

FRONT-END MANAGEMENT OF PROJECTS ¹

Knut Samset,
Professor NTNU, and Director of the Concept Research Programme

Introduction

Projects constitute a meeting place for different stakeholders such as project owners, financiers, contractors, users, opponents and public authorities. These can have shared or conflicting interests – often a combination of both. Commonly, the society's perspective is usually much broader than the perspectives of the bank, the contractor or the user. Much of media's discussion of projects is limited to the implementation of the project itself seen in a short-term perspective, notably with regard to delays and expenditures over budget. These aspects can easily be measured and are usually the first criteria against which the project can be assessed. The effects of the project and whether it attains its goal can only be verified at a later stage.

Despite the difficulties, it is essential to take a broad perspective on projects from the very start when the project is conceived and formulated – and throughout its implementation. Much of the problems in projects can in fact be attributed to the problem that they have been designed and implemented without taking into account some of the broader and long-term effects.

The project as a means to achieve an aim

The tasks that projects are assigned to solve are defined in terms of more or less precise and realistic *goals*. Being a temporary arrangement, and also because a project is more or less unique, uncertainty is often greater than what is common in permanent organisations.

A project is a temporary endeavour undertaken to create a unique product or service.
(Project Management Institute, PMI)

Numerous projects have caused high additional cost for the society both during and after they have been implemented. During the last decades, there have been several Norwegian projects in the oil and gas sector with overruns in billions of US \$ due to the technical complexity and uncertainty facing these projects. In Norway, the Oslo Airport rapid commuter train project was concluded with final cost exceeding twice what was budgeted for, due to a number of circumstances, among them inadequate geological surveying leading to an unfortunate choice of track for the railroad. In the health sector, a new central national hospital was constructed and got much attention due to considerable cost overrun as the result of unclear delimitation and several major changes during the construction phase. In the IT sector, the National Social Security Administration had to cancel an ambitious project aimed to design a comprehensive computer based administrative system after the equivalent of almost 300 million US \$ had been expended. The project proved to be unrealistic and impossible to implement.

¹ The paper is an extract from the book "Project Evaluation. Making investments succeed" by the author. Tapir Academic Press, Trondheim 2003

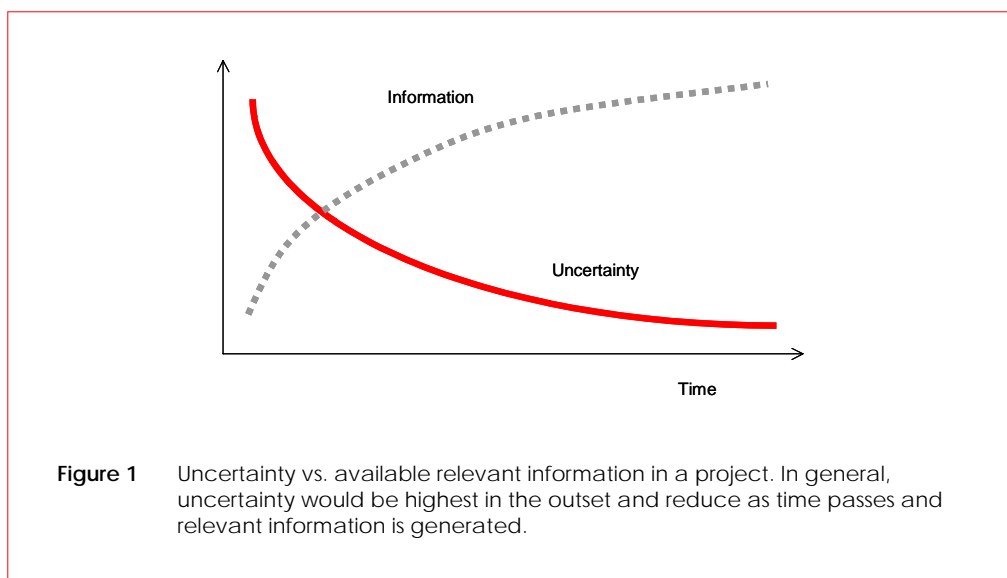
One comprehensive study of major projects, *Morris and Hough (1991)*², concludes that ‘the track records of projects are fundamentally poor, particularly for the larger and more difficult ones. Overruns are common. Many projects appear as failures, particularly in the public view.’ It seems therefore that there is a contradiction between the increasing use of projects and the fundamental problem of projects often overrunning their budgets and exceeding their set limits.

