

Front-end Definition of Projects: Ten Paradoxes and some Reflections regarding Project Management and Project Governance

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Abstract

The importance of the front-end decision-making phase in securing projects long-term success is being increasingly recognized. This area is underrepresented in the literature, but there are several key themes that run throughout, identifying key issues or difficulties during this stage. Public investment projects do not always meet the expectations of different stakeholders. Many are delivered too late, at a higher cost, and do not meet the agreed quality standards. These are common problems that might have considerable adverse effect on operational costs and even the economic viability. In most cases, however, the long-term effects of such problems are minor. The more serious type of problems associated with projects is when they are not able to produce the anticipated effect. Clearly, a key to successful projects lies in the choice of concept.

This paper presents some findings from the work of the Concept research programme, which was initiated in year 2002 to explore front-end management and governance of major public investment projects in Norway. It offers some findings from the research, framed as a number of paradoxes, and their implications for theory in project management today, 12 years after its inception. The point of departure is the contention that a project evolves during its conceptual phase as the result of two interacting processes of analysis and decision-making. The studies explore strengths and weaknesses in these processes in the early phase before the final choice of conceptual solution is made, and the extent to which projects under study are (or are likely to be) *relevant* and *effective* in relation to needs and priorities in society. It concludes that there are frequent deficiencies in these processes, and that the potential for improvements is huge.

Introduction

A large and increasing share of the activities taking place in private as well as the public sector is organised as projects. In private sector projects, the ultimate goal is to improve the companys profitability, either directly or indirectly, through improvements in its competitiveness. In public projects, the commissioner is the government, representing the entire society and its taxpayers. In such cases, the benefits of the project must be considered in a broader societal perspective, to ensure that the project provides value for money and contributes to the desired development.

There are many challenges facing public investment projects that must be overcome to achieve project success, such as lack of competence among planners, avoidance of hidden agendas during planning, underestimation of costs and overestimation of benefits, unrealistic and inconsistent assumptions, and how to secure essential planning data and adequate contract regimes. Many of these problems can be interpreted in terms of deficiencies in the analytical or political processes preceding the final decision to go ahead. Hence, the importance of the front-end decision-making phase must be recognized to strengthen project governance.

The term *governance* is derived from the Latin word *gubernare*, meaning ‘to steer’. It refers to the administrative and process-oriented elements of governing, whether undertaken by a government, market, or network, whether over a family, tribe, formal or informal organization, or territory, and whether through laws, norms, power, or language (Bevir, 2013). Governance is about processes of rule more than institutions of government. It relates to processes and decisions that seek to define actions, grant power, and verify performance. Different instruments are available to improve governance, ranging from legally binding regulations, to economic and other types of incentives, as well as information and skill development. The challenge in governance is to identify the optimal mix of different instruments.

Project governance refers to the processes, systems, and regulations that the financing party must have in place to ensure that projects are successful. This would typically include a regulatory framework to ensure adequate quality at entry, compliance with agreed objectives, management and resolution of issues that may arise during the project, and standards for quality review of key appraisal documents (Samset and Volden, 2014). These processes and regulations can often be described in terms of stage-gate phase models.

Project management refers to the processes established to organize and manage resources required to complete a project within defined scope, quality, time, and cost constraints. Whereas the literature on project management is substantial, project governance has only recently become an issue of importance in the project management community (e.g. Müller, 2009).

Peter Morris (1994) brought to our attention that in the early years, project management had an extremely narrow focus, reflected only in the project life cycle, and ignoring the critical front-end. He noted that as long as we only focus on the life cycle itself, we are missing the critical front-end and institutional elements (shown in his Management of Projects paradigm) that more accurately typify the responsibilities of the project owner and the project manager.

The present study

In the year 2000, the Norwegian Ministry of Finance introduced a governance regime for the country’s largest public investment projects, the so-called Quality Assurance (QA) regime, in terms of a mandatory quality-at-entry scheme to meet such challenges. It is a simple stage-gate process with a top-down review of the quality of project proposals, which are typically the result of bottom-up processes of analysis and decision making in society. The Norwegian QA scheme includes two external reviews in the front-end: Quality assurance of the conceptual solution (QA1) before Cabinet decision whether to start a pre-project, and Quality assurance of the cost and steering frames (QA2) before the project is submitted to Parliament for approval and funding (see figure 1).

In parallel to the QA regime, the Norwegian University of Science and Technology in year 2002 initiated the so-called Concept research programme, designed to focus on the front-end management of major public projects. The governance scheme clearly would be a unique laboratory for research on longitudinal data. It has allowed researchers to follow the largest public projects in Norway since 2002. The Concept programme works to develop the research frontier in the area of project governance. This is undoubtedly an interdisciplinary field, and the programme has conducted separate studies in areas such as public management, project management, portfolio management, economic analysis, planning, decision-making, risk analysis, contract management, the theory of incentives, applied logic, and judgmental assessment.

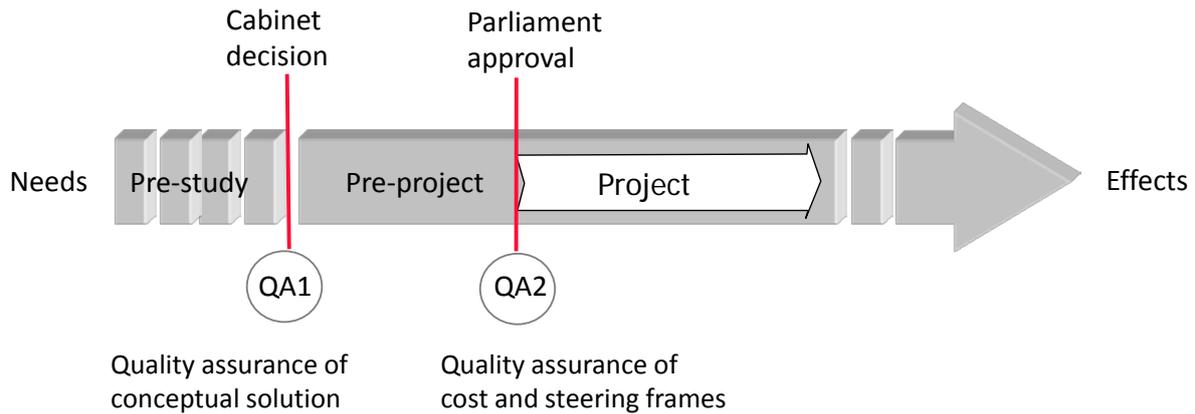


Figure 1 The Norwegian Quality Assurance regime, a stage-gate phase model with two external reviews in the front-end of major public projects. Source: Norwegian Ministry of Finance

The idea was to broaden the perspective on projects. To quote Morris (2009:60), “effective management of projects is more than just execution-oriented project management. Projects are undertaken to create value and deliver benefits. Shaping the interaction between the sponsor’s goals and the way the project (or programme) is to be developed, in the best way possible, absolutely crucial – probably one of the most important aspects of managing a project”.

This understanding is an underlying motivator of our research. However, the approach has been inductive rather than deductive. It has been more of a probe into new areas than a process guided by precisely formulated and theoretically founded problems. The perspective has been on projects as means to create value and deliver benefits. Some studies had a focus on decisions, others on analysis, but all of them were meant to provide insight into what is here termed project governance.

Miller and Lessard (2000) contended that the front-end phase from inception and until the budget is approved by Parliament takes 6-7 years on average in major public investment projects. This is also the case in Norway. The subsequent implementation phase takes typically 3-5 years, and projects will have to be at least three years into their operational phase before an ex post evaluation can be undertaken. The Norwegian QA scheme has now been in operation for 14 years involving about 20 new projects each year. This means that there is a tremendous time lag as regards availability of empirical data. During the early years of the programme, researchers were first left with the option to do theoretical desk studies, and then gradually shifting into more hands-on studies of procedures and practices in planning, quality assurance and decision making during the front-end phase as more projects were added. Only recently, empirical data are becoming available. At present, the total number of projects is about 260, of which only 50 have been implemented so far. In addition, not more than 10 projects have reached a degree of maturity that allow for ex post evaluations.

Fourteen years after the quality assurance scheme was introduced it has proved to have a positive impact on cost control, since almost 80% of the first 40 projects were completed below budget, which is quite remarkable (Samset and Volden, 2013). Getting to grips with the choice of conceptual solution and securing the strategic performance of projects may prove to be a much more complex matter. It is challenging, but no less interesting

The present study draws on some research findings from the Concept programme, presented below in terms of ten paradoxes, all of which have implications for the theory of project management and project governance, as well as a concluding study that demonstrates some of their implications. The term “paradox” in this paper is used to describe situations with a counter-intuitive result, some of which are based on fallacious reasoning or incomplete or faulty analysis. These are the paradoxes of:

1. how success is understood
2. the significance of front end management
3. early information overflow
4. the opportunity space
5. strategic alignment
6. cost estimation
7. disregarded analyses of costs and benefits
8. “predict and provide”
9. perverse incentives
10. myopic decisions

Their common denominator is that they all focus on the choice of conceptual solution. Each paradox is rooted in one or more studies in the program, but also inspired by research findings presented in the biannual international Concept symposia on project governance. According to Pinto (2004), these symposia “.. have provided much of recent theoretical and epistemological structure to the construct of project governance. Papers from these symposia have been on the leading edge of many of the insights we have on the current state of project governance”.

The three first paradoxes are not rooted in empirical research, but in desk studies and literature reviews. The remaining seven (number 4–10) are based on cased studies involving 5–40 cases, most of them are major public projects that have been subjected to external quality assurance under the Norwegian QA scheme. It should be noted that most of these studies are written in Norwegian only. The reports can be downloaded from the program’s website www.concept.ntnu.no, where also summary reports in English are available.

