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Section 2. The Proposal

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Abstract

This section discusses different views and perspectives on success, and how projects can be defined in terms of their tactical and strategic performance. Further how quality-at-entry can help to assure project performance and viability. It takes a look at what a proposal for a project is and what it needs, with a particular view on the alignment of needs, objectives and anticipated effects. It presents an approach to defining possible project concepts, and how to identify systemic borders to guide the selection of alternatives. Strength and weaknesses of making essential analyses up front with very limited information is highlighted, and how to apply probability assessment and logic in judgmental assessments. There is a special focus on estimating cost and benefit throughout the front-end phase of the project. Also, some essential lessons and common pitfalls in projects that can be associated with analyses and decisions in the earliest phases are discussed.

Finally, financing mechanisms for projects and their characteristics are presented, their features and strength and weaknesses under different circumstances: Public-private partnership, central government funding, Public and private loans, soft loans, Government guaranteed funding,

central/local government cost sharing, etc. The issue of providing incentives with or without liability for the users (perverse incentive) is also discussed.

1. Different views and perspectives on success

Measuring success in projects is not a simple and straightforward undertaking. That is because the term "success", used as an indicator, is a highly complex and aggregated measure. For one, the degree of success is time-dependent. Secondly, it may be interpreted differently by different individuals and institutions. Thirdly, it tends to be measured differently in different types of projects, depending on the nature of their immediate outputs and long-term outcome. And finally, 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.

To illustrate how success is affected by time the track-record of the Empire State Building in New York can serve as an example. It was commissioned 1929 by General Motors, who wanted to exceed the height of rival car manufacturer Chrysler's building. It was completed one year ahead of schedule, almost 50 per cent below budget (helped by the depression), and to the specifications as designed. In the immediate perspective the project would therefore be a complete success. However, only 20 per cent of the building space was rented at the building's opening, so it was nick-named the Empty State Building. It took 17 years for the building to have enough tenants to turn a profit. It has been a success ever since and is again the tallest building in New York with almost 100 per cent tenancy. The project went from success, to failure and then success again.

Success is measured differently in different types of projects, depending of the nature of their immediate output and more long-term outcome. A hospital is 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 *outcome* 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.

Williams (2008) suggests that the archetypical "man in the street" would be likely to think of projects as generally unsuccessful. A key word often associated with them in the public's mind is the English colloquialism "white elephant" (something whose cost and subsequent upkeep is much greater to the owner than its value, deriving from the reputed practice of monarchs giving sacred white elephants as gifts), Morris and Hough (1987), concluded that "the track record of projects is fundamentally poor, particularly for the larger and more difficult ones.… Projects are often completed late or over budget, do not perform in the way expected, involve severe strain on participating institutions or are cancelled prior to their completion after the expenditure of considerable sums of money."

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. Projects are often rated as successful because they have come in on or near budget and schedule and achieved an acceptable level of performance. Other project organisations have begun to include the client satisfaction variable in their assessment of project success. 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 as a generic term means to gain advantage, superiority, accomplishment, achievement or added value. One interpretation of project success is that the stakeholders that are part of or affected by a project are satisfied. Being such a compound measure, success will have to be translated into a hierarchy of indicators that would enable measuring. Wideman (1996, p3-4) describes a sequential set of four success measures, all of them time dependent: (1) "internal project objectives (efficiency during the project), (2) benefit to customer (effectiveness in the short term), (3) direct contribution (in the medium term) and (4) future opportunity (in the long term)". Three of these measures go beyond the project's immediate outputs. There are many examples of projects that score highly on efficiency, but subsequently prove to be disastrous in terms of their effect and benefit. There are also numerous projects that failed to pass the efficiency test but still prove to be tremendously successful both in the short and long run.

Clearly, a successful project is one that delivers its outputs and significantly contributes to the fulfilment 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 Organisation for Economic Co-operation and Development (OECD), and the European Commission (EC). They comprise five requirements or success factors that have to be fulfilled: 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 many planners and decision-makers.

1.	**EFFICIENCY**	Delivery of outputs in term of scope, timing and cost in relation to what was agreed
2.	**EFFECTIVENESS**	The extent to which the objective has been achieved
3.	**IMPACT**	All other positive and negative changes and effects caused by the project
4.	**RELEVANCE**	Whether the objectives are aligned with valid priorities and users' needs

5.	**SUSTAINABILITY**	Whether the positive effects of the project will be sustained after the project has been concluded

2. Tactical and strategic performance

In applying the success criteria above, we 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 over its lifespan. This is essentially a question of getting the business case right, or, in short, of choosing the most viable project concept.

This is illustrated in Figure 2.1. 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 long-term perspectives. It would to a lesser degree involve focusing on technology and management issues, but more on societal and economic aspects.

The Empire State building was a success in tactical terms from the very start. The economic depression, with low costs and abundance of cheap labour offered a golden opportunity for this type of investment. That affected the tactical performance favourably. Then for 17 years it was considered a failure in strategic terms, until it had got enough tenants to turn a profit. In times of depression the market for expensive offices in the centre of New York had collapsed, and the project was therefore not *relevant*. The building was underutilized, running at a loss, and therefore also not *effective* or *sustainable*. With time, things changed radically and the project became a huge success, not only in terms of its relevance, effectiveness and sustainability, but also its *impact,* since it rapidly became a major tourist attraction and national symbol.

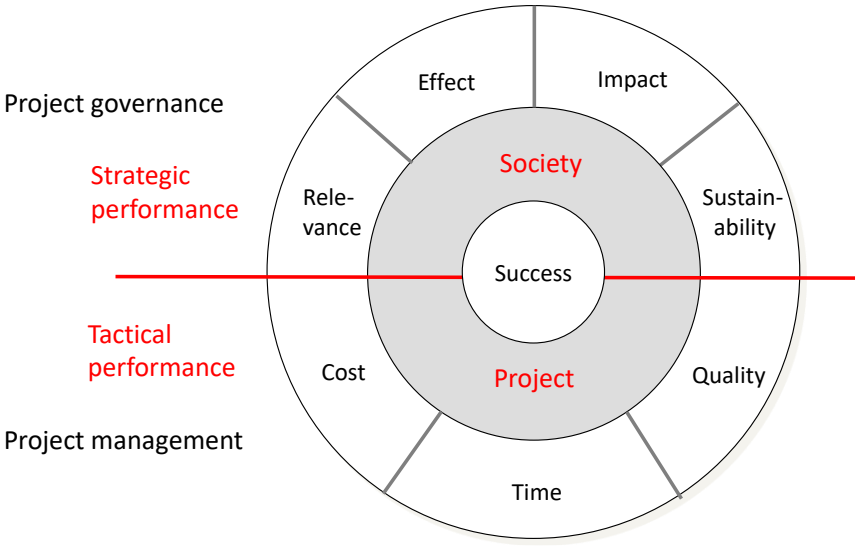

Figure 2.1 Successful projects. Tactical performance is a question of delivering the project outputs as planned, while strategic performance is the worth or utility of the project as seen in a long-term perspective

Generally speaking, tactical considerations typically are restricted in time and perspective, such as the presumed ability to meet short-term performance targets and trade-offs to keep stakeholders on board, all likely to prove ephemeral when matched against the lifespan of most projects. This includes the often proclaimed success of a project simply because it has come in "on cost and on time." Strategic performance is the key issue, but strategic success will only emerge over time in the context of the project having sustainable impact and remaining relevant and effective over its lifespan.

Projects that score highly on all the five success criteria mentioned above are those that perform successfully both tactically and strategically. Such projects may be rare cases. The tactical performance of projects is of less concern at the early project proposal stage. Strategic performance is the main issue. But to what extent is it possible to make a meaningful assessment of the proposal in relation to the above success measures? Would the amount and types of information available early on be sufficient?

In order to assess the *efficiency*, the costs of a project and the nature of its delivery are reasonably well understood at an early stage. But there's doubt as to whether cost estimates are realistic and the conditions of implementation will allow that outputs are produced as anticipated. Consequently, attempting to gauge efficiency may not be worthwhile in the front end phase. Not least the complications facing planners and decision makers in estimating realistic costs clearly indicate that the basis for rigorously evaluating efficiency usually is poor.

The same is true of *effectiveness*. Undoubtedly, the anticipated first-order effects usually are clearly known, their realization is time-dependent and relies on the fulfillment of other events outside the scope of the project. Realistic forecasting may therefore be notoriously flawed.

Early estimates of *impacts* are even more difficult. Undoubtedly, experiential knowledge may be acquired by studying similar projects. But we face conditions that are difficult to forecast and arguably require imagination and guesswork beyond our capabilities.

However, the situation for *relevance* differs. Common sense and user surveys, as well as knowledge of markets, laws and regulations permit us to form an early, accurate picture of whether an initiative is relevant. That we also are notoriously poor at this sort of early evaluation is not due to it being impossible, but rather to it not being done to a sufficient extent.

Forecasting future *sustainability* is also difficult. However, the question is closely related to whether the proposed project is relevant. Moreover, early on, we have long been able to realistically analyze cash flows.

Consequently, the answer to the question above is that with modest effort, we can gain a good picture of whether a project is relevant and sustainable. Extensive analyses of the other three criteria may not be worthwhile at an early stage. The good news is that relevance and sustainability are precisely the attributes that determine whether a project will be successful or not in the long term. Therefore, this may be a minimalistic answer to the question raised, or a quick-and-dirty approach to ex ante evaluation of project proposals, in which the benefits are great compared to the cost.