However, ultimately most projects attain their objectives in one way or another, even if too many are made too expensive or are delayed. There are several reasons for the increasing use of projects today. One answer is that many tasks in society are so enormous and complex that individual organisations lack the competence or capacity to carry them out alone. This is particularly the case in small countries. Another answer is that the project focuses and visualises the task, and therefore has a motivating effect on all stakeholders. In projects, responsibilities are clarified and the different parties are made accountable. Moreover, the project is an expedient way of transferring risk from the financing to the implementing party. The project is also a conducive way of organisation, which allows participants to pool resources and co-operate towards a common goal.

Uncertainty affecting projects

Uncertainty characterises situations where the actual outcome of a particular event or activity is likely to deviate from the estimate or forecast value. It follows that decision-making becomes more difficult as uncertainty grows. Further, that the availability of relevant information increases predictability and reduces uncertainty seen from the decision maker’s point of view.

This is illustrated in Figure 1. In general, uncertainty would be highest at the earliest stage where the project concept is conceived and will reduce as time passes and information accumulates. The potential to *reduce* uncertainty and risk is therefore largest in the outset and could be exploited by adding more information. Obviously, there are limits to this.



² Based on 31 separate studies from the period 1959-86 covering more than 4000 projects

Usually, the distinction is made between the value-neutral term *uncertainty*, and the *subjective* effect of uncertainty which may be either negative or positive seen from the point of view of different parties, usually termed *risk* or *opportunity*, respectively. Uncertainty can therefore also be a source of motivation. For instance, a strictly pre-defined and predictable routine job provides few challenges and the motivation will frequently be low. Increasing uncertainty may represent a challenge which motivates for improved performance. However, if uncertainty increases beyond a certain level where major parameters become unpredictable and the understanding and control over the project is lost, the motivation is commonly reduced.

There is a tendency that people value not only risk but also uncertainty in negative terms. This is because more people are risk-averse than risk seeking, and tend to highlight the negative aspects of uncertainty more than the positive. They become uncertainty-averse and may therefore put themselves in a position where they may avoid risks, but at the same time do not take advantage of the possibility to explore and exploit the impending opportunities in an uncertain situation.

Internal and external uncertainty

In analysing uncertainty in a project, a useful distinction is between *operational* uncertainty and *contextual* uncertainty. *Christensen and Kreiner, 1991*. Operational uncertainty is basically associated with the implementation process itself. It is characterised by such features as the quality of plans, management, staff qualifications and experience, project design, funding problems, etc. It will be reduced as the project develops. To some extent it can be reduced by increasing the amount of information available, but also by establishing operational objectives at a realistic ambition level and through systematic, realistic planning.

Uncertainty is the combined effect of the initiating events and all processes that cause and affect the outcome. Each of the initiating events and processes may be predictable to varying degrees. Their combined effect is usually considered to be less predictable. Uncertainty is determined to some degree by the type of and number of such processes involved.

Contextual uncertainty is associated with the operating environment and conditions or circumstances beyond the scope and authority of the project, for instance political processes, decisions and responses in affected institutions, demands and responses in the market, technological development, price changes, etc., The possibility to predict and influence contextual uncertainty is often limited.

There is a widespread belief that success and uncertainty is related. Projects therefore go to great length to explore, understand, reduce or overcome uncertainty in decision-making. To this end, the most common means is to:

1. Generate and analyse as much essential information as possible
2. Take a broad view to understand the factors that affect the project
3. Reduce the level of ambition
4. Reduce the planning perspective in time, etc.
5. Improve planning, for instance by using stochastic analysis, etc.

Society is in constant change, and therefore to some extent unpredictable. This is because of the in-built dynamism in social and administrative systems, particularly their self-adjusting abilities. As

the result, minute planning at an early stage may be less effective in achieving objectives than successive interventions to influence the dynamic process as it unfolds. Systematic assessment of uncertainty at different stages is therefore not an alternative but a powerful supplement to planning. It is essential both in the front-end phase when the viability of basic project concepts is assessed, and later when performance and effect are scrutinised.

