great variation between the projects, which shows that the uncertainty linked to progress can be high.
- A majority of the projects, 55 per cent, are delayed to a greater or lesser extent.
- Among the projects that are delayed, the average delay is 20 months. The median is 12 months.
- Close to 50 per cent of the projects are at least one year late. One in ten projects is delayed by more than three years.
- A majority of roads, railways and buildings in the civil sector are being completed according to the timetables. Defence projects (buildings and materials) and ICT projects are delayed by at least two years on average.

- There is a 30 per cent probability that a random project will be 12 months late or more.

We also do univariate regression analysis of which factors cause delays (in months). These show:

- There is no significant relationship between project size measured in kroner and the probability of delay.
- Projects that are ongoing over a long period, i.e., that have a long planned completion time, tend to be more delayed by months than short-term projects.
- There is only a weak relationship between cost overruns and delays. It is not the case that a cost overrun automatically leads to a delay or vice versa.
- The average delay has been reduced over time, and the variation in deviations from the planned completion time has also been reduced.
- Our analyses do not suggest that projects in cities are necessarily more delayed than projects elsewhere.
- Delays in the time immediately following a parliamentary decision are propagated in the implementation phase and lead to delayed opening/delivery.

We use interviews to investigate more closely why projects are delayed.

According to the interviewees, the most important reason for delays is that a supplier/contractor has been chosen who, in retrospect, is believed to be unsuitable for delivering the project in accordance with the contract.

Furthermore, the interviewees point to various project characteristics which means that they are particularly exposed to delays. Urban projects and projects with new technology are subject to greater uncertainty in the opinion of the interviewees. This can result in challenges related to project implementation.

Ground conditions are another source of several challenges in projects and often lead to delays and cost overruns.

The client's organization with sufficient capacity and competence and its ability to manage the project effectively is considered a critical success factor in projects. If this fails, project implementation will suffer.

Since the results show that almost half of the projects in the sample are completed on time, we also discuss why certain projects are completed within the schedule. The reasons why projects avoid delays to a certain extent mirror the reasons why they are delayed, but while the interviewees largely pointed to the supplier as the most important reason for failure, they believe that the client's own organization should take the credit when you succeed. Having competent project staff and sufficient internal resources so the project can be carried out as expected is considered the most important success factor for good project progress. Several also refer to the importance of project ownership.

The interviewees also state that uncomplicated projects go as planned to a greater extent than projects where the delivery consists of new or complicated solutions. They also point to the importance of choosing the right supplier and that communication within the project, both between client and supplier, but also with users and external stakeholders can be important for success.

Even though the interviewees did not agree on whether the grant system with annual grants per project represented a problem, a majority of those who have an opinion on this would like better opportunities for real portfolio management or project-based financing where you get all or most of the project grant when the project is approved.

In Chapter 5, we summarize the results and make some recommendations on how to practice in large government projects can be improved. We first point out that since this study has been based on projects that have been completed, the results are to some extent characterized by selection bias. Several ongoing projects are experiencing major delays. The worst delays are probably not included in the sample at all. Therefore, it is likely that the real average delay is greater than what this study has documented. We have also based a fairly "liberal" interpretation of when a project should be finished, in the form of an interval. If several of the projects had had specific time targets in the form of a date, it may well be that the results would have shown greater delays.

Based on the findings of this study, we recommend that the ministries and responsible agencies emphasize the following:

- Better tools for uncertainty analyses of time.
- Testing the realism of the estimates against similar completed projects.

- Formulate a clear, but realistic, time for when the project will be finished and what completion entails.
- More standardized project descriptions in parliamentary proposals to increase transparency and facilitate verification.
- More emphasis on learning and systematic acquisition of experience from other projects.
- Standardized final reports.
- Broader set of evaluation criteria than price alone when awarding contracts. The realism of plans should be discussed with the supplier if this is possible within the chosen implementation model.
- Work with a common understanding of goals before starting. Develop incentive systems that reward rapid progress without this coming at the expense of HSE, quality and project benefit.

As far as we are aware, this is the first major Norwegian study based on data from several (government) sectors that documents whether large projects are carried out on time. Uncovering the extent of a problem is the starting point for possibly being able to do something about it.

Concept report series

Paper version: ISSN 0803-9763

Web version: ISSN 0804-5585

Norwegian version: <https://www.ntnu.no/concept/concept-rapportserie>

English version: <https://www.ntnu.edu/concept/concept-report-series>

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Concept report no. 69

www.ntnu.no/concept/

Forskningsprogrammet Concept skal utvikle kunnskap som sikrer bedre ressursutnyttning og effekt av store, statlige investeringer. Programmet driver følgeforskning knyttet til de største statlige investeringsprosjektene over en rekke år. En skal trekke erfaringer fra disse som kan bedre utformingen og kvalitetssikringen av nye investeringsprosjekter før de settes i gang.

Concept er lokalisert ved Norges teknisk- naturvitenskapelige universitet i Trondheim (NTNU), ved Fakultet for ingeniørvitenskap og teknologi. Programmet samarbeider med ledende norske og internasjonale fagmiljøer og universiteter, og er finansiert av Finansdepartementet.

The Concept research program aims to develop know-how to help make more efficient use of resources and improve the effect of major public investments. The Program is designed to follow up on the largest public projects over a period of several years, and help improve design and quality assurance of future public projects before they are formally approved.

The program is based at The Norwegian University of Science and Technology (NTNU), Faculty of Engineering Science and Technology. It cooperates with key Norwegian and international professional institutions and universities, and is financed by the Norwegian Ministry of Finance.

Address:

The Concept Research Program
Høgskoleringen 7A
N-7491 NTNU
Trondheim
NORWAY

ISSN: 0803-9763 (paper version)

ISSN: 0804-5585 (web version)

ISBN: 978-82-8433-018-1 (paper version)

ISBN: 978-82-8433-019-8 (web version)