3. Quality at entry

One of the prime goals of strategic planning is to attain structured and effective continuous management. The strategy shall conduce decision makers at various levels to pull in the same direction by providing a common long-term goal to keep in mind in making decisions. Research has shown that this is essential to attaining good results (Heijden 1996). A study of 1125 projects compared the extent and quality of pre-project studies, appraisals and design prior to project inception with whether or not they were successful. The conclusion was that 80% of the projects that scores highly in terms of their quality at entry (QaE) were successful, compared to just 35% of those that were started without proper preparation (World Bank 1996).

A survey conducted in the USA of about 600 project managers contributed to identifying which critical factors influence the level of achievement in projects. The conclusion was that planning the project was by far the most important factor. Problems that could have been avoided with a better project plan arose repeatedly during the entire project cycle (Pinto and Slevin 1988).

An international project that drew on the experience of 60 large infrastructure programmes concluded that projects with great strategic depth, that is an appreciable level and extent of strategic assessments that underlie a project, were more likely to be successful. A clear concurrence showed that the projects that attained the best results had allocated greater portions of their overall costs to their front end phases. These cost allocations varied from 3% for simple projects and as much as 35% for complex projects. The costs in the front end phase, before the decision was made to start, varied from 15 to 500 million USD. The conclusion was that such costs often were justified and resulted in considerable cost reductions in the implementation phase, more socially acceptable projects and better risk management (IMEC 1999). The study also found that in particular, three aspects characterized the most successful projects: (1) the front end phase had been long, that is, several years, (2) the concept had been revised several times, and (3) problem solving was systematic and

inclusive. Moreover, it was found that the use of risk analysis was vital and that there was a decided advantage in open debate on project planning.

Typically, the less successful projects resulted from authoritative choices made by investors, public agencies or strong interest groups and often were carried out under time pressure. Little time was allocated to pre-project studies or to evaluation or appraisal of concepts. The original concept was maintained to save time, with insufficient emphasis on acquiring relevant information. Consequently, in many cases, projects had conflicting goals and were based on assumptions imposed by interest groups or the authorities.

Paradoxically, the greater portion of resources expended to ensure project success is not used up front but during the implementation phase. Moreover, the greater part of the resources expended up front is used to work out a relatively detailed strategic plan, while only a relatively smaller part of the resources are used in concept development, that is to identify and test alternatives and delineate a strategic framework for the final project.

This is perhaps one of the principal problems in project activities in general. Early on, before the project or process is initiated, there's often too little attention given to fundamental questions concerning the concept itself. There are fine-tuned, resource-intensive precision instruments for controlling processes that don't detect whether the concept is sensible or not. In many cases, the methods are used to marginally improve concepts that should have been discarded and thereby contribute to upholding them. Projects with budgets in the billions are precision controlled in time spent, costs incurred and quality delivered, while the choice of concept itself is insufficiently considered.

This is due in part to the complexity of assessments, as they depend not only on knowing, but also on foreseeing. In the initial phase, uncertainty is greatest and the amount of reliable, factual information smallest. At that stage, there is not a great diversity of methods to apply, because information is scarce, qualitative and often judgemental. Consequently, it makes little sense to use precision instruments.

4. Tactical flexibility

Strategic planning is only part of the solution, *tactical flexibility* is equally important, to allow for manoeuvring within the strategic framework delineated, as the project is implemented. Additionally, there should be latitude for changing the strategic perspective if that becomes necessary. Strategic planning is built on judgment and assumptions and don't necessarily identify the most suitable choices in situations that may arise. Requiring that a strategic plan be followed strictly can make it a straightjacket. In practice, this means that there's little sense in formulating a detailed strategic plan early on.

This line of thought is underscored by Napoleon Bonaparte's remark on planning, *"Plans are nothing, but planning is everything."* The creative, initial planning process affords decision makers the opportunities of identifying and assessing the key alternatives and of finding the way to a sensible, realistic concept. Planning helps decision makers think through alternatives and thereby become better equipped when they later are faced with situations in which they must make tactically vital choices. In some cases, these tactical choices will influence and change the strategy. Normally, the chances are limited that a precise strategy will be implemented in detail strictly as laid out.

A plan presupposes a degree of determinism, a quality of information and a clear cause-effect relationship that at best exists only in the implementation phase. It allows only cursory

consideration at an early point in time of the inconceivability of foreseeing the interplay between various involved or affected parties over time, of the incompleteness of information and of the cause-effect relationship being influenced by uncertainty that can change the analytic context that comprises the base of the goals and strategic choices undertaken.
A story often cited in the project literature concerns a Swiss military troop that returned exhausted to base camp after three days in a blizzard high in the Alps. By the troop leader's recount, the men had lost their way and thought that they were doomed until one of them found an old map in his pocket. Courage renewed, the men found shelter, waited until the storm subsided and then used the map to find their way out of the area. Afterwards, they were astonished to find that the map was of the Pyrenees, not the Alps.
The story is used to show that in a situation with high uncertainty, it's not necessarily the quality of the strategic instrument that counts, but rather the tactical response chosen. Yet strategy can be useful even though it's completely wrong. It's principally an aid to point out a main direction. A detailed strategy strictly followed can be worse than any strategy.

There are differing perceptions of what a strategy is: The ideal would be the rational, i.e. that it is (1) a designated plan based on thorough preparation and designed to serve a specific purpose. In many cases however it is merely (2) a pattern, i.e. a standardized scheme which is applied over and over again in different projects. And finally, which is also quite common, it is merely a ploy which is designed to serve a different purpose, for instance to stir interest in a scheme or attract funding. Mintzberg, H. (2005)

Consequently, the question of which concept is best concerns more than the systematic, rational identification and assessment of various alternatives. In the front end phase, the interests and prioritizations of various parties become evident, intervene and lead to decisions that often are far from that which appeared logical and rational at the outset. Hence, understanding this process is as vital as questions regarding the information base and the rational analysis choice of method.

Major public projects are typically conceived as the result of politically expressed needs in dialogue between various stakeholders. This is followed by a lengthy process of developing the project and making the necessary decisions, typically involving the government at various administrative levels, but also political institutions, the public, the media, and consultants and contractors in the private sector. Such processes are often complex and unpredictable. The processes can also be deceptive and irresponsible, affected by hidden agendas rather than openness and social responsibility. Flyvbjerg, B., Bruzelius, N. and Rothengatter, W. (2003). These aspects are discussed further in sections 5. – 7. of this book.

5. The project proposal

As discussed, it is a long way from analytic results to decisions and actual project realization. The merit of the decision basis is central. Clearly, its quality cannot be assessed solely on the grounds of the methods used or the quality of the input data, but must be viewed in connection with what happens later in the process. All too often the decision basis is restricted to a detailed assessment of just one alternative concept. The basis for decision could for example essentially be a probabilistic analysis, which results in expected values of costs and time expenditure that are considered favourable. Such a decision basis is too narrow in most

projects. The assessments must embrace more than the narrow implementation perspective. They should also consider the long-term consequences of the project. Moreover, they need to build on real assessments of alternative conceptual solutions. Studies of the scope and quality of decision bases of projects in general show that this often is not the case.

Decisions may be made on very simple bases. One might toss heads or tails, or, if reliable information is available, undertake a simple assessment of foreseen reward relative to costs. But the decision bases also may be comprehensive. Projects of some extent usually have a thorough, detailed pre-project study. In some cases, a pre-project study may take years and include complex analyses, simulations, pilot studies, etc. Studies of managerial uses of decision information have shown that many managers first decide on the basis of their own experience and intuition, perhaps after having conferred with persons they trust. Thereafter, available information is used to support the decision, not as a basis for making a decision.

However, in many cases, the type and extent of studies in the *initial phase* often are severely limited. The terms of the final project often are shaped more by the events of the initial phase than by the pre-project study. At that point of time, the terms of the pre-project study are determined. With a prior, top-down assessment of the concept itself, strategic guidance could be included in an initial phase that also puts the pre-project study on a sensible track. This may be extremely useful, both in the short term and the long term, not least because the costs of the initial, broad and often qualitative concept studies are relatively small.
The extent of effort in the initial phase of a project apparently is either pretty limited or relatively comprehensive. This may be ascribed to formal requirements, such as for impact assessments and quality assurance, first being imposed when the project exceeds a certain size. Hence, there is no accepted tradition for systematic front end phase appraisal of smaller projects. The same is true of systematic use of risk analyses in project activities. Today, there are no widely used method tools or standards for such analyses.

A project proposal should ideally include the following steps and elements:

1. A needs analysis mapping all stakeholders and affected parties and assessing the project's relevance in relation to needs and priorities in society.
2. A specification of all requirements that need to be fulfilled when the project is implemented (e.g. functional, aesthetic, physical, operational and economic)
3. An overall strategy defining the project's goal and purpose (first order and long-term effects) with emphasis on consistency, realism and verifiability.
4. Specification of concepts that might be considered as alternative solution to realize the identified strategy
5. An alternatives analysis including a full economic analysis and risk analysis involving at least two alternative main concepts and the zero-option (doing nothing). The analysis should evaluate the proposed alternatives with emphasis on:

    - **Relevance** in relation to
        - Needs
        - Societal priorities
        - Existing portfolio of projects under the responsible ministry/agency
    - **Feasibility** in relation to
        - Proposed budget

    - Time frame
    - Quality of outputs
    - Composition and timing of elements in the total project
- **Sustainability** in the operational phase with emphasis on
    - Long-term economic benefit
    - Financial sustainability
    - Uncertainties

6. Rank the proposed alternatives and provide recommendations regarding decision strategy and implementation strategy for the project.