Since this paper can only provide brief snapshots of the studies, most of the references will have to be found in the underlying reports, and are only to a limited degree included in this paper.

1 The success paradox:

Success is measured in terms of tactical performance rather than strategic performance

The term “success”, used as an indicator, is a highly complex and aggregated measure. More than two decades ago Pinto and Slevin (1988), concluded that: “the concept of project success has remained ambiguously defined both in the project management literature and, indeed, often within the psyche of project managers... Until project management can arrive at a generally agreed upon determinant of success, our attempts to accurately monitor and anticipate project outcomes will be severely restricted”.

“Success” may be interpreted differently by various individuals and institutions. It may be measured differently in different types of projects, and different individuals tend to assess the success of the same project differently depending on their preferences, values and to what degree they are affected by the project. In addition, the degree of success is time-dependent. For instance, Aaron J. Shenhar et.al (2001) offer a chronological sequence of events as a compound definition of project success: (1) Meeting time, budget, and other requirements, (2) impact on the customer, (3) benefit to the performing organization, and (4) preparing the future. The projects stakeholders do not necessarily share the same view of success. The project manager typically sees his job successfully accomplished when the project is done on time, within budget, and to specifications. The users will be concerned about the immediate effects of the project, and the investor or commissioner will typically be more concerned with the long-term economic viability.

Success as a generic term means to gain advantage, superiority, accomplishment, achievement or added value. Measuring success will have to look beyond the immediate outputs of the project to assert the anticipated and wider impact in a longer-term perspective. A hospital will ultimately have to be assessed in terms of its health benefits. An industrial project might be judged essentially in financial terms, and an infrastructure project in term of its utility.

The assessment of success can be in absolute or in relative terms - that is in relation to what was agreed versus what was realistically achievable. *Ambition* is expressed in terms of the project’s stipulated objectives. Its *effectiveness* is a direct measure of what has been actually achieved. Clearly, success measured in absolute terms may give a misleading conclusion if objectives are unrealistically ambitious. By measuring in relative terms, that is in relation to what could reasonably be expected as compared with experiences in similar projects - the same project might possibly be considered a success.

The media tend to give unsuccessful projects more publicity than successful ones. However, their perspective is highly restricted. The number one criterion of failure in the media is cost overrun; number two is delay in time. Truly, a much wider view needs to be taken on the success and failure of projects. The initial choice of project concept is of critical importance. This represents the one key decision of many made during the lifetime of a project, which is likely to have the largest impact on long-term success or failure, Williams (2008). Here, by “the project concept” we mean much more than just the technical solution – it includes the entire business case, all of the various organisations involved, and the various mechanisms and arrangements involved in the inter-organisational relationships, see Miller and Hobbs (2009).

Here, it is necessary to distinguish between the projects’ *tactical* and *strategic* performance. Success in tactical terms typically means meeting short-term performance targets, such as producing agreed outputs within budget and on time. These are essentially project management issues. Strategic performance, however, includes the broader and longer-term considerations of whether the project would have a sustainable impact and remain relevant and effective in its operational phase, throughout its lifespan. This is essentially a question of getting the business case right, or, in short, of choosing the most viable project concept.

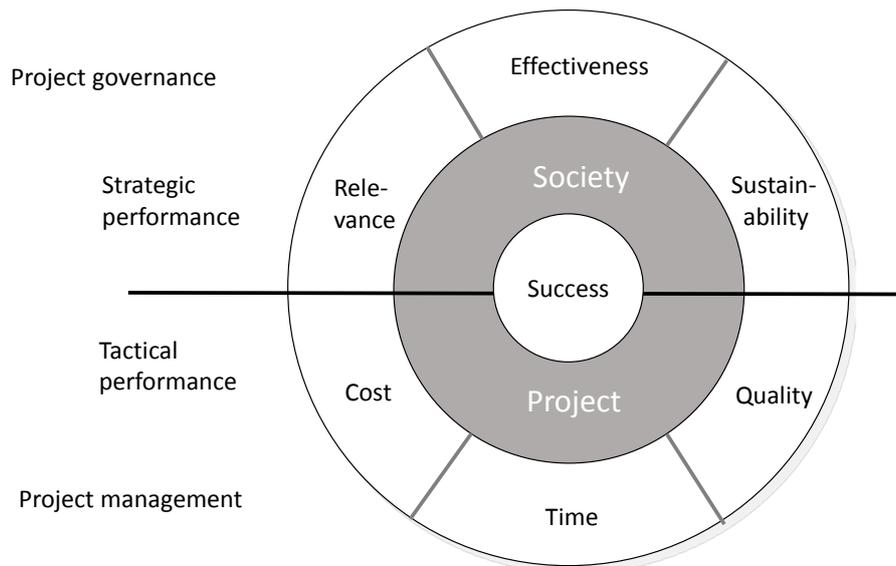


Figure 2 Successful projects. Tactical performance is a question of delivering the project outputs as planned, while strategic performance is the worth or utility of the project as seen in a long-term perspective (Samset, 2014)

This is illustrated in Figure 2. Tactical performance is a question of how the project is implemented, i.e. how inputs are converted into outputs. These are measures of its *efficiency*, here measured in terms of the cost, timing and quality of deliverables. Strategic performance is a question of how the project performs after the outputs have been delivered. This will have to be monitored with the more compound measures mentioned above, which would cover the broader and longer-term perspectives and to a lesser degree involve focusing on technology and management issues, but more on societal and economic aspects.

One example of tactically inefficient projects but viable in strategic terms could be the University Hospital in Oslo, Norway. Due to emerging new technologies and added responsibilities, captured during the engineering phase after the budget was decided, it was completed a year behind schedule and with considerable cost overrun, adverse newspaper reports and a public inquiry. No doubt that cost overrun was considerable in absolute terms, but in relative terms, it was equivalent to only a few months' operational costs for the hospital, and therefore insignificant in a lifetime perspective. The overall conclusion after a few years of operation was that the University Hospital was a highly successful project; and it would perhaps be unfair to suggest that initial decisions should be able to capture problems at this level of precision.

More serious by far is when a project fails in strategic terms, even if it successfully produces the intended outputs. It means that the choice of concept turns out to be the wrong one in relation to the problem at hand. In some cases, it may create more new problems than it solves, in others the initial problem no longer exists once the project is completed. One such example is an on-shore torpedo battery built inside the rocks on the northern coast of Norway in 2004, (Samset, 2008). The facility was huge and complex, designed to accommodate as many as 150 military personnel for up to three months at a time. It was officially opened as

planned and without cost overrun. Already one week later it was closed down by Parliamentary decision, since it was obvious to all involved that a potential enemy would not expose its ships to such an obvious risk; the concept had long since been overtaken by political, technological and military development. What was quite remarkable was that this project, which can only be characterized as a strategic failure, got much less negative attention in the media than the University Hospital, possibly because it was a success in tactical terms.

Clearly, a successful project is one that delivers its outputs and significantly contributes to the fulfillment of agreed objectives. Moreover, it should have only minor negative effects, its objectives should be consistent with needs and priorities in society, and it should be viable in the sense that the intended long-term benefits resulting from the project are produced. These requirements were first formulated for US-funded international development projects by the United States Agency for International Development (USAID) in the 1960s, and subsequently endorsed by the United Nations (UN), the Organization for Economic Co-operation and Development (OECD), and the European Commission (EC). (USAID, 1980) They comprise five requirements or success factors that have to be fulfilled, i.e.: the project's efficiency, effectiveness, relevance, impact and sustainability. These are tough requirements that go far beyond the issues that usually are covered by the media or indeed by many planners and decision-makers.

Applied as standard requirements both up front and ex post when projects are evaluated would be likely to improve project governance considerably in the future.

2. The paradox of the significance of front end management:

Less resources are used up front to identify the best conceptual solution (project governance), than to improve tactical performance during implementation (project management)

Projects are exposed to uncertainty in varying degrees and this is often used to explain their failures. Uncertainty characterises situations where the actual outcome of a particular event or activity is likely to deviate from the estimate or forecast value. Uncertainty may have many and various causes, related to the situation itself: the design of the project, the time perspective, available information, the implementation of the project, etc. (Ritchie and Marshall, 1993). Obviously, decision-making becomes difficult when uncertainty is high. Availability of relevant information reduces uncertainty from the decision-maker's point of view. It is widely believed that uncertainty is highest at the initial stage, when the project concept is conceived, and that it tends to reduce rapidly as information accumulates over time.

This line of thought is illustrated in Figure 3. It follows that the utility of adding information is at its highest in the earliest stage. It is also commonly believed that the decision-maker's flexibility and the cost of making amendments are opposites. This is visualized with a similar graph. Decision-makers can juggle with different ideas and strategic solutions to a problem in the initial stages, but once decisions are being made, essential choices become locked, and it is more difficult and expensive to change the overall design. Therefore, major issues such as agreeing on the most effective solution to a problem and the choice of concept need to be dealt with as early as possible - later on is too late. Less essential issues such as avoiding major cost overrun can be handled later, for example when the final budget is agreed.