The project's main stakeholders

Project stakeholders are individuals and organizations who are actively involved in the project, or whose interests may be positively or negatively affected by the project. The key stakeholders are the *financing party*; the *operator*, and the *users*. Their roles and interests are described below. The outline is simplified and does not take into account that there in many cases might not be a clear-cut distinction between the three groups. The financing party can, for instance, represent the society's perspective in a project to construct a power plant, or could also represent the users in a residential housing project initiated by a housing association. In many cases, it is not possible to distinguish between the financing party and the operator in, for example, a project which is internal to an organisation. In other cases the operator may also be the key user of the project's result.³

A project is not necessarily a success when seen in a broad societal perspective - even if successfully implemented in terms of time, cost, and quality. Also, we cannot automatically assume that a project with major overruns in terms of time and cost and with major quality flaws will come out as a failure when seen from the users or the society's perspective. There are many examples of projects that have failed in the implementation phase have proven successful at a later point in time, when assessed in a wider perspective, for example the Opera House in Sydney, which was a disaster in the narrow sense but later became an international attraction and that brought enormous financial gains both directly and indirectly and placed Sydney on the world map.

The operator's perspective

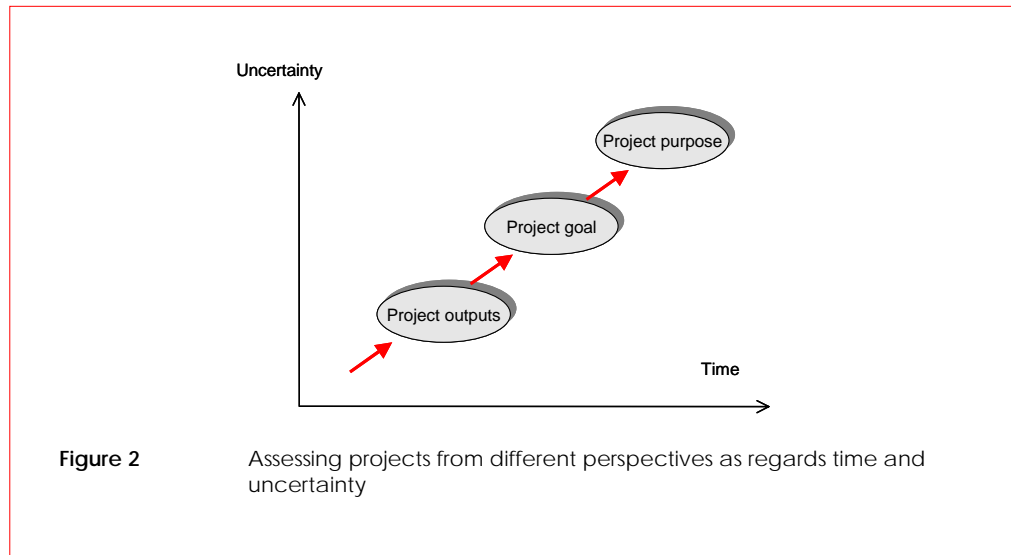
Project operators have their attention directed, first and foremost, towards the production of project outputs – focusing on the cost, time-frame and quality produced. In other words: the concern is the *tactical* completion of the project within the *strategic frames* which are laid down by the financing party.

This is often misleadingly termed as the project perspective. It is the most restricted and short-sighted perspective one can use when assessing projects. It refers to the lowest level in the project's hierarchy of objectives, see figure 2. Take, for example, a road project, where the focus is narrowed down to the road itself, and the extent to which it is built according to the agreed quality standard, budget and schedule. The project outputs for a school construction project might correspondingly be restricted to constructing and outfitting the school buildings.

If focus is placed on the operator's perspective alone, a number of problems can develop. Too much emphasis on the agreed time schedule, budget and so forth, could divert attention away from possible adverse side-effects of the project, which can, in the long run, bring about considerable

³ In some cases, each of these parties might be represented by several individual stakeholders, who, in certain cases, are also legally or financially independent of each other. Therefore, not only do conflicts of interest arise between the different groups, but also within the groups themselves. In exceptional cases severe problems might occur just because of internal changes of personnel. It is easy to forget that we deal not only with organisations, but the representatives of these organisations, and that these not always act in a co-ordinated manner.

negative reactions in society. Paradoxically, this can result in a much more costly solution, or reduced long-term economic gain as the result of the project.