The project proposal should be prepared by the end of the pre-study phase at a time when the choice between alternative concepts is still open. It should guide decision makers by providing a sound basis for the decision whether or not to initiate a pre-project with further investigation of alternatives.

After the pre-project phase, the project proposal should be followed up with an overall project management document with the aim to ensure the quality of the decision basis, including cost estimates and uncertainties associated with the chosen project alternative before it is submitted for final approval and funding. The document would typically include information on the following:

1. Outline of the strategy for the project (what, when, where, how and by whom, and so on).
2. Scope of activities and assumptions
3. Financial analysis including cost estimates
4. Assessment of return on investment and effort
5. Risk assessment with identification and classification of possible threats or risks during implementation and subsequent operational phase
6. Technological assessment of feasibility, technological risk, trends and outlook for relevant technologies
7. Environmental impact assessment (EPA)
8. Project management structure and administration
9. Contract strategies and associated risks

The relationship between strategic management and project-management is not one-way. Morris (2008) describes how strategy implementation is accomplished with project management, but project management can also contribute to strategic management. He points out that project management's contribution "can add value to the emerging strategy and ensure that benefits are reaped from its realisation." The strategy is or ought to be a major concern to both parties, because it lays out the direction and justification for the project in a long-term perspective. Alignment of needs and objectives is a key issue.

6. Alignment of needs, objectives and anticipated effects.

Projects in a typical management environment, public or private, can often be said to be in a "wicked mess". "Projects are complex, ambiguous, confusing phenomena wherein the idea of a single, clear goal is at odds with the reality". Linehan and Kavanagh, (2004) Engwall (2002), describes the establishment of the perfectly correct goal as a "futile dream". For

projects to be aligned with organisational strategy – *and stay aligned* – it is important to recognise the turbulence of the environment, and build in the capability to cope with this turbulence at the start of the project. Miller and Hobbs (2005) suggest that this is equally important when the project is being undertaken by a heterogeneous consortium or group of organisations, where processes and structures need to be developed to deal with turbulence.

Therefore, flexibility needs to be built into the project strategy, both in the front-end concept stage, and in later stages. Olsson (2006) shows the need for tactical flexibility within a defined strategy, and Samset (2010) points out the danger in seeking predictability. He warns that "prediction [can] become a prescription…it shifts the decision-makers focus from finding the best solution to …[making] his own idea or prescription come true". Premature lock-in to an inappropriate concept can be a major danger to project success.

At the earliest phase however, and despite of remonstrances such as those mentioned above, there is a need to ensure alignment of *needs, goals* and anticipated *effects*. Strategies are designed in response to certain needs. The phenomena of needs, goals and effects are closely related, and they need to be compatible in the sense that the causality or logic between them is right.

- The goal specifies the need formally in terms of scope, time and quality
- The effect should correspond at least to the anticipated results specified by the goal
- The gross effect should be such that the needs are satisfied

For example, a hydroelectric power project is initiated and planned to meet a need for electric power in the market. The project is to build a facility with a stated capacity. The goal is to attain stable delivery to the grid at that level. Need and effect often are expressed indirectly in derived units. For example, the triggering need and effect can both be expressed in economic terms, in this case respectively in production and consumption. As mentioned, the design of the project shall include the basic requirement of a connection between needs and effect. The goal shall be derived from the needs, and the effect shall at least correspond to the goal set for the enterprise. The needs must be real to attain the anticipated effect. Basic user and market research may be used to ascertain whether this is the case. The lack of user or market adaptation lowers the chances of success.

Alignment in this context would imply the following requirements:

- Needs are expressions of a future desired situation, and should not be expressed as one specific solution to the problem at hand. Needs should be expressed in a way that allow for alternative solutions or concepts to be considered
- The goal should specify what to be achieved as the result of the project and expressed in terms that can be measured. An intention becomes a goal if and only if measures are made to fulfill it. The goal should be realistically achievable as compared with the time and resources available, and uncertainties that might affect project implementation
- The effect expresses the degree to which the goal was achieved. The effect can only be established in retrospect. The combined or gross effect should also include any side effects that might be attributed to the project

As they are formulated and agreed upon, objectives are a project's prime success criteria. Formally viewed, success is ensured when a project is implemented as efficiently as possible

and causes effects that concur with its objectives and correspond to the needs that triggered it. So formulating, furthering and following up objectives are a management function.
Large investment projects are complex and usually have several objectives that are more or less mutually dependent. Customarily, a hierarchy of objectives is defined to clarify how the various objectives relate to and support each other. The location of an objective in the hierarchy indicates how general or concrete it may be but doesn't necessarily indicate its importance. The hierarchy displays cause-effect relationships. So, to a degree, it indicates realizability, in other words, the ambitiousness of the individual objectives.

Studies of projects have shown that ambitious objectives motivate better performance, but also that performance drops when objectives are overly ambitious or completely unrealistic. Næss (2004) contends that in American literature, this is used to argue that objectives should be formulated so that they are realistic, that is, they can be achieved with the means available. In Scandinavian literature, it's asserted that entirely realistic objectives (that we are certain that we can achieve) are insufficiently challenging in a continually changing world. Visionary objectives are needed to bring out the best performance. This means that overall objectives should be sufficiently ambitious to motivate yet be realistically attainable in time. Of course, impossible objectives are purposeless.

The formulation of an objective should indicate what's needed to attain it. This is what strategy sets forth. An objective may be expressed at the project or process level, such as building and furnishing a new opera, or at the organizational level, such as attaining a target market share or membership. Or it may be at the national level, such as in keeping inflation at a specific level.

The purpose of formulating an objective is principally to clarify the direction for that which is sought. The scope of that which is sought also needs to be stated so one may know when an objective is attained. Multiple objectives may confuse that which is sought if they point in different direction. This is particularly evident if the objectives also conflict with each other. The development of a new oil field hardly can be justified with an environmental objective, as the investment undeniably will result in increased emission of atmospheric pollutants. Here there's a conflict of objectives. Using an environmental objective for a hydroelectric project will not give rise to such conflict, disregarding other environmental aspects, such as those associated with the damming of watercourses.

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. Often, this isn't possible, simply because there are differing prioritizations and needs and because some parties simply may be opponents of the project.

Moreover, the objectives should limit the enterprise or the strategy. This means that the resources allocated and the results anticipated should correspond. Inadequate allocation of resources leads to insufficient conditions for realizing an output. If the objective is overly ambitious, the anticipated effect isn't achieved. Finally, objectives should be expressed in ways that permit assessing performance and results. This means that objectives are verifiable and measurable. Such requirements often are expressed in terms of SMART, a mnemonic for Specific, Measurable, Attainable, Realistic and Time-bound.

Practice often differs considerably from this ideal. A study of major Norwegian governmental investment projects conducted by the Ministry of Finance in 1999 found that the formulations of objectives were vague and overly ambitions, unrealistic and little suited to overriding management. The objectives stated mostly were activities or tasks, while there was no hierarchy of objectives between these extremes (Berg et.al. 1999). The finding was hardly unique. Rather, it seems to be commonplace practice, as corroborated by several studies, including (Samset 1998).

7. Defining project concepts, and systemic borders to guide the selection of alternatives

The generic notion of a concept designates an abstract idea or model that corresponds to something concrete in reality or in language. As used in the context of project definition, a concept is a construct of thought that is meant to solve a problem or satisfy specific needs. The concept should be of principal nature in the sense that several different concepts might be identified as solutions to the same problem. Further, in each specific case, all concepts ought to be real alternatives in the sense that they are mutually exclusive. This would imply that the concepts should have certain common features that make them suitable as solutions to the same problem. Finally, the quality of being principled means that the concepts are not just variations of a particular solution. This is illustrated in Figure 2.2, in which the investment case is distinguished from the project. The investment case is an abstract construction or an instrument used by the financer or the commissioner as a basis for appropriating funds, subsequently to be implemented in a project.