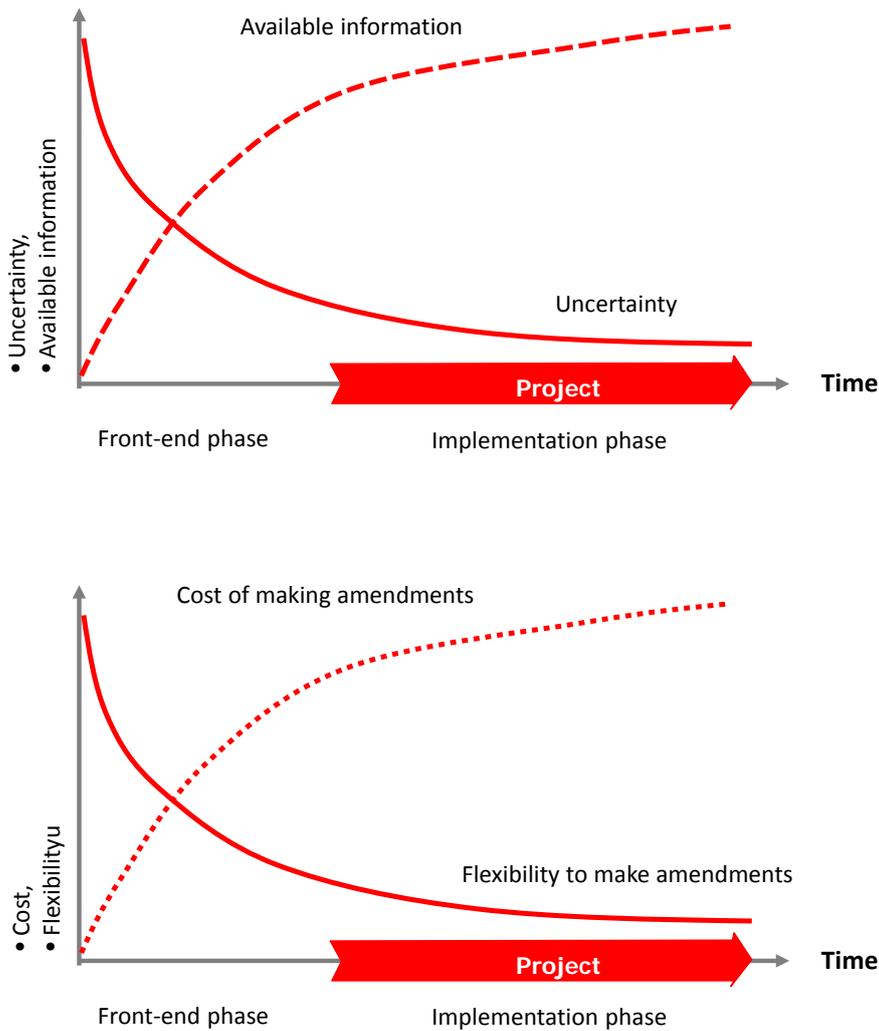


Figure 3 People’s conception of how uncertainty is affected by information and how flexibility to make amendments is restricted by cost, as time passes in a project. Source: Authors

In Figure 4, the distinction is made between the front-end and the implementation phase. The graph suggests that the potential to reduce uncertainty and risk is the largest up-front, and decreases substantially when the project is implemented. It is a paradox therefore that most of a project’s planning resources may be spent on detailed planning and engineering, while too little is usually spent on getting the idea right from the start where the potential to reduce uncertainty by means of adding information is the largest. The paradox is that most resources are used to reduce uncertainty during the implementation phase, where the potential is much less.

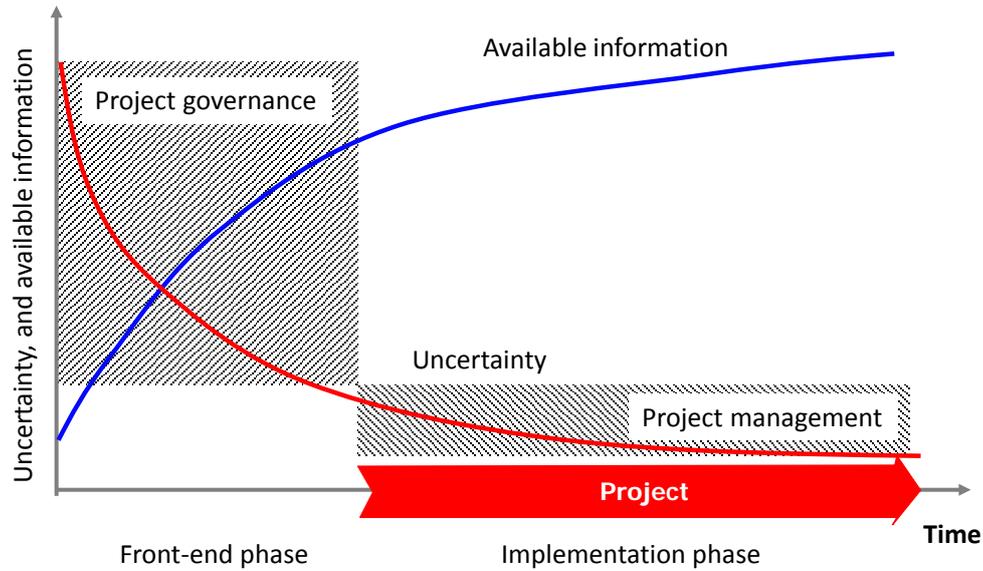


Figure 4 The project life cycle. Uncertainty is greatest in the front-end phase and diminishes as more and better information is acquired for making decisions. Source: Samset (2010)

Recent literature has highlighted the front-end phase including the project definition, as important for ensuring strategic project success (see for example Merrow, 2011 and Morris, 2013). Where projects fail strategically, it is likely that the problem can be traced back to decisions in the earliest phases, when the initial idea was conceived and developed. What happens during the front-end phase is therefore essential for a project's success. A study by the World Bank based on a review of some 1125 projects concluded that 80% of the projects with a satisfactory "quality-at-entry"¹ were successful, while only 35% of those with an unsatisfactory quality-at-entry achieved success. (World Bank, 1996) Improved front-end management is therefore likely to pay off in a wider life cycle perspective, as evinced by the IMEC study (Miller and Lessard, 2000). One way of improving quality-at-entry is by challenging initial ideas and applying simple analyses, extracting and making use of previous experience from similar undertakings, and consulting with stakeholders. Jordan et al. (1988) argued that 15 % of the time and resources in projects should be spent on front-end work, whereas Miller and Lessard (2000) suggested up to 35 %.

In most cases the key issue at the earliest stage is to shed sufficient light on the underlying problem that provides the justification for the project, and the needs that the project is meant to satisfy. Detailed information about possible alternative solutions is less relevant. This illustrates what seems to be a major dilemma, since most projects originate as one specific solution to a problem, while the problem itself may not be analysed sufficiently, and alternative solutions may not have been considered at all. Typically, the preferred concept originates in the mind of one individual, based on intuition and experience, rather than

¹ Quality-at-entry was used as an indicator to characterize the identification, preparation and appraisal process that the projects had been subjected to upfront.

systematic analysis of problems, needs, requirements, etc. Most of the information generated is associated only with the initially identified solution (Whist and Christensen, 2011)

A second dilemma is that this information, which may be very detailed and specific, tends to lock decisions into the initially preferred concept – to the extent that this will inevitably be the one that is finally chosen. It is all too rare that alternative concepts are identified and analysed to the extent that they get a fair trial in the subsequent decision process.

3. The paradox of early information overflow:

Decisions are based on masses of detailed information up front rather than carefully selected facts and judgmental information relevant to highlight the essential issues

It follows from the above that the front end phase is when fundamental choices are made, uncertainty is at its highest, freedom to choose is at its optimum, and available information is most restricted. Adding information, therefore, makes sense - but only to a certain degree. The crucial issue is not the volume but what type of information is needed.

But contrary to the idea depicted in Figure 3 the sheer *amount* of available information upfront might not be the issue. In the initial phase of a project the priority is to establish an overall perspective, and to analyse the problem in its context, considering the needs and priorities of stakeholders, users and affected parties, in order to come up with a sensible strategy. Opportunities and risks should be considered. Experience suggests that creativity, imagination and intuition can be more valuable at this stage than large amounts of data.

Decision making may be complex, unstructured, and affected by chance. Analysis may be biased or inadequate. Decisions may be affected more by political priorities than by rational analysis. Political priorities may change over time. Alliances and pressures from individuals or groups of stakeholders may change. The amount of information is large and may be interpreted and used differently by different parties. The possibility for disinformation is considerable.

Another aspect is that the early selection of a concept tends to survive decision-making, regardless of process, expert-driven rationalistic or more open-ended and democratic. This makes a strong case for proper research to identify the most viable concept up front. However, time factor, complexity and lack of predictability also imply that the outcome of rationalistic planning upfront tends to alter over time.

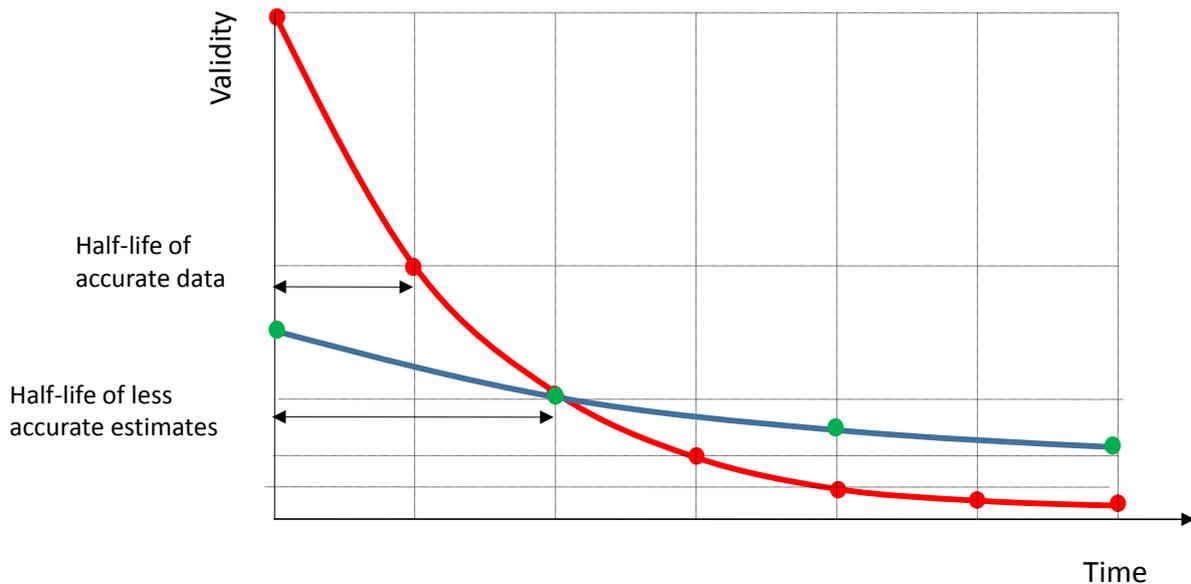


Figure 5 Half-life of information. Validity tends to decrease over time during the front-end phase. More rapidly for accurate data than for less accurate estimates. Source: Samset (2010)

Exact quantitative information tends to be more affected by time than the choice of concept. On the one hand it is obvious that the higher the precision, the more rapidly information is outdated.² It is tempting to speak of the “half-life of information”, see Figure 5. For instance, exact information about the demand in a fast-developing market will have limited value after months, or even weeks. On the other hand, there are many examples to suggest that qualitative assessments tend to remain valid for much longer. Consider the assessment of users fundamental preferences within a market segment. While it might not be possible to make a valid prediction of the actual demand three years into the future, it may be judged that demand will continue for a long time and can therefore be relied upon in strategic planning up front.