The user's perspective

Users are more concerned with the utility of the project seen from their point of view, and less with the actual implementation. They tend to assess the project from a broader perspective, with reference to the *project goal*. The parameters used to assess the extent of success are associated with the project's first-order effects. Assessment, thereby, concerns how the project's application and financial aspects affect the user. In a road construction project, such assessment to a certain extent concerns the technical quality of the road, but primarily whether the road makes it easier and quicker to travel from A to B, e.g. the distance and the flow of traffic. For a school construction project, the user's interest goes beyond the suitability of the school buildings, and to the learning and teaching that takes place in the buildings. This, obviously, falls outside the operator's sphere of responsibility. The user's perspective is therefore more ambitious as regards both time and uncertainty, as is illustrated in Figure 2. The chance of success is correspondingly more limited in relation to assessing the project from the perspective of the operator alone.

The financing party's perspective

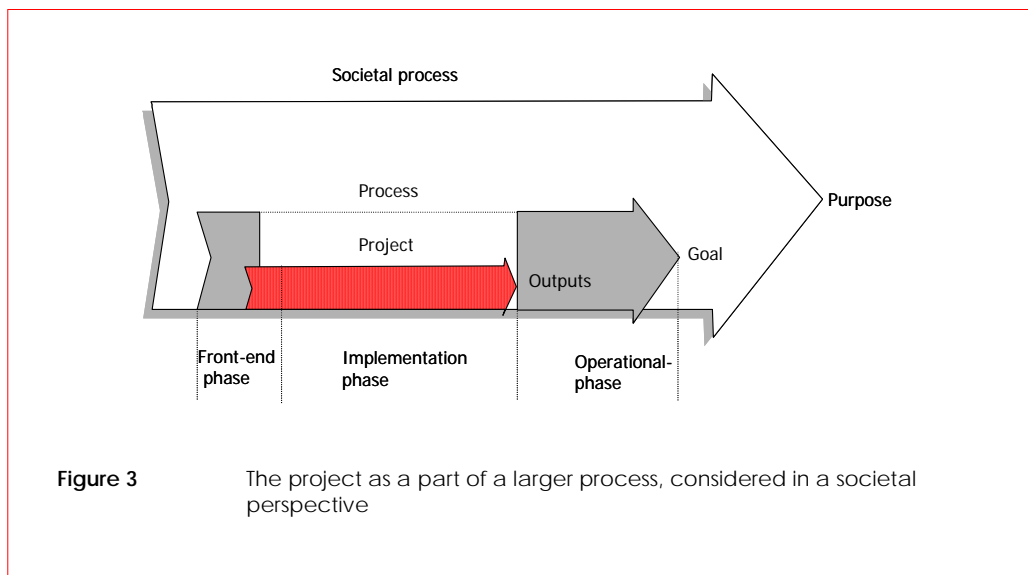
The financing party normally has a perspective beyond the user's perspective, or what is seen to be the immediate effect of the project. Society in general has a perspective that tends to include the collected effect of the project on society as a whole. This is what is termed the project's *purpose*, which is the highest level and expresses the long-term consequences of the project. Private investors will normally place greater emphasis on the value added or profitability, while public investors would emphasise public utility.

In a road construction project, one is concerned with the positive economic effect on society, for example, as the result of reduced travel time, yielding more productive time, the establishment of new settlements or enterprises near the road and so on. In a school construction project, the long-term aim would focus on the effect of education in terms of employment, the economic effect of provision of goods and services, and so on.

In principle, the assessment is similar to that of the user, but now related not only to the primary “user-group” but also to the interests of other parties that are affected by the project, directly or indirectly. Such assessments are ambitious; since the time horizon is extended and uncertainty is higher than is the case of the other perspectives, see Figure 2.

The project in a time perspective

Figure 3 illustrates the project over time as seen in relation to the three planning perspectives outlined above. The idea is that the project represents a focussed undertaking where the primary objective is to produce a number of agreed outputs within a specified time-frame. Commonly, the project can be seen as a time-restricted part of a *process* with a wider purpose and a time perspective beyond that of the project. This process can be characterised by what is termed the project goal. The process in turn contributes to a broader and more long-term societal process, which in this context is characterised by what is termed the project purpose. This objective gives a concerted strategic perspective both for the project and the process that the project is part of. It is often the case that the process presupposes that several projects run concurrently or in sequence. The process, in turn, will be one of many processes that contribute to the long-term objective, here called the project purpose.



The project is planned in a *front-end phase*, which ends when the final decision is made to appropriate funds for the purpose. It is executed in an *implementation phase*, which ends when the project outputs are realised. Commonly, there is an *operational phase* of the project, which follows when the project outputs are realised, that is when the building is built, the road is constructed, etc.