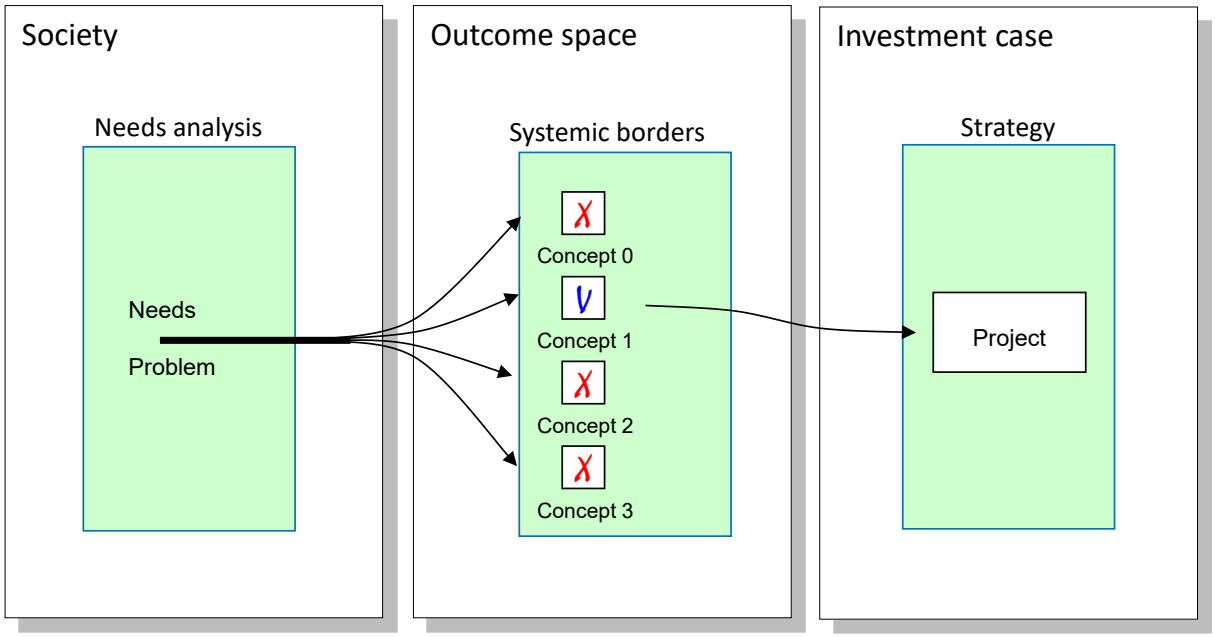

Figure 2.2 An investment case is implemented as a project after prior assessment of alternative concepts

As mentioned above, the needs, goals and effects are expressions of the same phenomenon that would be appear at three subsequent stages: up front, during implementation and in the operational phase. The point of departure is an undesirable condition in society, here called the problem, which is the cause that gives rise to a need. To satisfy the need, there must be a positive change, here called the goal. If the goal is realized, an effect is achieved so that the undesirable condition ceases. The original problem then is solved.

Needs

Intervention is necessary to make the cause-effect chain process work. This is called the concept. It comprises the actions that enable realization of the goal. The choice of concept then is guided by the original problem and the expected effect. Needs, goals and effects may be defined at various levels. The less general the definitions of needs, the more it will provide guidance in the direction of specific types of solutions. That brings in the risk of the project not being suitable to attaining the overriding goals. There are numerous examples of needs analyses identifying one particular technical solution as a need, and that goals and impact assessments being constrained to concern implementation of a given main concept.

What this means in practice is illustrated by the following example of the planning of a transport project in an urban area suffering congestion of its main streets (Næss 2005). At the concept level, for example, the needs may concern reducing travel time between sectors of the urban area, prompting a more environmentally-friendly transport mode distribution and the furthering less travel-generating, car-dependent urban development patterns. The goals at this level must reflect these needs, and the effects of various solution concepts (and their relevant combinations must be assessed).

When a main concept, such as an urban tramway system, is chosen, demand analyses, goal setting and impact assessment will focus on ensuring that it is designed and implemented in the most socially acceptable manner. Needs and goals at this level may, for example, be concerned with attaining high passenger volumes, financially favourable and environmentally-friendly routing, and with contributing (through the locations of stations) to urban development in targeted areas.

Whenever demand analyses, goal setting and impact assessment at the strategic level are skipped, and instead the project level is initiated within the framework of a given solution, the initiators' needs can easily be confused with those of the society. Hence, the wishes of special interests for financial gains, prestige or ideologically preferable solutions may take precedence over top-down political goals and the needs of broader social groups. Such constraint of planning at a premature stage is a commonplace weakness in the planning of large, public investment projects.

Problems

The assumed effect is decisive to the choice of concept. But often the starting point is an undesired condition or a problem that initiates a search for a solution. In such cases, there are different aspects that need to be considered in determining a concept.

First, it's essential to focus on existing problems, not assumed, probable or future ones. Second, problems should not be expressed as absence of a particular solution. For example, the farmers' problem is not that they don't use pesticides, but that their crops are infested by pests. So there are considerable differences in the way the problem can be approached. There are many alternatives in addition to spraying crops. The problem therefore ought to express an

existing undesirable condition, and it needs to be concrete. If the problem concerns traffic congestion, stating it in terms of too few traffic lanes points to just one solution.

Expressing the problem in more general terms gives latitude for several alternative solutions. Instead of directly dealing with the problem of too few traffic lanes, one but may seek other indirect solutions, such as by routing some traffic on other streets or by using other means of transport. All are solutions to the overriding problem, which in this case deals with traffic flow.

This example underscores another aspect, namely that the concepts chosen should be dissimilar. Nonetheless, they would have to share common characteristics suited to solving the same problem. If that is not the case, they are merely variants of one set solution. Of course, the final choice of solution also needs to be assessed. But that should happen not at the concept level, but at the project level after the concept has been chosen.

The alternatives also have to be genuine, in the sense that they exclude each other. An oversimplified example is that if you want to start a family and have found two potential spouses, you normally are faced with two mutually exclusive alternatives, unless you wish to be a bigamist. If at the same time, you have three job offers, each in a different city, you have 2 x 3 = 6 mutually exclusive alternatives (Løwendahl and Wenstøp 2002).
We have no solid tradition for identifying truly alternative concepts as bases for designing projects. Most often, the choice is made at the starting point, and assessment is mainly at the project level. For example, in a study of a new national museum of art, architecture and design in Oslo, the choice was between alternatives that all featured co-location of the museums on the same site. The alternatives differed in distribution of space above and below ground, remote or central storage, and the like. So, obviously the concepts merely were variations on the same solution. Genuine alternatives would, for instance, look more closely at which museums should be co-located and where in the city or in the country they should be located. These aspects could then be weighed against the increased benefit envisioned. In this case, the problem, the anticipated effect and the benefit were all vague and gave no clear guide for choice of alternatives. Consequently, there was no substantive discussion of the reality of the proposal put forth.

The reason for the requirement of genuine alternatives is that it would stimulate creative thinking and thereby increase the chances of a good choice. Experience suggests that this is worthwhile. At the same time, we know that innovative thinking is no guarantee that it will happen. So there's a need to assess several alternatives. Moreover, these alternatives ought to be assessed against the zero option to avoid ending up with something that turns out to be worse than what existed.

There are no commonly agreed guidelines for a best practice for systematic identification and selection of unique and different solution to a problem, what is here termed concepts. Also, there are not a great many studies that offer a systematic inquiry into how this is done in practice, the range of alternative concepts that are identified, and which ones are chosen. One such study, which is not conclusive but that might offer some clues on the state of affairs in the Norwegian setting, concluded that (Minken et.al, 2009):

- The alternatives being considered were merely different technical solutions to the same problem than mutually exclusive concepts.

- The tendency was that the preferred technical solutions were used to guide the choice of concept rather than vice versa.
- The link between the choice of concept and the underlying societal need or problem was often not made explicit.
- The project-triggering need or problem would frequently be confused with other perceived needs or problems
- The anticipated, desired effect of the project was often confused with various positive or negative anticipated side effects.
- The zero-option, or the low-investment alternative solution, was often not identified, formulated or considered in relation to the alternative concepts being analyzed.

On other words, there is a strong tendency to choose the initial concept and stick to it. Experience also suggests that we tend to prefer incremental improvements of an inferior solution - rather than fundamental change. Also that there is an overwhelming inertia: once set in motion – a project being implemented is almost impossible to stop. On the positive side there is much to suggest that the window of opportunities is usually larger than envisioned - and largely unexplored.

The window of opportunities is exactly the same as what is termed the outcome space in Figure 2.2. It is delineated by the systemic borders that will define what can be identified as possible concepts. These borders would to a considerable degree translate into what would subsequently be the investment case's strategy or the strategic frame for the project. Laying out the systemic borders at an early stage is therefore much more essential than formulating objectives according to the SMART requirement which would eventually have to be done later, when the project is implemented.

One challenge would be to apply different perspectives in the quest for sensible conceptual solutions, both (1) the retrospective, looking at trends in the past, (2) the normative, identifying the desirable and useful, (3) the explorative, using projections to identify what is possible, (4) the interdisciplinary, to identify opportunities, uncertainty and risk, and (5) the counterfactual, the take a second look at the zero option, which would usually be the lowest cost alternative.

8. Front end analyses with limited information - strengths and weaknesses

When 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. There are different ways to improve quality-at-entry, for example by challenging initial ideas, extracting and making use of previous experience from similar undertakings, and consulting with stakeholders.

In most cases the key issue at the earliest stage is to shed sufficient light on the underlying problem that would provide 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

systematic analysis of problems, needs, requirements, etc. Most of the information generated is associated only with the initially identified solution. 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.

The gravity of this is obvious because this is exactly the stage when the fundamental choices are made, when uncertainty is at its highest, freedom to choose is at its optimum, and also when available information is most restricted. Adding information, therefore, makes sense - but only to a certain degree. However, some available information might not be relevant in the decision-making process, and information that would seem necessary will not be available until later.

The crucial issue is not the volume but what type of information is needed. 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 also be considered. Experience suggests that creativity, imagination and intuition can be more valuable at this stage than large amounts of data. Therefore, lack of information in the earliest phase may not necessarily be a problem: it can even be to our advantage. Many planners have learnt that in the early phase of a project it can be of considerable help to operate primarily with qualitative expressions and only to a very limited degree with quantitative data.