This suggests that restricted quality of information upfront may not be a major problem, since the need for precise information is low. It increases as the time for detailed planning approaches. In other words, the utility of exact information tends to reduce with the time-span. The opposite seems to be more of a problem: when decision-makers are confronted with an abundance of detailed information at an early point in time it may result in what is referred to as “analysis paralysis”. This problem is discussed by Williams (2008). And besides, the cost of collecting information on a specific topic usually increases progressively with the amount of information collected. This is because more information requires more in-depth studies or more wide-ranging information searches. On the other hand, the gain in utility of additional information tends to decrease. This is because there is usually a critical amount of information that is needed to get the necessary insight in a situation: Additional information

² We need of course to make a distinction between lasting information, for example physical data on the one hand, and less durable information such as economic estimates on the other hand.

will be of limited use. Maximizing the utility/cost-ratio will set a limit to the amount of information that is useful. (Jessen, 2012)

This emphasizes the need to invest in relevant information at the earliest stage of a project, while at the same time limit the search to what is useful for decision-making at this stage. A targeted search for information regarding the main uncertainties likely to affect the project is more cost-effective than an unguided search, since it makes it possible to increase the share of relevant information and reduce the total amount.

4. The paradox of the opportunity space:

The choice of conceptual solution is made without systematically scrutinizing the opportunity space up front

Every project is initiated to solve some problem or meet some needs. And every project faces a choice of concept in terms of how to solve this problem. Consequently, a key task in the early phase of a project is to identify possible ways to solve the problem it has been mandated to solve (setting up the opportunity space), furthermore to evaluate alternative concepts (limiting the opportunity space), and decide on the one best suited. There is much evidence to suggest that this is not always how things are done.

One problem is that planners are discipline experts with an inherent tendency to emphasize some aspects of the matter and downplaying others. The same may apply to organization undertaking the planning; its rules, procedures, etc. This is the reason for path dependency (Margolis and Liebowitz, 2000; Dosi, G. 1997); systematically choosing some solutions while avoiding others, even if these conflict with rational choices.

The situation become even more complex since these decisions are made at the intersection between the professional and political, in other words in-between what is rationally sound and politically possible. In the end, the complexity of the decision situation depends very much on whether there is agreement about what one wants to achieve and what are the best means to this end. (Christensen, 1985).

A case study of 17 major public projects was carried out to explore the use of the opportunity space, i.e. how it was defined, the type of conceptual alternatives identified and the effect on decisions. (Andersen et al., 2013). It was found that in 11 cases the choice of concept had in reality already been made when the front-end process started, only in six cases, truly unique alternatives were identified. In most projects the analytic focus was narrowed to detailed project-specific issues at the expense of overall societal aspects. In half of the projects, the opportunity space was restricted to such a degree that real alternatives were excluded. There was a strong degree of path dependency where the alternatives represented a continuation of the current solution or variations over a theme.

It was emphasized that these processes take place on the borderline between the professional and political spheres, especially since the political backdrop is what exerts the most restricting effect on the opportunity space.

What is politically feasible	+	Should be discouraged	Must be implemented
	-	Must be eliminated	Should be promoted
		-	+
		What is rationally conceived	

Figure 6 Categories of projects within the opportunity space. Source: Whist and Christensen (2011)

While the analytical process is largely within the realm of the professional constituency where the intention is to expand the opportunity space to allow identifying the best alternatives, the decision still remains with the political level. And the processes and decisions at this level are not always rational, as illustrated in Figure 6. The two dimensions of rationally derived and politically feasible span four categories:

- The win/win projects score well on both dimensions and “must be implemented” (Hydro power plant with no environmental downsides)
- Rational projects, but which are not politically mature, where a quality-at-entry approach, such as the Norwegian Ministry of Finance QA regime can aid in the decision process to get these promoted (close down nuclear power plants)
- Politically acceptable, even desired, but poorly conceived projects, these should be stopped, and the QA regime can help clarify the financial realities and thus kill such initiatives (Olympic games in a small country)
- The lose/lose projects have no support in either direction and should never go further (private exploration of space)

A separate case study of 23 major public investment projects, (Whist and Christensen, 2011) went deeply into how the analytical and political processes interacted during the front-end phase, in order to understand how this affected the outcome of the projects. It was found that the majority of projects started out with a predetermined solution. In about half the cases an unambiguous problem analysis was nevertheless carried out, and in one third of the cases new problems were introduced during the front end phase, Figure 7. The result was that two third of the projects were initiated with the same conceptual solution as the initial one, while in one third of the cases the conceptual solution was a different or changed substantially. Ten of the projects were considered relevant in relation to needs in society. Nine of these had a comprehensive problems analysis up front, and the Government had been a central actor in seven of them, while only in two of the thirteen projects were considered less relevant.

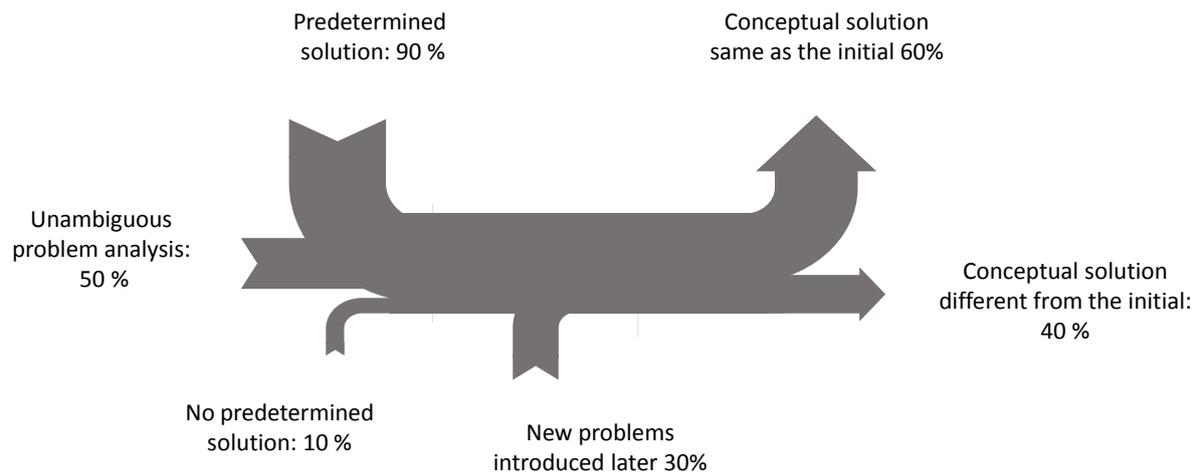


Figure 7 Path dependency in defining and agreeing on conceptual solutions up front. Source: Authors

These studies, and the examples mentioned, first and foremost illustrate the unpredictability of the political system in a mature democracy; a well developed, rational decision basis is no guarantee for a rational choice of concept. It was concluded that a scheme with external quality assurance of the decision basis provided to the political level had proved to have some positive effect in terms of helping make some choices more rational.

While the analytical part of the decision-making processes overall was rather weak, the participation of and control with the participating actors was considerable in these projects. From experience we know that a bad starting point may be adjusted through a successful decision-making process, even when the original idea was quite wrong. We also know that in many cases this does not happen.

This study demonstrated that there are many hurdles for any project. Democratic decision-making processes, particularly those which take long time, are complex and difficult to predict, and many will claim that this is a necessary part of democracy. If this is taken as a premise, the study suggested that the biggest potential for improvement lies in strengthening the analytical process. What would seem to be a reasonable compromise in front end analysis and quality assurance of major projects would be that the first step should be to identify and eliminate the worst alternatives. These are low hanging fruits and proper action can give a high reward with little effort. The next step should be to seek for good alternative concepts, but within reasonable limits, and not necessarily crave for the best, since the case will nevertheless be handed over to decision makers to conclude.

5. The paradox of strategic alignment:

Strategy and alignment of objectives are highlighted as essential concerns, but in most cases the internal logic of causalities and the probabilities of realization are erroneous

Alignment of objectives is the exercise to define the basic logical structure outlining the project by following the causal link from the basic needs of users and society, through defined

goals to the delivery of project results (outputs), their outcome (effects) and long-term benefits after the project is terminated (purpose). This needs to be done before starting significant work on a project or programme. Unfortunately, this is not always done and can result in significant underperformance compared to expectations. (Cook-Davies, 2011).