It follows from the illustration in Figure 3 that the time perspectives vary for the different parties. The operator could possibly have a time perspective of three to four years, and would wish to delimit his commitments to the period of the guarantee. The financing party could have a much wider time perspective equal to the pay-back period or beyond, and will want to restrict his obligations to this period. For large infrastructure projects, the period could be between 15 and 20 years. The lifespan for that which has been constructed can be much longer. The society can thereby be obliged to maintain the built object for generations.

Economically, the front-end phase deals, to a greater extent, with the organisation of who bears the uncertainty and risk involved in the project. When the financing party has established the strategic framework for the project and the main terms that should guide planning and implementation, and has identified a qualified party to take on the responsibility for implementation, then it is implicit in the arrangement that he does not wish to manage the project in detail but hand the responsibility for the project and the risk over to the operator.

His concern would rather be to ensure that the project moves in the right direction. He should monitor the project and detect as early as possible which amendments would be necessary to secure that the project has its desired effect in a strategic perspective. The division of responsibilities between the financing party and the operator is commonly regulated by contracts to ensure a certain flexibility for the operator within the strategic framework laid down by the financing party.

The operator will, in the front-end phase be concerned first and foremost with estimating the right price in order to be able to carry out the work to a satisfactory level without too great risk and, at the same time, seeing a profit. What makes this transaction viable is that the transfer of risk comes at a price. A core part of the contract between the two parties implicitly concerns how to share and price the risk. This forms the basis for the sharing of responsibility, such that both parties can attain their goals either fully or in part.

The project strategy

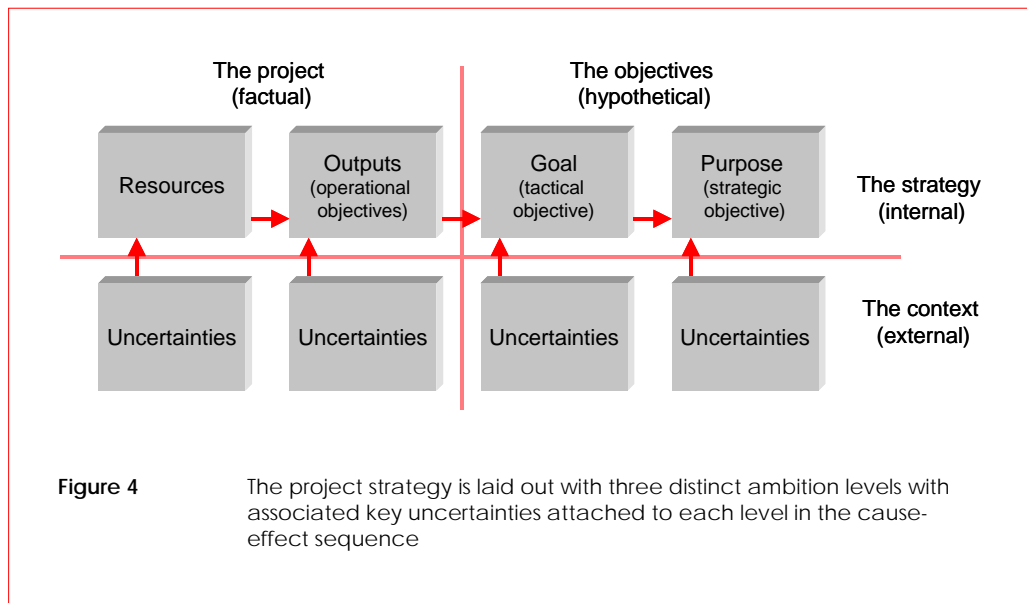
Project designers tend to be ambitious. One reason may be that ambitious objectives provide motivation for those involved to improve performance, another that ambitious objectives help justify proposed projects at an early stage. The dilemma is that high ambitions tend to reduce the probability of success, since success is determined by performance relative to ambition.

Planners may start with an idea of the amount of funds available and stipulate an objective to match the resources. Although this is a perfectly rational approach in planning, the result is often a mismatch between objectives and resources. Often, objectives are ambitious beyond what available resources can support, since people have a tendency to underestimate costs. Availability of resources, however, does not necessarily guarantee project success. The critical factors affecting the project may be insensitive to the amount of resources available, for instance if they are related to the market response, carrying capacity of the environment, the availability of technology, etc. The assessment of realism at the planning stage would usually have to consider a large number of such factors.