Scheibehenne and von Helversen (2008), concludes that “less can be more”, and that having less information can actually help decision-makers. A restricted, but carefully selected, sample of relevant facts and judgemental information may be an advantage in the effort to establish a broad overall perspective, and identify and test alternative strategies. Omitting details and less relevant information helps avoid “analysis paralysis”, when decision-makers are presented with large amounts of detailed information too early in the decision-making process. Furthermore, accurate quantitative information tends to quickly become out of date. This is a problem, since the front-end phase in major projects may last for years, even decades. The phenomenon can be coined the “half-life of information” (Samset, 2008). For instance, exact information about the demand in a fast developing market will have limited value after months, even weeks. We cannot make a valid prediction of the actual demand three years into the future, but might be pretty certain that the demand will remain for a long time and therefore rely on it in strategic planning up front. In other words, carefully extracted qualitative information about a well thought-out project concept could provide reliable and valid input to the decision for the whole of the front-end phase.

What is of interest here is the principle that decisions need to be based on a foundation of assessment. The solidity of assessment depends on the selection of decision criteria, and the underlying information used to substantiate these. Each decision criterion needs to be substantiated with a number of parameters or indicators, producing an information hierarchy. The principle is valid, however, regardless of the type of information used. It can be factual or judgemental, quantitative or qualitative. For the assessment to be useful and trustworthy, the selected decision criteria need to both capture the essential aspects that ought to be considered, and be sufficiently comprehensive. Underlying supporting information needs to be valid and reliable. Reliability is a question of whether you can trust the information, this being determined by the quality of sources and the way it is collected. Validit*y* is a term used

to express the extent to which an indicator provides information that corresponds to what is to be measured. The type of indicators chosen will determine the validity of the assessment. Using several indicators at the disaggregate level helps improve validity at the aggregate level, providing that each indicator is valid. In most projects the five success criteria mentioned in the beginning of this section could be applied.

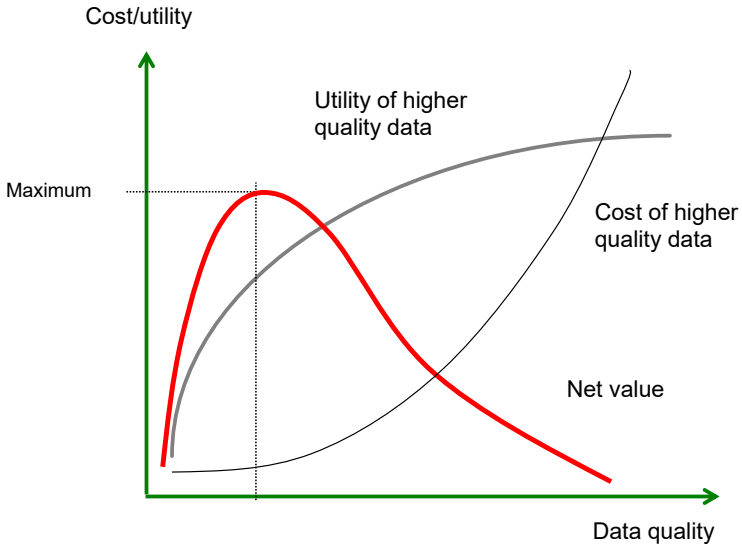

Figure 2.3 Trade-off between the amount/quality of information and the acquisition cost. Restricting precision to rather rough information giver the highest benefit/cost ratio.

Clearly, up-front decision making is not simply an issue of adding masses of information. As is illustrated in Figure 2.3, 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 will be of limited use. Maximising the utility/cost-ratio will therefore set a limit to the amount of information that is useful. The maximum would typically be quite a bit to the left in the diagram, which would come as a surprise to many planners and decision makers alike.

Adding to this it is useful to point out that decisions may be affected in different ways:

- More by subjective or political priorities than by rational analysis.
- By priorities that may change over time.
- By changing alliances and pressures from stakeholders
- How information is interpreted and used by different parties.
- By the existence of disinformation, etc.

Still, when taking the above reservations into account, the fact remains that the soundness of the documentation that constitutes the basis for decisions, or the quality-at-entry, has proved beyond doubt to be of vital importance for the outcome of investments.

9. Front-end estimation of cost and benefit

In project management, cost is the management parameter that attracts the most attention during the front-end phase and implementation. Some would argue that other parameters, such as project relevance deserve more attention. In many projects, even large cost overruns have had little effect on long-term profitability. Yet in other cases, cost overruns may comprise a death blow.

Cost is eminently suitable as a management parameter, because it is expressed quantitatively with great precision and is continuously updated as a part of all transactions in a society. Costs are suited to making participants accountable, to gauging progress and result attainment and to comparing expenses with income to assess economic viability over time.

The prime focus is on cost overruns related to budgets. Major cost overruns can be serious, not least because they may trigger prolonged conflicts between the responsible parties on who shall pay the bills or how costs shall be divided. But the type of costs involved in budget overruns often is only top of an iceberg. In innumerable cases, the budget increase in the front end phase, from the first cost estimate to the adopted budget, is much greater. An interesting observation is that in projects in general, the initial cost estimate almost without exception is lower, not higher than what eventually is decides as the final budget.

In principle, there are four causes of cost overruns. They occur successively in the course of the front phase and the implementation of a project:

- Initially, planners and decision makers wilfully estimate costs low to increase the chances of a project being considered.
- The information base and the cost estimation methods are unsatisfactory.
- Unforeseen situations necessitate changes, for instance regulations imposed by the public that will increase cost.
- Inadequate cost management when the project is implemented.

Of the four, the first often has the greatest effect in terms of increased estimates. In many cases, the reason is deliberate underestimation to gain consideration. The principal point is obvious: get on the agenda, because the longer a project has been in the budget process and the further it has been studied, the greater the chances that it will be approved and implemented. Hence, underbidding price in the first round can be decisive. Moreover, even very large budget increases in the front end phase seldom have consequences for the responsible parties. Of course, it's the final cost estimate that's applicable. So, what's the problem? Evidence pretexts including *'we only wanted to start the discussion'* or *'a better estimate wasn't possible because we lacked information'*. Decision makers are surprisingly tolerant of what gets by early on, in spite of it arguably being the most decisive part of the entire project process. The same is true of the cost estimates of projects that have passed the first enquiry and are on the agenda. It has become so commonplace that one no longer speaks of systematic underestimation, but rather on normalization of deviation (Pinto 2006). In other words, a culture has evolved with lax views of honesty and compliance, to the extent that decision makers no longer see reason to trust the figures put forth in the front end phase. Hence, the possibilities of controlling and influencing are going down the drain.

This is serious. It means that poor projects slip through, though they should have been rejected had a realistic estimate put forward up front. Needless to say, this is a far greater problem than marginal budget overruns in the implementation phases of projects.

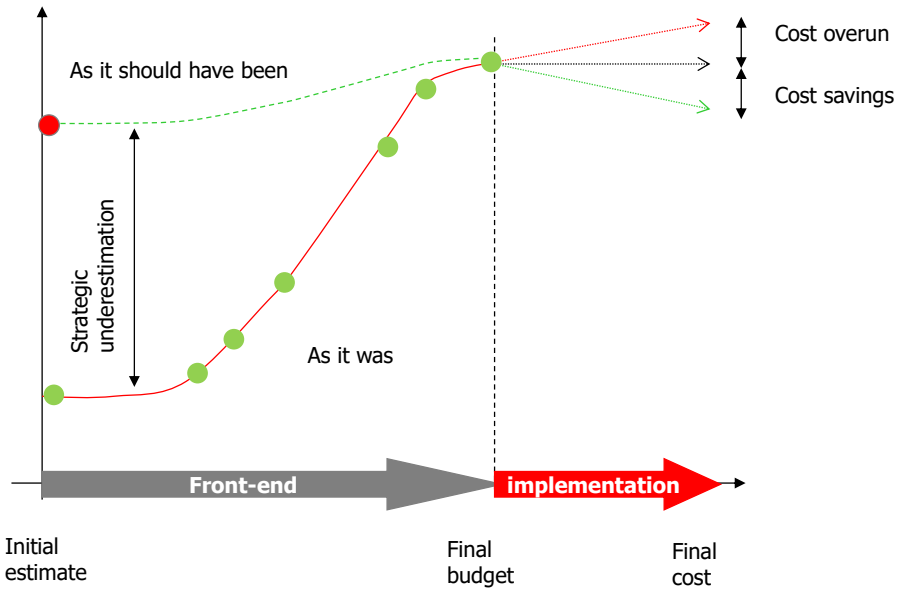

Figure 2.4 Early underestimation relative to what is the finally approved budget often is far greater than the cost overrun. Improving cost estimation in the front-end phase could result in fewer poor projects being chosen.

Systematic underestimation appears to be greatest in public projects, particularly so in local projects put forth for national financing. Hence, the phenomenon has become known as *strategic underestimation*. The principle of it is shown in Figure 2.4. The dots indicate cost estimates in the front end phase. The plot often ends up in some sort of S shape. Cost estimates are low in the initial period before the first systematic estimates of costs are undertaken. With time, the information basis improves, and the first surprises come to light. In turn, that triggers greater focus on the effort, demands for greater openness and realistic estimates, often by independent appraisals, and the cost estimate rises rapidly to the level at which it should have been at the outset. Thereafter, there are minor modifications until the final budget is approved.

The dashed line uppermost illustrates the development of cost in the front end phase as it should have been had the process started with an estimate at a realistic level. The difference between the dashed and solid lines is called strategic underestimation. In many cases, this is called tactical budgeting, which is a misunderstanding since what is at stake here is the choice of the project concept, which is a strategic choice.

The development of cost in the implementation phase is indicated by two dots at the upper right, designating cost overrun or cost savings. Strategic underestimation, as it is used here, often is large and in many cases many times the cost overrun. Cost overrun in relation to budget is typically in the range 10 – 100 per cent. The final budget is often several times as high as the first estimate, in some cases as high as 10 – 20 times.