Any large projects, and particularly major public investment projects, are initiated in order to produce benefits for their owners (society). Many authors have studied success factors and predictors of failure, notably Morris and Hough (1987), Pinto and Slevin (1988), Miller and Lessard (2000); Flyvbjerg et al. (2003), and Hopkinson (2007). The available literature provides several different answers to why things go wrong and what could bring success in projects. Earlier literature tended to focus narrowly on the outputs in terms of cost, time and quality, whereas more recent literature may offer a wider perspective. For example, Morris and Jamieson (2005) study the processes, practices and people issues involved in moving from corporate strategy to projects. Their results are promising, though only based on four case studies. A common feature is that when projects' strategic success is low, the problem possibly lies in the early phases of the project and at the governance level (the owner perspective).

Some studies on international development projects have provided insight in this area. An analysis of a large sample of such projects concluded that most of the uncertainties affecting these projects were internal and not contextual, for a large part associated with aspects of management and the fundamental project design. (Samset and Haavaldsen, 1998) Consequently, the suggestion was that most of the problems ought to be met early, i.e. in the pre-study phase.

Youker (1999) concluded that the lack of shared objectives and agreement on the objectives of a project was one of the biggest problems facing international development projects. A study of alignment of objectives in development projects based on a sample of 30 international aid projects, concluded that most of the projects had design faults at all levels, and no projects were without faults. Typical problems identified were insufficient resources, and too many and unrealistically ambitious goals, (Samset, 2006).

The same analysis was repeated on a sample of 17 large public investment projects in Norway, (Andersen et. al, 2013). A project strategy will always be a hierarchy of goals that are interlinked in cause-and-effect chains that illustrate the ambition levels for a project, as well as their realism. Objectives were analysed in terms of their internal causality, and ambition. Complex statements were broken down in several single objectives.

The study found that in most of the Norwegian projects the goals are consistent with the needs, but there were shortcomings when it comes to achieving reasonable levels of clarity and ambition, as shown in Figure 8. For instance, when a project to acquire defence equipment presents "*stability within the international legal system*" as a societal goal and a limited road construction project expects to result in "*increased settlement*", we intuitively understand that the distance between cause and effect is too large and that the goals are too ambitious for the given project.

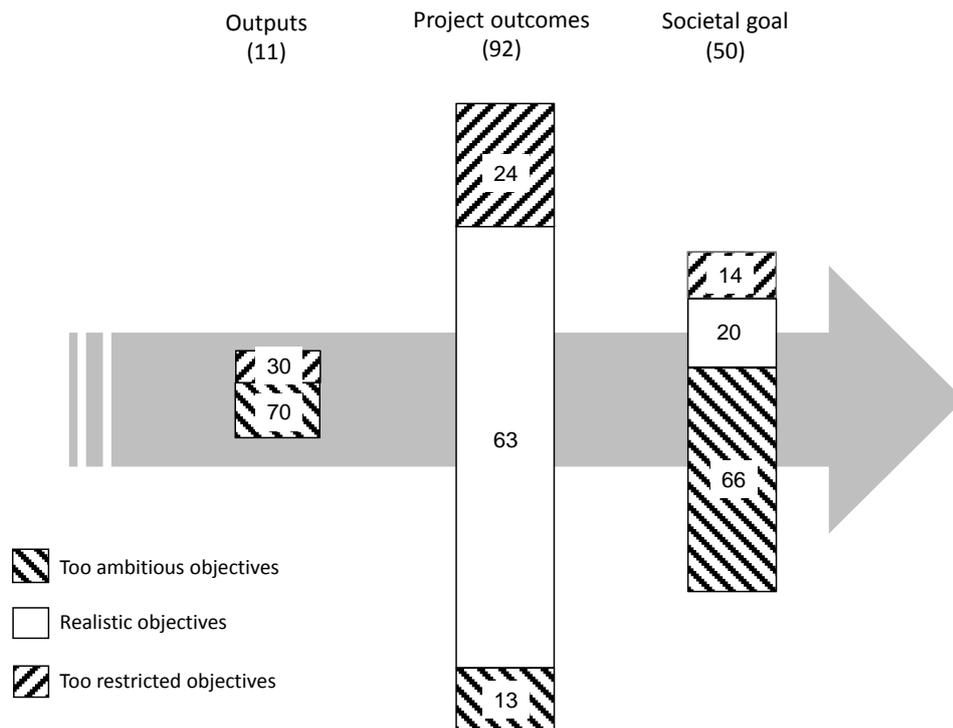


Figure 8 Assessment of the goals in the sample of projects in terms of location in the goal hierarchy and their level of ambition. (Samset, Andersen, Austeng, 2014)

Figure 8 compiles the findings from the study and breaks down the percentages of goals across the different goal levels. Of the total 152 goals presented by the 17 projects, by far most of these were defined as project outcomes with the majority of the remaining goals being societal goals. About a quarter of the project outcomes were in reality societal goals, while two thirds of the presented project outcomes actually were project outcomes. Also, a small portion of the social goals are completely unrealistic, while a small set of the project outcomes were in reality project outputs, i.e., specifying aspects of the project's deliverables. In total, none of the projects avoided erroneous definitions of goals, but they performed better than the international development studies mentioned above. But clarity seemed to be the largest problem. Five of the projects had in reality no societal goals whatsoever, while others had too many. One project had as many as seven societal goals. In such a case, the strategy is of little help to focus the efforts and clarify the purpose of the project. Regarding project outcomes, the majority of projects had 3-9 project outcomes, two projects even more than 10. The purpose of formulating an objective is principally to clarify the direction for that which is sought. The scope also needs to be stated so one may know when an objective is attained. Multiple objectives may confuse if they all don't point in the same direction. This is particularly evident if the objectives also conflict with each other. Objectives should give rise to common understanding among and motivation of all parties involved in or affected by a project. On one hand, this means that objectives should be unambiguous and realistic. On the other hand, to motivate, they also have to be well founded, to the degree that they are accepted. Moreover, the objectives should limit the enterprise or the strategy. This means that the resources allocated and the results anticipated should correspond.

In looking at customary practice in planning projects, the threshold for improvement seemingly is very low and the possibilities of marked improvement accordingly are great.

Regardless, practice indicates a need for more concise formulation of objectives in the front end phases of projects, at any rate to establish common understanding of where a project is going and how it will get there.

6. The cost estimation paradox:

The focus is on the final cost estimate (the budget), while early cost estimates are overlooked

We have already discussed how planners devote less attention to identifying the best conceptual solution than to improving tactical project success. This is understandable to some extent because planners find it easier to relate to tangible and quantified success criteria such as cost and time, than to multidimensional and qualitative assessments of societal benefits. However, the investment cost is tangible and concrete, and crucial both to the choice of concept and to tactical success. Although cost uncertainty is higher in the early stages, it too is tangible and manageable (e.g. Austeng et al., 2005). Planners should therefore be strongly committed to establishing a rough but realistic cost estimate in the early phase, for comparison with project benefits.

Under the auspices of the Concept research program a study of cost estimates in projects' initial phase has been conducted (Welde et al., 2014). The study explored a sample of 12 projects to determine the basis for and how the first cost estimates came about and developed during the whole period from the first initiative that was taken until the project was approved by Parliament. As shown in Figure 9 the first cost estimate in all 12 cases was far below of what was ultimately approved as the projects' final budget. The increase in cost estimates during the front-end phase ranged from +70% to almost +1300%, with an average of +650%. By comparison, the cost increase during the implementation phase was much less, and some projects were even completed below budget; the variation ranged from -19% to +186%.

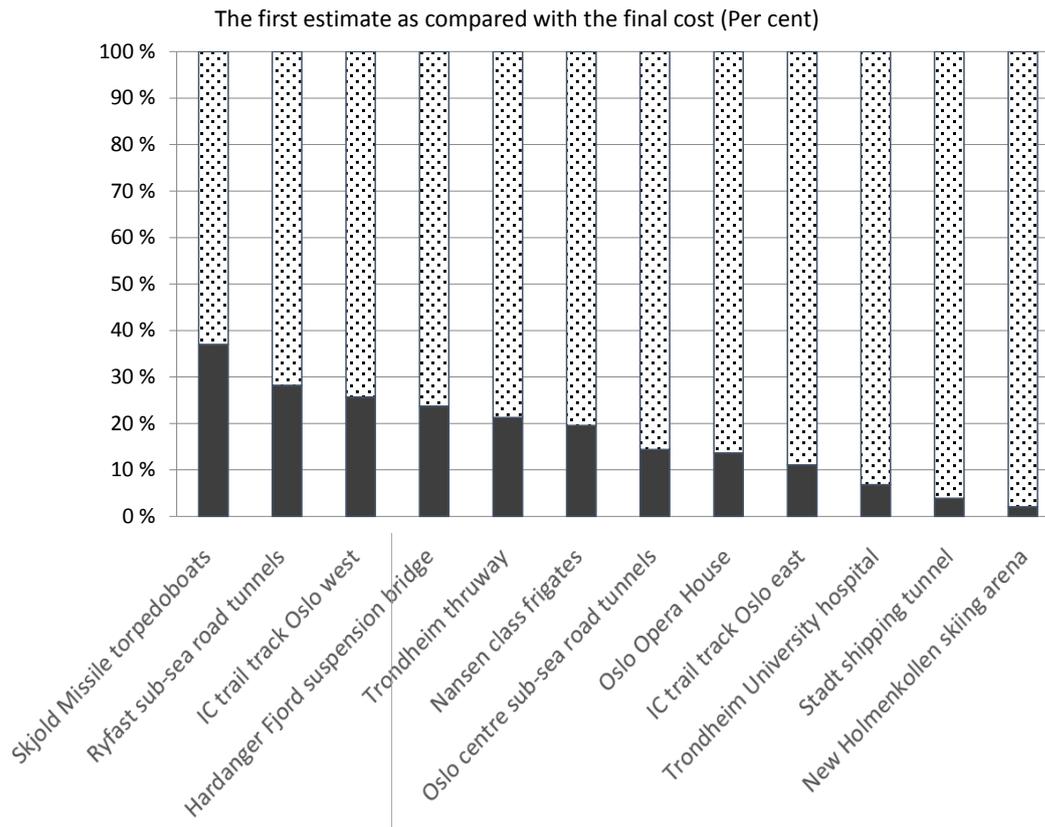


Figure 9 The earliest cost estimate as a percentage of the final cost, for 12 Norwegian projects. Source: Welde et al. (2014)

The study is a first probe into the matter of early cost estimation. More research is needed to determine the extent of the problem and its implications. However, it indicates that initial underestimation may be significant and result in the approval of projects that otherwise should have been rejected in the early stages. The authors considered it likely that at least 5 of the 12 projects would have been screened out at an early stage if the first estimate had been at a realistic level as compared with what was the final cost. The question is of course hypothetical, but there is no doubt that underestimation of costs at an early stage can have dramatic implications for project selection and is probably a far more severe problem than cost overruns in the implementation phase. Hence, it is clearly a paradox that so little attention is devoted to the initial estimate.