Laying a realistic strategy is a question of deciding the ambition level rather than laying out the sequence of events and stipulating achievements in detail. A systematic analysis of the *probability* and *utility* associated with each ambition level in the project is probably more significant than the detailed analysis. It is also much less expensive. And still, systematic analyses of probabilities and utilities are not always done in projects.

In figure 4, the key elements in a project have been structured in a logical sequence including an operational, tactical and strategic level, with the main contextual uncertainties influencing the strategy linked to each level. A realistic strategy needs to provide a description of the main elements in the project and the main influencing factors or uncertainties in its surroundings. It should have a strategic objective which provides the justification for the project, a tactical objective which is explicit regarding the preferred situation that the project is meant to contribute to, and a number of operational objectives that are explicit regarding what the project should produce. The operational objectives should be *factual* in the sense that the project is expected to fulfil these objectives with a

high probability. The tactical and strategic objectives are *hypothetical* in the sense that the project is only one of several conditions that have to be fulfilled in order for the objectives to be realised.



A realistic strategy is built on a cause-effect chain, which starts with an amount of resources to be used within the project to fulfil a number of operational objectives. The resources must be sufficient to ensure the realisation of objectives. The operational objectives must therefore be defined so that the probability of realisation is close to 100 per cent. If the operational objectives are hypothetical, the project is not formally designed to succeed.

Projects are often designed with several independent objectives at the tactical and strategic level, sometimes involving different ambition levels. In some cases the same project can have conflicting objectives. This creates internal uncertainty, which opens up to different interpretations of the objectives by different parties. A successful strategy requires that the tactical objective should not be ambitious beyond what is realistically achievable within the time frame associated with the objective. Also, the objectives must be defined precisely and as singular objectives. Agreeing on only one tactical objective will facilitate planning, allocation of resources, project management and control. The same requirements apply for the strategic objective.

The project's strategy is established by the main normative elements in the upper row in the matrix in figure 4. Below are the main uncertainties affecting the strategy and linked directly to the fulfilment of the different levels in the strategy. A realistic strategy requires that as many as possible of the major uncertainties are identified in the outset. The matrix provides room for the information necessary for an overall description of the fundamental characteristics of the strategy. Such a strategy, without details, will provide useful insight for all parties involved in or affected by the strategy and will be a good point of departure for the assessment of realism and a subsequent more detailed design of the project. The framework provides a fuller perspective than the much narrower but more detailed picture presented by common project management tools.

Successful projects

Success is a highly aggregated parameter. There are large variations in how it is defined and interpreted. A meaningful comparison of success rates in different projects can only be made if the definition and application of the concept is carefully explained in each individual project. This is often not the case.

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.

Pinto and Slevin, 1988

However, assessing success is not only a question of choosing the right parameters. It will also largely depend on which ambition level is used as reference when the project is evaluated. It follows from figure 4 that the chance of success of a project is highly dependent on what time in the project cycle the evaluation takes place. During implementation it is usually possible to establish with some confidence whether the project will succeed in the operational perspective; more so the closer we get to the completion date. A reliable assessment of success in a tactical or a strategic perspective will have to be made at a later stage.

To confuse the picture further, projects have a tendency to change both ambitions and performance over time. In such cases, its success as measured against operational, tactical and strategic objectives may change considerably. In literature, success rates are often discussed and even compared without any reference to what stage in the project cycle the projects have been evaluated. This problem further limits the possibilities to make valid comparisons of success between projects.

On the background of the experiences outlined above, one sees the need to consolidate the overall management part of the process, that is: the financing party's strategic grip, which formulates the premises for the planning stages before decisions are made regarding financing. Experience shows that serious errors could have been avoided, or that economic results could have been greatly improved – if greater emphasis had been placed on the strategic preparation for projects. The World Bank has, for example, through a large-scale study, demonstrated that projects where a thorough job had been done initially to identify and assess risk, the chance of success was much higher than in project where front-end preparation were insufficient.

The reason for this is that what causes the main problems in projects are aspects which are often quite obvious and predictable at an early stage. Such problems commonly have a bearing both on the implementation of the project as well as the utility and relevance of the project as seen in a user or societal perspective. It is therefore reasonable to conclude that more thorough front-end assessment and improved concept design often could have improved quality at entry and possibly solved some of the major problems.