A disproportionate amount of research has focused on the problem of cost overruns in projects. The difference between budget and final cost is erroneously designated by some as strategic misrepresentation (Flyvbjerg et al. 2003). In light of the discussion above, this might be called tactical cost estimation. Here we may distinguish between two phenomena. Strategic underestimation in the front end phase influences the actual choice of project. Improving cost estimation in the front end phase conceivably is far more important than gaining control of cost overruns in implementation, as it may lead to fewer poor projects being chosen and thereby to increasing the overall benefit of investments.

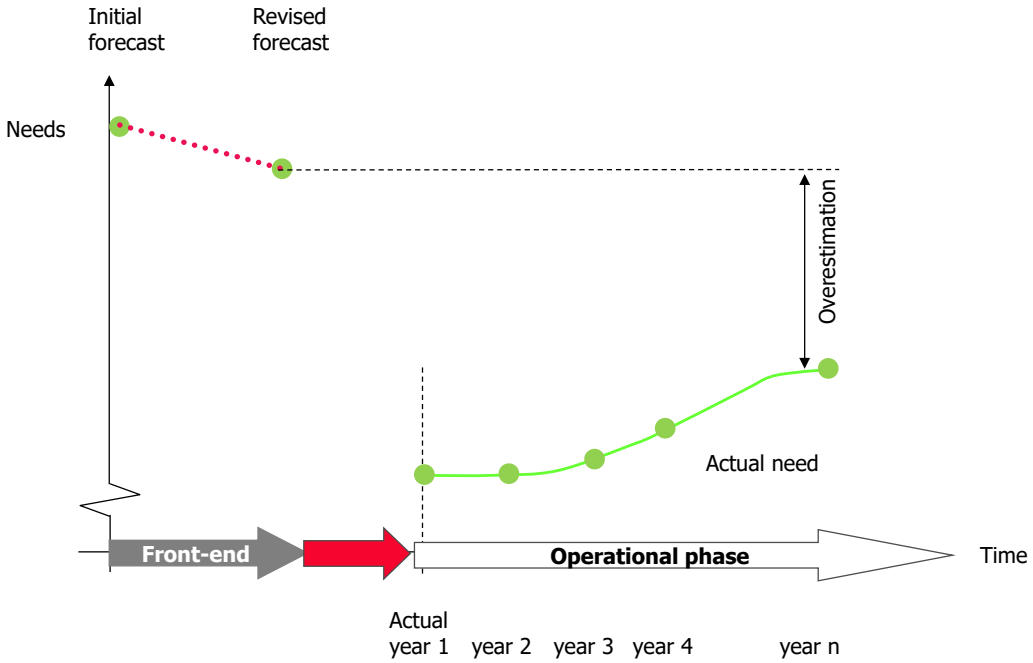

Figure 2.5 Strategic overestimation of benefits. The moment of truth is some time in the operational phase. The actual demand often deviates considerably from that assumed.

Adding to this picture, much the same problem as can be seen in cost estimation also applies in estimation of the anticipated utility or benefits of projects, as illustrated in Figure 2.5. Strategic overestimation of utility is common, much for the same reasons as mentioned earlier.

It's reasonable to assume that project utility often is more difficult to foresee than cost. The final effect of a project may be assessed only at some time after it has been handed over, and often many aspects difficult to predict affect user and market responses. In the front end phase, utility is estimated on the bases of parameters such as traffic volume, turnover, market response and the like. In some cases, the estimates are revised in the front end phase as more information is acquired. The moment of truth arrives when the project has been implemented and user response is evident. Initial response often is much lower than forecast response. Thereafter, response goes up and perhaps flattens out during the first few years, indicating an S-curve. The gap between the actual response curve and the prognosis amounts to what is here called strategic overestimation of utility.

The combined result of overestimated benefits and underestimated costs when expressed in terms of a benefit/cost-ratio could obviously be exceedingly misguiding for decision makers and their possibility to decide on a sound choice of project concept. In numerous infrastructure projects in the USA and Great Britain, the actual benefit/cost-ratio turned out to be 15% to 25% of that assumed at the time funding was approved (Flyvbjerg et.al. 2003). This implies that the benefit-cost-ratio was prospectively overestimated by a factor of four to seven. That said, it is worthwhile to give heed to the possibility that going backward in time in each of these projects, to the earliest cost estimates and the earliest prognoses on which utility assessments were based, would reveal far greater exaggerations of benefit/cost-ratio or economic viability.

10. Financing mechanisms for projects

A necessary part of every project proposal is a plan for how to meet the project's financial obligations during every period of its life cycle. Firstly, the project needs capital as an input to production and to finance the high and negative cash flow during the construction phase. Secondly, the subsequent payback throughout the operational phase is not necessarily in financial terms. For example, a public road is expected to generate benefits in terms of time savings and improved safety conditions, which are benefits that are not easily sold in a market. This is illustrated in Figure 2.6, in which the dashed line is the *private* (financial) benefit and the solid line is the *social* benefit of the investment.

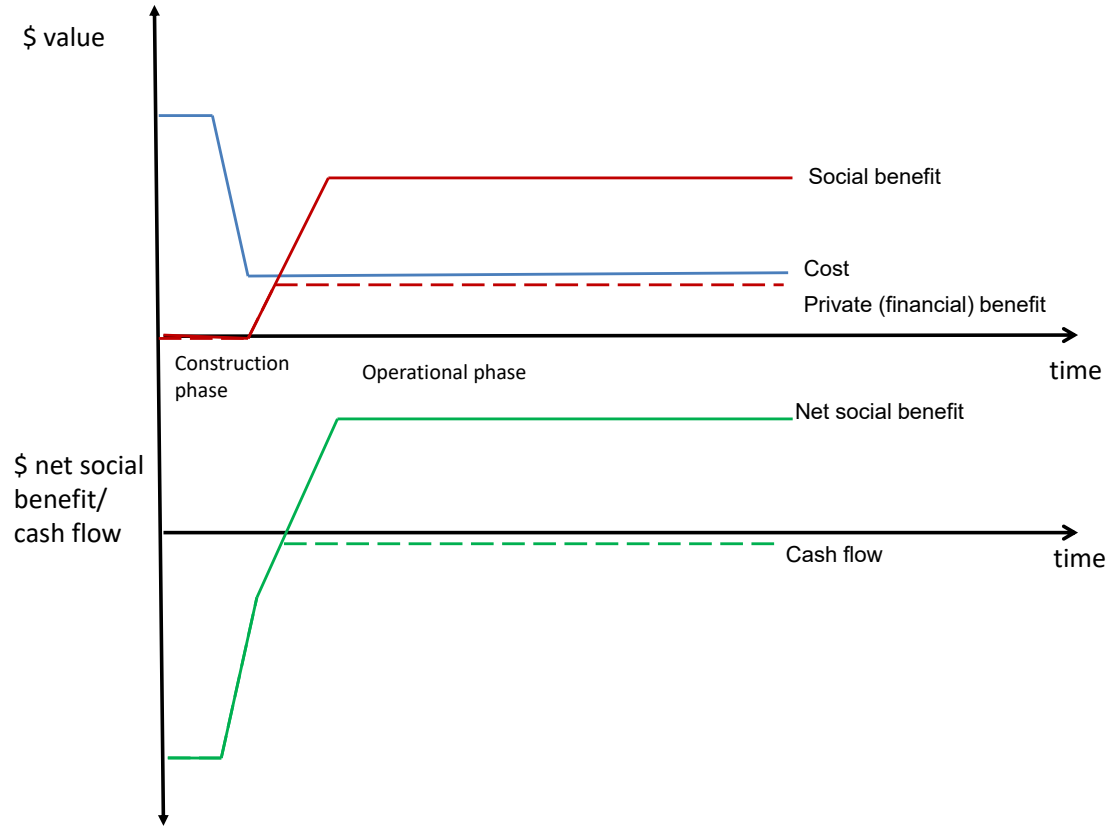

Figure 2.6 Costs and benefits over the project's life cycle

The Asian Development Bank (1997) suggests that the financial analysis focus on three questions:

1) Are adequate funds available to finance the project's expenditure? The cost of the funds needs to be taken into account.
2) Is it possible and desirable to seek recovery of some of the project's costs from the beneficiaries?
3) Is there an incentive to ensure a continued participation from the central stakeholders in the project?

In this section, the focus is primarily on public projects, particularly on infrastructure projects. State government funding is often the principal source of funds to meet investment and operating expenditures. Assuming that these funds mainly come from *extra taxes*, the marginal cost of taxation should be estimated. Moreover, a choice must be made as to whether it is possible and desirable to let users bear some of the financial burden in the form of *user fees*. If the local community as a whole is the beneficiary, one option is to seek *co-funding from local governments* (which in turn will be paid by local taxes). Another funding option for public projects is to bring in *private capital* of some form. Arguments for the latter are that public budgets are tight, and that private capital may be considered more cost-efficient. These alternatives will be discussed in more detail below, and we will argue that they may have an impact on the project's overall performance, both in strategic and tactical terms.