The report discusses possible reasons for the substantial underestimation in early phases. An often used distinction is made between political, technical, and cognitive reasons (e.g. Flyvbjerg, 2005). It may be very difficult to prove that the cause is political, but in several of the projects there were clear indications that the first estimate was deliberately low in order to increase the chance of the project idea being considered. This corresponds well with other studies that have attempted to prove that costs are underestimated deliberately to make the projects appear more attractive (e.g. Wachs, 1987; Mackie and Preston, 1998; Flyvbjerg, 2007; Welde et al., 2014). Wachs (1989) discusses how the most effective planner is sometimes the one who can cloak advocacy in the guise of scientific or technical rationality. In other cases the total investment was split between several projects that would have to be

approved separately in sequence. However, in the most of the projects there were also different cognitive reasons why costs had been underestimated up front. Over-optimism is a well-known phenomenon in cognitive research literature, see e.g. Kahneman and Tversky (1979). Further, the study discusses measures to reduce the problem of early underestimation, such as systematic recording of early cost estimates, the use of reference projects, of stochastic cost-estimation techniques, increased provisions for uncertainty to account for possible scope changes, and third party review at an early stage.

7. The paradox of disregarded analyses of costs and benefits:

Detailed estimation of cost and benefits is commonly done up front, but disregarded by decision-makers, who tend to emphasize other aspects

A substantial amount of resources is devoted in major investment projects to establish a decision basis. Detailed Cost-Benefit Analyses are often performed, and complex models are developed to simulate traffic volumes and other inputs to these analyses. However, there are indications that decision-makers have little confidence in Cost Benefit Analysis in Norway.

The transport sector is a special case. In this sector there is a long tradition of using Cost Benefit Analysis. A recent study conducted by the Concept research program, Welde et al. (2013) studied the significance of Cost-Benefit Analysis in the final prioritization of road projects in Norway and Sweden, where the approaches to such analyses in the two countries are very similar and unit prices are of the same magnitudes. The study revealed that the Cost-Benefit ratio had no significant impact on the selection of projects in Norway. On the contrary, many unprofitable projects were realized, such as spectacular tunnels and bridges in sparsely populated areas. By contrast, in Sweden, the results of the Cost-Benefit Analyses had somewhat more influence on the selection of road projects. Clearly, in the case of Norway there must have been other factors that were more important but that were not included in the analyses.

One explanation for low confidence in the Cost-Benefit Analyses could be weaknesses and shortcomings in the methodology, see e.g. Næss (2006 and 2012). The trend is however that more and more effects are included in the analysis, and the empirical basis for estimating realistic values is improving. See for example Vickerman (2008) on the inclusion of so-called wider economic benefits from transport infrastructure projects. Another explanation for low confidence could be strategic use of analyses to promote a desired result. One study, by Kvalheim (2014), examined a special case where nine Cost-Benefit Analyses had been made of one project, a shipping tunnel on the west coast of Norway. This study found a remarkable lack of consistency between analyses. The analyses were performed between 1990 and 2012, and the Cost-Benefit ratio varied from 0.2 (highly unprofitable) to almost 1.0, and even exceeded 2.0 (highly profitable) in an 'optimistic calculation' provided in one of the reports. The analysis reporting the most positive number was funded by local stakeholders, with no financial obligations. An interesting finding was that the relative weight put on different benefit components varied noticeably, as shown in Figure 10. This underscores the credibility of such studies. By 2014, the tunnel project had still not been approved for funding or finally rejected.

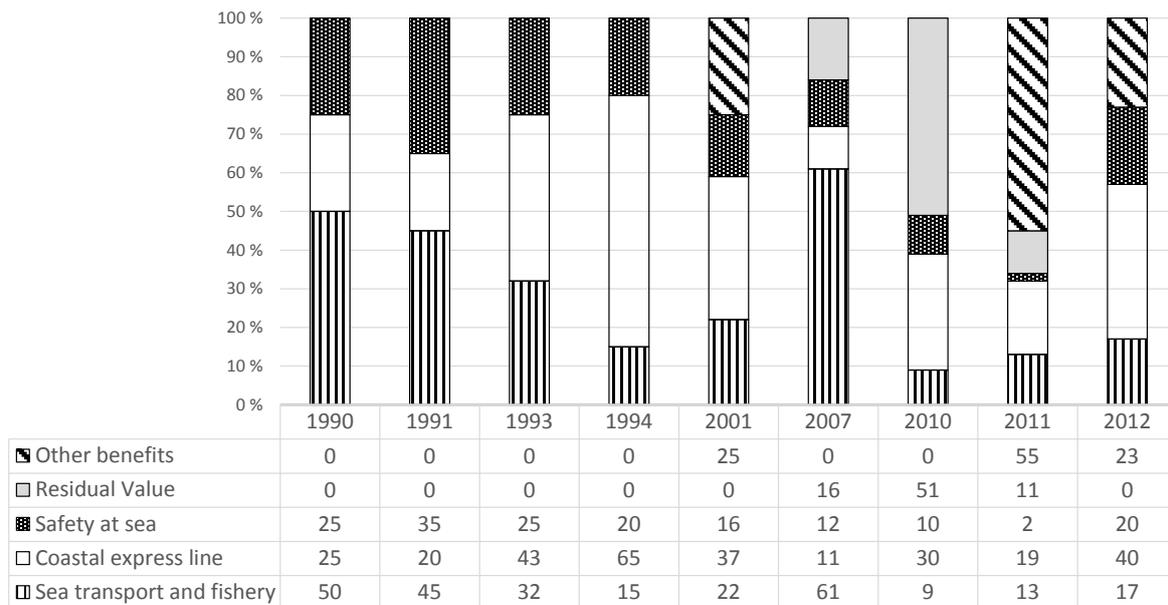


Figure 10 Percentage of the total monetized benefits in nine different cost-benefit analyses of the Stad shipping tunnel, showing how much weight was placed on the various components. Source: Kvalheim (2014)

Not all effects of an investment project may be quantified and expressed in monetary terms. Nevertheless, if they are relevant to the decision they should be systematically reviewed as much as the net present value. Norway is often regarded to be at the forefront internationally when it comes to including non-monetized impacts in Cost-Benefit Analyses. However Bull-Berg et al. (2014) reviewed a practice regarding non-monetized impacts in more than 100 economic analyses in Norway. With a few important exceptions, their findings are rather discouraging. The section presenting non-monetized impacts in the economic analysis is characteristically short, and not based on transparent methodology and well-documented processes. The study concluded that there is substantial potential for improvement and a need for guidance.

The paradox in this case is that so much effort is devoted to the calculation of a net present value that decision-makers may not find useful or credible. Clearly, planners should focus more on non-monetized impacts in economic analyses, as well as other complementary analyses such as cost-effectiveness analysis, impact evaluation, and multi-target criteria analysis. In addition, competence requirements are crucial to ensure high-quality analyses.

The above situation is mirrored in the World Bank, which made wide use of Cost Benefit Analyses for decades to demonstrate its reputation as a knowledge bank and its commitment to measuring results and ensuring accountability to taxpayers. However, according to the World Bank (2010), the percentage of projects justified by a Cost Benefit Analyses has been declining, and the cost-benefit ratio is now rarely mentioned in policy documents. These results are explained by a decline in adherence to standards as well as increased difficulty in applying Cost Benefit Analyses in new sectors where traditionally it has not been applied and where benefits can hardly be quantified. The situation is that economic assessments are not performed at all. The World Bank concludes that there is a need to recognize the difficulties in quantifying benefits, but at the same time quality, rigour, and objectivity must be ensured because poor data and poor analyses are misinforming and do not lead to improved results.

8. The paradox of “predict and provide”:

The tendency is to choose a “predict-and-provide” strategy rather than explore alternative solutions

Different perspectives can be taken when evaluating the need for an investment project. As discussed by Næss (2005), public planners tend to use a predict-and-provide approach. When confronted with capacity problems, the planners, who are often engineers, almost always recommend increased capacity based on estimates of future demand. However, unsurprisingly, there is often excess demand for public services and infrastructure offered free-of-charge to citizens. The need should not be defined narrowly as a need to increase capacity but rather as *a need to solve the congestion problem*. The latter allows for a variety of measures, including demand regulation, congestion pricing, and legal and informative measures, most of which are far cheaper than a construction project to expand capacity.

Our suggestion that needs should be considered in a broader perspective is supported by Odhage (2012), who studied early project planning in Swedish road projects. He found that the planners were never truly interested in finding and developing measures that would reduce the need for transport. This is obviously an example of path dependence, and Odhage asked the timely question ‘Can one expect anything different from a process that is run by the transport administration and concerns transport issues?’

Further, in many cases there are political goals for a development that is quite the opposite of a predict-and-provide strategy. Næss (2005) distinguishes between (1) needs defined by national-level political objectives, (2) market-based needs as measured by demand or willingness-to-pay, and (3) the needs of different stakeholder groups. As noted, public planners tend to narrow down the identification of needs to the second demand, while ignoring the broader spectrum of needs, and even political goals to reverse the demand trend. A country with high ambitions to reduce the emission of greenhouse gases will view increased traffic (i.e. growing demands for roads) as a problem.³ Similarly, in the university system, a purely demand-based approach probably would not necessarily lead to a distribution of graduates in line with society’s need for expertise in different disciplines.

The paradox in this case occurs when needs and benefits assessments in public infrastructure projects are decoupled from overriding political priorities and goals, possibly because such overriding societal goals are conflicting and multidimensional. The result of this is that issues such as scaling and capacity of infrastructure projects, highly political choices, are left to planners, who (i) have a tendency to define the problem narrowly as absence of capacity, and (ii) use readily available estimates of demand as a reference for adjusting capacity. There is obviously a need for project owners (the government) to clarify what needs should be taken as a starting point for planners, and to express them as clear objectives for the project. Only if the development given by trend extrapolation is a clearly desired one can the predict-and-provide strategy be readily used in individual projects, as illustrated in Figure 11.

³ In a separate study, Hagen (2010) discusses economic measures as accounting for external effects on the environment.

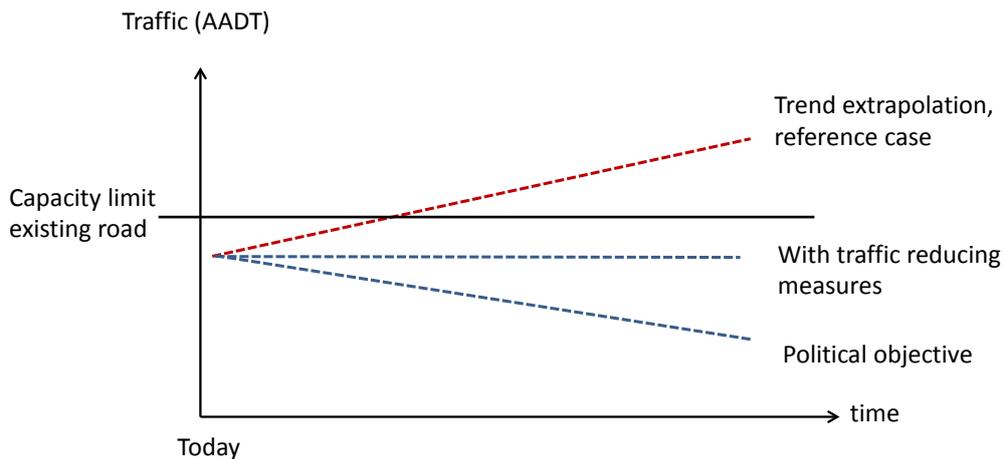


Figure 11 Traffic development in different scenarios, illustrating that the need for an infrastructure project follows from the assumption that capacity should adapt to demand. Source: Authors

9. The paradox of perverse incentives:

Public investments with no financial obligations for the target group may cause perverse incentives and result in counterproductive projects

The state often appears as a generous donor on behalf of taxpayers when financing projects that benefit specific groups or geographical regions. Such projects may be initiated either by the beneficiaries themselves or by the state out of pure altruism. There are indications that such projects often prove unsuccessful in strategic terms, and we should not be surprised by this. When a project does not entail financial obligations for recipients, there is no incentive to opt for the most socially beneficial or cost-effective alternative. Different actors may have a vested interest in certain projects being chosen.

The term *perverse incentives* refers to the situation where one or more actors are motivated to make choices resulting in a project that is a complete failure seen in retrospect. The theoretical basis is the principal-agent theory (e.g. Jensen and Meckling, 1976; Laffont and Martimort, 2002). There is a huge amount of literature on incentive problems in general, but less in relation to state-funded investment projects. A pivotal study in the field has been published by Ostrom et al. (2001), who demonstrate serious problems with perverse incentives in Swedish-funded aid projects that resulted in the waste of public funds and adverse side effects such as corruption.

Norway is a special case because the local government is financially weak and dependent on the state to finance local infrastructure. The State is rich due to revenues from the exploitation of petroleum resources. Whist and Christensen (2011) demonstrate how the early phase of state-funded investment projects in Norway is often characterized by ‘local rationality’ and complex coalitions. Samset et al. (2014) explored the phenomenon of perverse incentives in nine Norwegian state-funded projects, to illustrate how perverse incentives might occur, what the causes and consequences might be, and what could be done to avoid them. One aid project served as a reference case to demonstrate how wrong things can go. The study revealed that half of the Norwegian projects scored very poorly, particularly in a strategic perspective

(Figure 12). Some of these projects clearly would not have been prioritized had the recipient been required to contribute to the funding. Several projects were classed as supersized because they were ‘free-of-charge’. Moreover, Samset et al. (2014) found that costs were being underestimated and benefits overestimated in advance.

Project	Type of project	Year completed	Total cost (mill. NOK)	State-funded without liabilities for beneficiaries	Operational success	Tactical success	Strategic success
Hvaler-tunnelen	Subsea road tunnel	1989	200	No	Yes	Limited	Limited
Linesøya	Bridge	2011	250	Minimal	No	No	No
St. Olavs Hospital	Hospital	2014	13 000	Minimal	No	Limited	Limited
Turkana Fisheries (Kenya)	Development aid	1990	1 500	Yes	No	No	No
OL Lillehammer	Sports event	1994	7 500	Yes	Limited	Yes	No
E16 Lærdalstunnelen	Road tunnel	2000	1 050	Yes	Yes	Limited	No
Lofast	Subsea road tunnel	2007	1 367	Yes	Yes	Limited	No
Rock city	Cultural building	2013	50	Yes	Limited	No	No
Stad skipstunnel	Shipping tunnel	Not yet	1 800	Yes	n/a	n/a	Not likely

Figure 12 Selected findings from Samset et al. (2014), one aid project, and eight Norwegian state-funded investment projects without liabilities for the target group

The problem of perverse incentives is twofold: (1) actors who act out of self-interest, and (2) a financing party that fails to reveal that. Measures to solve or mitigate the problem should therefore also be twofold: (1) aligning recipients’ objectives with national objectives, through requirements such as co-financing and local risk taking, and (2) reducing the information asymmetry by introducing, for example, by information control, external review, and public hearings. The Norwegian quality assurance regime is thus a measure that is expected to reduce the problem of perverse incentives.

10. The paradox of myopic decisions:

Long-term viability is the intention but the planning horizon is too short, resulting in sub-optimal choices that one will regret later

Probably the most crucial strategic success criterion for an investment project is that it is viable and sustainable, i.e. that project net benefits are likely to continue in the long run (OECD, 2002).

Viability can only be determined in the very long run. Samset (2012) studied 10 projects from history, and found that only a few were still considered highly successful and thus viable more than 100 years after completion, whereas others had been closed down after a short time. Needs and priorities in society may change over the years, and therefore a project’s viability is contingent upon its ability to adapt to changing needs. Ironically, one of the most viable projects in the study was the Eiffel Tower, which was built for no other purpose than to be an exhibition object to showcase France as a leader in science and technology, but which later became one of the greatest tourist attractions in the world.

Since viability can only be determined in the long run, an assessment of viability *ex ante* must have a long-term perspective and the planner must be able to think creatively about possible future scenarios. It is not sufficient that the project is feasible and relevant on the opening day; planners must consider whether it will continue to be so throughout its lifetime. Lædre et al. (2012) studied 24 appraisal reports of major public projects from the period 2005-2011 with respect to their assessments of viability. The results were rather disappointing: needs and benefits were most often assessed in a short-sighted and static perspective; trends were extrapolated without discussing alternative scenarios; most attention was devoted to tangible effects, ignoring non-monetized impacts; and significant risk factors, such as political risk, were not identified and discussed. Such practice may lead to myopic decisions, which we are likely to regret in the future, as illustrated in figure 13.

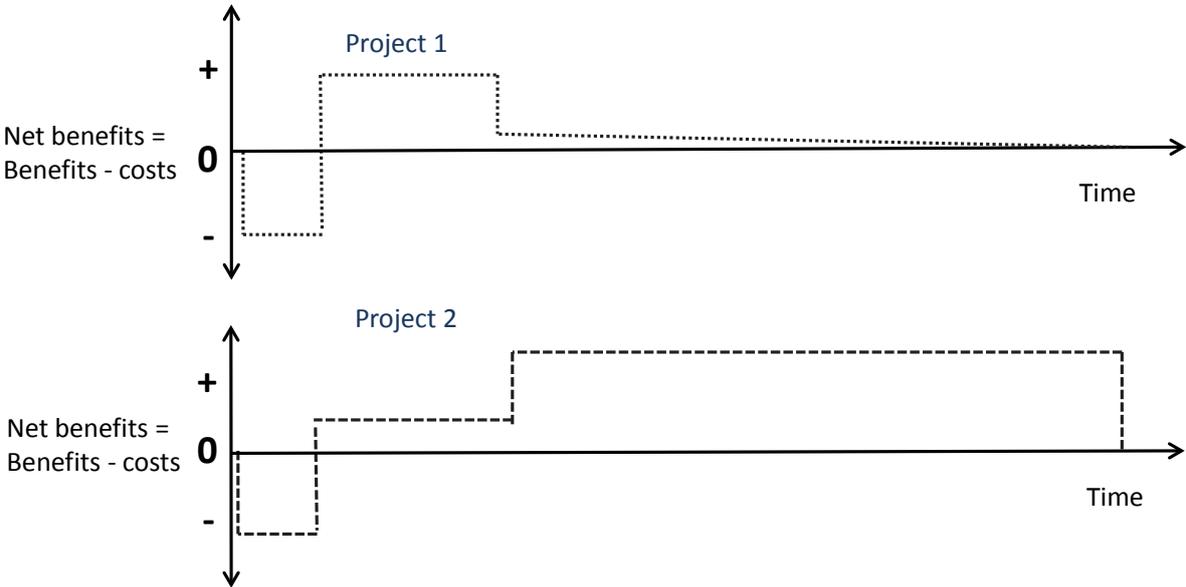


Figure 13 Illustration of myopic decisions. Two projects with identical investment cost have different net benefit flows throughout their life-time. In a long-term perspective it is clear that project 2 is more viable, but a myopic planner would emphasize short-term effects and choose project 1. For example, investments in preparedness and prevention capacities are often very low, something that one regrets later when a disaster strikes. Source: Authors