11. General taxes versus user fees

The cost of public funds

The collection of taxes, whether by central or local government, creates an efficiency loss in the economy through the taxes' impact on relative prices, and on people's behaviour. In addition, there are administrative costs associated with tax collection systems, which is called 'the cost of public funds' or 'the shadow price of taxation' (Grønn, 2003; NOU 1997:27). Some taxes are more distortionary than others. For example, personal income tax normally induces a high efficiency loss because it leads to a decrease in production. Sales taxes are somewhat less distortionary, whereas property tax is as close as we can get to a 'lump sum tax', which exhibits virtually no effect on people's behaviour. Some taxes even *increase* economic efficiency. For instance, 'green taxes' are introduced to correct a market failure. It is possible to estimate the efficiency loss from the mix of all taxes in an economy, thereby estimating the marginal cost of increased taxation for financing new projects. In Norway, for instance, which is a country known for a rather high income tax level, a 'conservative' estimate of the cost of public funds is approximately 20% (Finansdepartementet, 2005; NOU 1997:27).

The deterring effect of user fees

The main alternative to general taxes is a 'tax' linked directly to the use of the good, i.e. a user fee. However, for this to be a realistic option it must be possible to identify and charge users, and to reject those who do not pay. Most infrastructure projects have some elements of a 'public good'.[1] Public goods are characterized as being: (1) *non-rival in consumption*, implying that once provided, the marginal cost of giving another consumer access to it is zero, and (2) *non-excludable in consumption*, implying that it is impossible or very expensive to prevent anyone from consuming it. Examples of pure public goods are defence infrastructure,

[1] See any textbook on the subject of economics, particular in relation to public finance, e.g. Rosen (1995).

lighthouses and to some degree, transport infrastructure.[2] It follows that public goods are associated with a 'free-rider problem'. Potential investors will not be able to obtain the necessary return on their investment, which is why free and uncoordinated markets are not able to provide public goods. This is a paradox for cases in which the project is highly socially desirable. In such cases, public funding through general taxes is therefore normally the only viable option.

When goods are excludable, user charging schemes may be established. The basic principle from welfare economics is that users should pay the marginal cost of providing the good or service to them. In the case of 'private goods' such as health care and education in which marginal costs are substantial,[3] user fees may provide an efficient way to prevent overconsumption. A public infrastructure is typically characterized by high costs upfront and negligible marginal costs, which implies that the optimal fee is close to zero. Any attempt to set a fee that exceeds the marginal cost will have a distortionary effect similar to those of other taxes (NOU 1997:27). This is illustrated in Figure 2.7 below; the socially optimal allocation is one where the price is zero and all users are being served. The impact of a tax is twofold: 1) area 'a' illustrates the tax revenue, i.e. a transfer from users to the infrastructure owner, while (2) area 'b' represents the social loss in terms of foregone benefits for users who exit the market.[4]

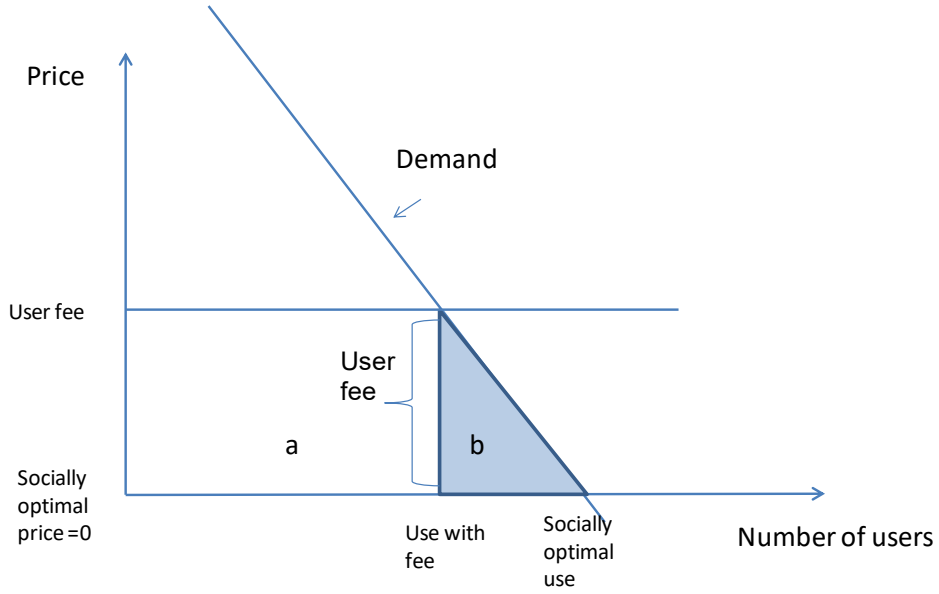

Figure 1.7 Deterring effects of user fees

Which are less inefficient, user's fees or general taxes?

Based on the above discussion, we realize that neither taxation nor user fees is a perfect choice as long as the marginal cost is zero. Below, we briefly discuss two situations in which user fees could be preferable (and vice versa):

[2] Classification of a good as excludable or not is not absolute, as it depends on the state of technology, on costs and on legal arrangements.

[3] The use of the labels 'public' and 'private' does not necessarily mean that it must be provided by those sectors, respectively.

[4] We have assumed a uniform user fee. If price discrimination is possible, less distortionary solutions may in theory be found (Rosen, 1995).

- *Inelastic demand:* The size of the efficiency loss of a user fee depends on demand elasticity with respect to the fee. If demand elasticity is low (illustrated by a demand curve with a steep slope), users have few alternative options except to pay the fee and continue to use the infrastructure. In such cases, the efficiency loss will be low, as shown in Figure 2.8.

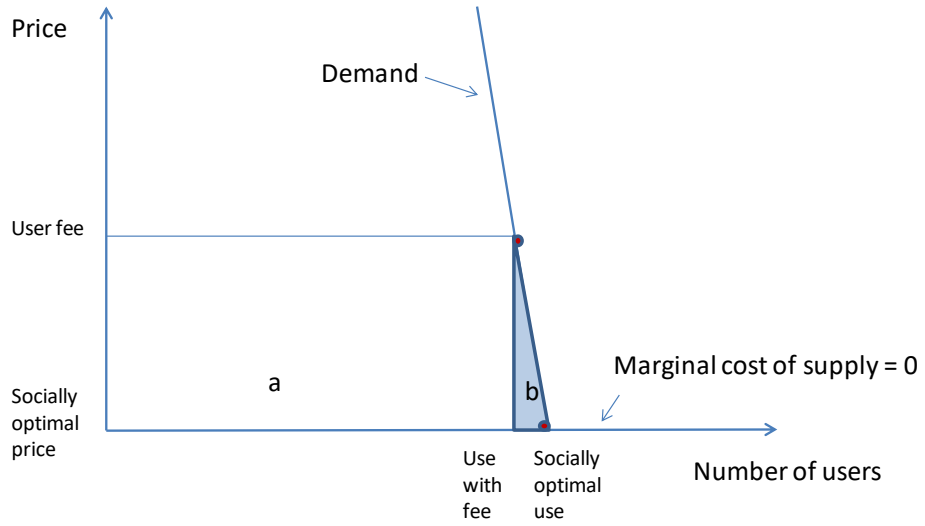

Figure 2.8 Inelastic demand

- *Negative external effects*: In some cases, using the infrastructure entails negative external effects not considered by users that can lead to overconsumption. For example, transport may have negative impacts on health, safety and the environment. Not least, transport systems impose substantial costs on society due to congestion (see for example Goodwin, 2004). The marginal congestion cost typically increases with the total number of users in the system, which is illustrated in Figure 2.9 below (based on Grønn, 2003). Area 'c' shows the social loss without pricing. Introducing a user fee during peak periods may yield a considerable social surplus, and according to NOU 1997:27, congestion taxes should *always* be implemented even before the need for increased capacity is considered.[5]

[5] However, as pointed out by, e.g. Parry and Bento (2001), this conclusion may be questioned in the presence of pre-existing distortions *outside* the transport sector.

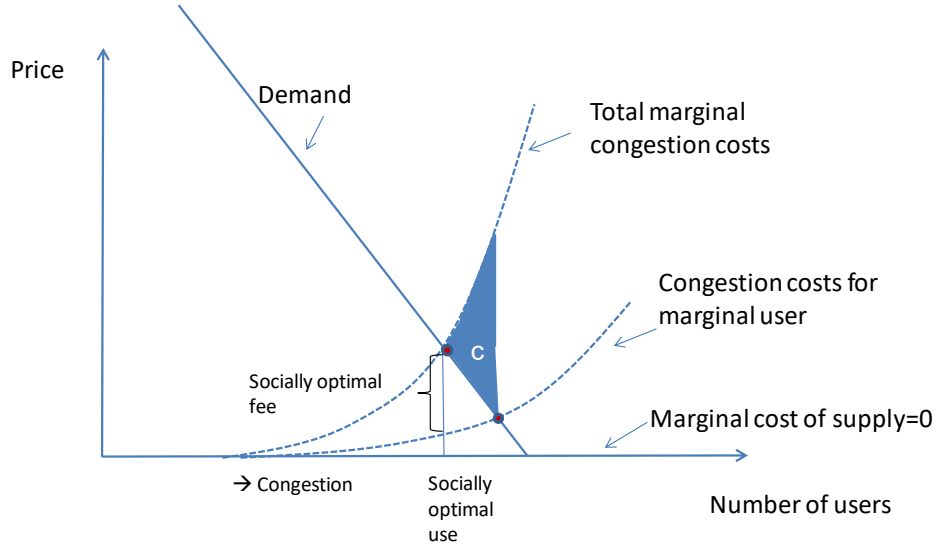

Figure 2.9 Pricing of congestion

Administrative costs
User fee collection requires a collection system. Amdal et al (2007) studied the operational costs of toll road companies in Norway, and concluded that some projects are unsuited for private finance, as the operational costs comprise a too high proportion of revenues, up to as much as 40%. Welde (2011) found that operational costs are difficult to predict ex ante, and often turn out to be higher than estimated. On the other hand, general taxes are collected through existing collection systems and the marginal increase in their costs is negligible. While this has been an argument against toll roads hitherto, toll collection costs are expected to decrease when electronic collection systems are adopted.