However, Lædre et al. (2012) also noted that no single analytical tool is able to comprehend all aspects of a projects viability *ex ante*. In particular, a Cost-Benefit Analysis, although intending to capture *all* economic impacts of a project, cannot provide sufficient analysis of viability, one important reason being the use of a discount rate. Therefore, in order to assess viability properly, several complementary tools combining quantitative and qualitative approaches are necessary. A separate study by Hagen (2011) goes further into the question of how the Cost-Benefit Analysis, through the use of a discount rate, leads to short-termism and neglect of future generations. However, Hagen also shows that it may be appropriate to use a *decreasing* discount rate over time. This would in fact increase the planning horizon and thus mitigate the problem.

The paradox in this case is that the emphasis on viability as a success criterion is far from reflected in project appraisals. Projects that are meant to last for decades and sometimes centuries may have significant impact on economic, environmental, and social development, yet they are still assessed in a short-term and static perspective. Lædre et al. (2012) offer some recommendations for how to obtain a broader and more long-term perspective in project appraisals. They involve shifting the analysts attention away from detailed estimations of investment cost to estimating future benefit flows and corresponding risk. Undoubtedly, evaluating a project’s viability ex ante can be challenging, but the alternative of finding out about its unviability too late is worse.

Discussion

Governance regimes for major investment projects comprise the processes and systems that need to be in place on behalf of the financing party to ensure successful investments. What happens during the front end phase is essential. Peter Morris (2011:7) writes that “It is evident from an extensive amount of research that management of the front-end definitional stages of projects is of overwhelming importance to their ultimate outcome yet we have little empirical data to suggest how best management competencies here should be improved.”

Project governance has only recently become an issue in the project management community. In order to move forward in this field we have to find answers to what would be the optimal mix of regulations, economic means and information in improved governance regimes. What seems to be an issue for the project management community is to lift their perspective beyond the delivery of the project itself and onto the broader issues of the projects utility and effects. It is obviously not only about the quality of analyses up front but also about decision processes. To arrive at the optimal conceptual solution based on rational analysis is of little worth if it is not the one chosen.

	Project number																							Sum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Analysis																								
Alternative concepts have not been scrutinized	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X				
Strategic underestimation of expected costs	X	X	X	X		X	X	X	X	X	X	X		X			X							
Inadequate/limited analysis of problems and needs	X	X	X	X		X	X	X	X	X	X	X		X			X							
Lack of realistic objectives and justification	X	X	X	X		X	X	X	X	X		X			X			X						
Tactical splitting up and sequencing of project	X				X		X	X	X	X				X	X			X	X		X			
Predictable surprises not taken into account	X			X		X				X		X		X										
Decisions																								
Disagreement regarding objectives and justification	X	X	X	X	X	X		X	X		X	X	X		X		X							
Expert advice overruled by political preferences	X	X	X	X	X	X		X		X	X		X		X	X	X							
Long lasting front end phase with shifting priorities	X	X	X		X		X	X		X		X		X		X			X		X			
Repeated playoff in political decision process	X	X			X								X		X								X	
Perverse incentives - benefits without liability				X			X	X							X					X				
Political horse-trading between competing parties			X		X						X							X						
Sum	10	8	8	8	7	7	7	7	6	6	5	5	5	4	4	4	4	4	4	3	2	2	1	1
Relevance of the project																								

Figure 14 There is a consistent tendency that projects that are considered relevant have less flaws in the analysis and decision making processes up front. (Samset, 2008)

The Concept program did a pilot project on a sample of cases to illustrate this (Samset, 2008), which was followed up with a more in depth study to explore the quality and interaction between analysis and decisions during the front end phase (Whist and Christensen, 2011) and

a broader follow-up of the pilot, (Samset and Volden, 2013). The result is displayed in Figure 14, where the flaws for the individual projects are plotted with “X”. The summary row at the bottom are marked to signify whether they are considered relevant as seen in relation to needs and priorities in society (white colour) or not (black). Each project is represented with one column. The columns are sorted from left to right according to the observed number of flaws. The resulting pattern suggests that the least relevant projects have a lot of flaws in their analytic and decision making processes (between five and ten). The ones that are regarded relevant on the other hand have much less flaws (between one and four).

The studies concluded that there is a strong tendency to choose the initial concept and stick to it, almost regardless of how bad it is. Also, there is an overwhelming inertia. Once the train has been set in motion – it is always impossible to stop. This goes a long way to explain the red projects on the left hand side. Further there is a third common tendency, that incremental improvements of an inferior solution are preferred rather than fundamental change.

On the other hand experience also suggests that the opportunity space is usually larger than envisioned – and it is often largely unexplored. What was evident, however, was that the green projects seemed to have been exposed to more vigorous analyses and decision processes that were less affected by disagreements, political preferences, lengthy processes and repeated playoffs in the political decision processes.

Conclusions

This paper reports from several in-depth case studies of major public projects, and identifies a number of paradoxes that could guide further research. In various ways the paradoxes point to two types of problems, i) problems of efficiency in terms of delays and cost overrun, and ii) more fundamental problems that have to do with the projects strategic success (choosing the wrong concept). Project management as a discipline should be concerned with both problems. To quote Peter Morris: “The discipline needs to be less inward looking: more relevant, not just to the sponsors needs but to societys challenges in general. We can foresee several changes in the years ahead in the ways projects and programs will be managed, but the obvious immediate needs are to focus more on improving sponsor value and on shaping the context in which projects and programs are formed and implemented” (Morris, 2013:23).

Many of the problems facing major public investment projects can be interpreted in terms of deficiencies in the analytic or the political processes preceding the final decision to go ahead, and the complexity and uncertainties affecting these processes. In particular, the fundamental problems with strategic success could typically be traced back to deficiencies in the earliest preparatory phases of the project. The role of the front-end phase in ensuring project success is therefore crucial, as highlighted in the literature (Morrow, 2011, Morris, 2013).

Project governance is the processes, systems, and regulations that the financing party must have in place to ensure that projects are successful, strategically as well as tactically. Many organisations have introduced stage-gate phase models, also the Norwegian Ministry of Finance, who introduced a QA scheme to ensure the best choice of concept (QA1) *and* efficient project implementation (QA2) in year 2000. Our research indicates that QA2 has already led to improved cost control. It is still too early to conclude that QA1 has improved the choice of conceptual solutions and projects strategic success, but there is evidence to suggest that an independent review of the project appraisal documents at a very early stage has a positive effect. There are many fundamental challenges that will have to be dealt with, such as tactical budgeting in local communities and responsible agencies at various levels, which is done in order to increase the chance to obtain government funding for a project.

Another challenge is to ensure a transparent and democratic process and avoid adverse effects of stakeholders involvement and political bargaining. But also to make the process predictable is a major challenge. The QA regime attempts to remedy these problems.

One salient conclusion from the research is that ex post evaluation should be an essential element in any project governance scheme. When a project succeeds at all levels, it should be imperative to ask what was done right. Correspondingly, one should learn from mistakes. However, experience shows that the use of evaluations for learning purposes is limited, and this is particularly true in the public sector (Samset and Christensen, 2012). The tendency is to look ahead with the concern of how to spend next years budget, rather than look in the rear mirror to learn from experience.

As a lead part of the current trailing research on Norwegian public projects, the Concept research program has since its inception been concerned with project evaluation and evaluation methodology as evidenced in several studies, including those by Olsson (2005), Andersen et al. (2007), and Volden and Samset (2013). The latter is a summing up of four pilot evaluations of so called QA projects. It recommends that systematic ex post evaluations of public investment projects should be carried out to learn from experience, not least how they perform in a strategic perspective, with the aim to improve public investment projects in the future. Under the auspices of the program therefore, a number of the major investment projects are now being evaluated, and this will continue in the years to come. Figure 15 shows some main results for the first nine projects.

Project	Efficiency (tactical project success)	Effectiveness (strategic project success)
Svinesund national border control facility	☆☆☆	☆☆☆
Sandvika-Asker inter-city rail line	☆	☆☆
Momarken-Sekkelsten, section of a highway	☆☆	☆☆
Skjold class missile torpedo vessels	☆☆	☆
Eiksund road system	☆☆☆	☆☆☆
Lofast road system	☆☆☆	☆☆
E6 Riksgrensen-Sv.skogen, section of a highway	☆☆☆	☆☆☆
NAV ICT basic project	☆☆☆	☆☆
Svalbard Science Center	☆☆☆	☆☆

Figure 15 Main results from ex post evaluations of nine Norwegian investment projects (three stars = high success, two=medium success, one= unsuccessful). For more detailed results, see the evaluation reports, available on www.ntnu.no/concept

Clearly, projects may fail even when formal rules for planning and decision making have been adhered to. Democratic decision-making processes, particularly the long lasting ones, are complex and the outcome difficult to predict. Many will claim that this is a necessary part of democracy. If this is taken as a premise, one could conclude that the biggest potential for improvement lies in strengthening the analytical process, as well as making decision processes transparent.

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