The benchmark for user fees should be the general costs of taxation, which, and as explained above, have been estimated to be up to 20% of revenues in Norway. This means that if the costs of user fees (i.e. the sum of the efficiency loss and administrative costs) could be kept below 20%, then user fees can be a good solution.

12. What is 'fair' funding?

Society cares not only about efficiency, but also about how resources are distributed. This explains why governments often provide not only public goods, but also education and health care, and why tax systems are used for redistribution purposes.

Different financing mechanisms have different distributional effects. Conventional theory has suggested that user fees have a tendency to be regressive, i.e. to comprise a larger proportion of the income of the poor compared to the rich. Recent research on congestion charging in the transport sector has indicated that the opposite could also be true. In general, equity effects depend on the choice of charging scheme, including revenue recycling (Levinson, 2010). Furthermore, there are different views on what is 'fair' or 'reasonable' with regard to cost sharing. Is it reasonable that users pay? Or are infrastructure goods to be considered 'necessities' that everyone should have a right to consume regardless of their income? We

will leave this discussion to the politicians. Nevertheless, we realize that it is important to consider these issues before making a choice of financing mechanism. The project's relevance and sustainability depends on it being accepted throughout society, including the sharing of the financial burden.

13. Local beneficiaries and perverse incentives

Infrastructure projects are often 'local public goods' and initiated by stakeholder groups in a local community. There could be many reasons why local infrastructure projects should be funded in part by state government budgets such as free rider problems, optimal risk sharing, distributional concerns and so forth. Different types of subsidies are available, e.g. central/local government cost sharing, 'soft loans' (an interest rate below the market rate), government guarantees, etc.

However, this induces a risk of a market failure known as the principal-agent problem in economics and contract theory.[6] This situation is characterized by: 1) a *conflict of interest* between the state government (the principal) and local agents, and 2) *asymmetric information,* in which the local agents know better about their real needs and their future behaviour. The state government is assumed to act on behalf of the entire nation, seeking the best projects within a national perspective. By contrast, local promoters only consider the benefits and costs accruing to them. A region with a low share of total taxes (for example, due to a small workforce) will regard a nationally funded project as being practically free of charge (Helland and Sorensen, 2007). Privileged *individuals* are particularly eager, e.g. a landowner who will benefit from increased land prices, a local politician who will increase his popularity among local voters and so on. Their arguments are typically formulated in terms of 'societal needs', although privileged groups have incentives to overestimate benefits, while underestimating costs and risk. It is not only local agents, but also planners in public organizations who may have a personal interest in the result. This leads to the 'survival of the unfittest', in which it is not the best projects that are built, but the most misrepresented ones (Flyvbjerg, 2007). Moreover, a project's success ex post often depends to a certain degree on local agents' efforts, although the state government cannot know whether these agents will make an effort once the funding is raised. These challenges are well known from development aid, and often increase within the layers of a hierarchy (see Ostrom et al., 2001).[7]

This problem arises because the state government does not have enough information to separate good project proposals from bad ones, and because agents are protected from the consequences of their own actions. One obvious solution is to therefore demand co-financing from local communities, the thinking with this being that agents will not promote bad projects if they have to bear the costs. Additionally, transparency and broad involvement in the pre-study phase is essential to ensure that local agents really do represent their entire community. An alternative explanation for the disproportionate distribution of national funding of local projects is the political parties' desire to maximize their numbers of seats in the national assembly (Helland and Sorensen, 2007). Parties will allocate more funds to districts with high voter mobility, and with many voters on the ideological cut-point. Furthermore, districts with a high ratio of parliamentary seats to voters will be favoured. Even so, in this case as well,

[6] See, e.g. Rosen (1995).

[7] A related challenge is the Samaritan's Dilemma, which was first identified by Buchanan (1975).

local (co-)financing may be an appropriate measure. Local communities will not accept a useless 'gift' if it comes with an invoice.

14. 'Project-based funding' – with private capital?

The discussion thus far has primarily been in relation to the potential of a project in terms of a social surplus ('strategic potential'). Yet, another special challenge in public projects more related to tactical performance is the following: The lifetime of most infrastructure projects is several decades, with an implementation phase alone that amounts to five years or more. For an infrastructure administrator to develop and operate major projects in a time and cost-efficient way, a high degree of predictability and flexibility is essential.

In the real 'public budgeting' world, however, there are impediments to the optimal planning of major projects. In particular, government budgets are tight, and grants are only available on a year-to-year basis. The result of this is often a prolonged construction phase, less returns to scale and a later realization of benefits. According to Vista Analyse (2010), the economic cost to society of this year-to-year principle amounts to 22-25% of construction costs. Mechanisms exist to overcome the problem by providing all the necessary funding at start-up, which is to be spent by the project administrator in a time-optimal way. These mechanisms are categorized as 'project-based funding', and normally involve the use of private capital (see Vista Analyse, 2010 and Econ Pöyry, 2008). Some examples of this are:

- *Multi-year budgeting* (politically binding but normally not legally);
- *State government loans* to public agencies, or allowing them a right to enter into *loan agreements in the financial market* (normally requires a change in organization, e.g. to a state-owned enterprise);
- Separating out *the projects as a legal unit*, with a right to take up loans;
- Leaving the development and operation of the infrastructure entirely in private hands (*privatization*);
- Creating a *partnership with a private contractor* who takes a major share of the responsibility for finance, development, as well as often maintenance and operation.

All of these models have been tested, and the results are mostly positive. Britain was a pioneer with Public-Private Partnerships for infrastructure projects such as roads and rail. One important experience is that such contracts work best when the entire project life cycle is taken into account in the contract (so-called life cycle models) and when the transfer of risk to the private party is 'real'.

As pointed out by the OECD (2008), there is an increasing gap between the demand for infrastructure and the available public finances in most OECD countries, due to ageing populations, an increasing health expenditure, etc. Hence, most countries have no other choice than to make more intensive use of private capital to help ensure the provision of infrastructure in the future. However, private investors will only consider their own payback and not the total social benefit, so in the end we are left with taxation and user fees as the ultimate (amortization) alternatives.

15. Conclusions

It all starts with the project proposal, and challenges in developing the proposal are abundant and complex. One is to avoid problems such as tactical budgeting, whereby responsible parties tend to underestimate costs in order to increase the chance to obtain funding for a project. Another challenge is to increase the chance that the most relevant project concept is identified. It is also crucial to ensure a transparent and democratic process and to avoid adverse effects of stakeholder's involvement and political bargaining. A major challenge is to make the process predictable, when the front-end phase will last for years. Many of the strategic performance problems facing investment projects can be interpreted in terms of deficiencies in the interaction between analysts and decision-makers in the front-end process.

Although we appreciate the rational decision model as an ideal, we are fully aware of the limitations facing planners and decision makers in real life: Time is limited, information is sparse, and stakeholder preferences vary and often conflict. But above all, we all live in a political reality that isn't rational or even reasonable and only to a limited degree predictable. What can be achieved by rational analysis and planning is accordingly limited.

The bounded rationality model (Simon 1979) holds that problems and decisions should be reduced to a level at which they will be understood. In other words, the model suggests that we should interpret information and extract essential features and then make rational decisions within these boundaries. We can hope not for a perfect solution but for one that is "good enough" based on the limited abilities of the analysts to handle the complexity of the situation, ambiguity and information.

Then we must take into account whether or not the analysts' advice is applied by decision makers. In the ideal model for decision making, decision and analysis follow in a logical, chronological sequence that eventually leads to the selection and go-ahead of the preferred project without unforeseen interventions or conflicts. In reality, the process is complex, less structured, and affected by chance. Analysis may be biased or inadequate. Decisions may be affected more by stakeholders' priorities than by rational analysis. Priorities may change over time. Alliances and pressures from individuals or groups of stakeholders may change. Information may be interpreted and used differently by different parties. The possibility for disinformation is considerable, etc.

Under any circumstances, starting with a well formulated strategy may be an advantage, but is no guarantee for the best choice when the final decision is made. In some cases, the result may be entirely different from the initial choice. In other cases, the lengthy and unpredictable decision process may result in an optimal decision, even though the initial choice was entirely wrong.

A financial analysis is a crucial part of every project proposal, not least in public infrastructure projects. Different financing mechanisms can be applied under different circumstances and their features, strength and weaknesses vary.

Private capital is often expected to improve project flexibility and thereby improve the project's tactical performance. Ultimately however, a public project must be financed either by taxes or by user fees. Both create an efficiency loss in the economy as well as administrative costs. User fees will normally reduce demand ex post and thereby benefits

realization. This option should therefore be considered only in cases of inelastic demand, negative external effects and/or highly efficient (electronic) collection systems.

Cost sharing between government and users/beneficiaries is also an issue. The risk of local agents' 'perverse incentives' could be an argument for local co-funding. The local share will ultimately be paid by local taxes or user fees.

The project's relevance and sustainability depends heavily on it being accepted throughout society. This includes the sharing of the financial burden. Therefore, the distributional impacts of different financing mechanisms should always be considered.

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