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Ole Jonny Klakegg

Governance of Major Public Investment Projects

In Pursuit of Relevance and Sustainability

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Ole Jonny Klakegg

Doctoral Thesis

NTNU
Norwegian University of
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Thesis for the degree of
philosophiae doctor
Faculty of Engineering Science and Technology
Department of Civil and Transport Engineering

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Preface and Acknowledgements

In the year 2000 the Norwegian Ministry of Finance initiated a new quality assurance scheme under which all major public investment projects financed by the State were to be appraised and analysed by external QA-consultants. In 2002 the Ministry initiated the Concept research programme to support and follow up the QA scheme. The main task of the programme is to perform trailing research, gathering and analysing empirical data from these projects and develop new knowledge that could help to improve the front-end governance of major public projects.

In 2006 the Concept research programme arranged an international symposium with the title 'Principles of Governance for Major Investment Projects'. This marked the start of preparations for this dissertation. The main topic studied in this doctoral thesis falls within the same thematic field, as reflected in the following question in the symposium brochure:

> *What would it take to develop more effective governance regimes at international, government or corporate level to ensure maximum utility and return on investment for society and investors?*

For the last five years I have had the pleasure of holding the position as Research Director of the Concept research programme. During this period I have developed a strong interest in the issues studied by the programme. These are complex issues that no one can expect to have full knowledge of. I have often felt humbled by the complexity in the issues when studying the challenges faced by those involved in governance and management of public projects. Typically, they are under pressure from many sides, and with a multitude of expectations to fulfil. I hope this research will contribute to make some of these challenges more manageable in the future.

The selection of problems addressed in the research reported in this dissertation was influenced by the symposium in 2006, as well as by the experience I gained through my position in the Concept research programme. In addition, my research had to be relevant for the Concept research programme in order to make it practically possible to combine my position with the doctoral studies. Finally, several other candidates have been or are currently working on their doctoral thesis in collaboration with the Concept research programme. My choice was to study governance of projects using a qualitative approach. Other candidates associated with the programme have chosen other research issues and applied more quantitatively based approaches.

Methodologically, this work represents an engineer's attempt to stretch beyond the usual approaches in the engineering field. I have done this without leaving the basic perspectives of an engineer, while at the same time I have tried to draw lessons from

social and political sciences to find new approaches. As a result, the dissertation covers issues that traditionally have not been much in focus in the engineering world.

I am deeply grateful for the financial support received from the Norwegian Ministry of Finance via the Concept research programme. Concept has also provided access to empirical data. Without this support the work would never have been possible.

I carried out a major part of the writing during one year as a visitor at the School of Management, University of Southampton, UK. My sincere thanks are due to Professor Terry Williams for making my stay possible and for his encouragement and support in the research work. My thanks also go to my colleagues in Southampton who, through their hospitality and friendship, made it a fantastic year for my whole family.

The remaining work was carried out at the Norwegian University of Science and Technology, Department of Civil and Transport Engineering. Sincere thanks are given to my supervisors, Professor Tore Haavaldsen, Department of Civil and Transport Engineering, and Professor Bjørn Andersen, Department of Production and Quality Engineering. I would also like to thank Deputy Director General Peder Berg of the Ministry of Finance, and Professor Knut Samset, Department of Civil and Transport Engineering, as important sources of knowledge and inspiration in the matters discussed in the dissertation. Thanks are also due to my co-authors: Ole Morten Magnussen, Nils O.E. Olsson and Helene Glasspool. I also thank all other friends and colleagues among the researchers, interviewees and informants who contributed additional data, knowledge and encouragement through discussions and analysis, and who are too numerous to mention by name here.

Thanks are also due to friends outside the university, with whom I can still talk about things that keep my feet on the ground. Without them, I could not have gone through this process. Last, but not least, I thank my parents and family – my wife Anne-Sissel and children Anette, Kristian and Renate – who still bear with me after this busy period.

Trondheim, October 2009

Ole Jonny Klakegg

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Summary

The ultimate purpose of this research is to contribute to making public investment projects more relevant and sustainable. The objective is to develop a deeper understanding of how governance frameworks can contribute to such development. The study aims at developing new knowledge about governance frameworks and how they influence major public investment projects. One reason for doing this is the acknowledgement that even well-managed projects may end up as failures in the perspective of their owner and financing party. Another reason is that this recognition has given rise to the development of a new generation of governance frameworks in the public sector in several countries. In Norway the quality assurance scheme was established by the Ministry of Finance in year 2000. This is one of the main starting points of my research and serves as an example in several of the chapters and papers in this dissertation. Other starting points are the Logical Framework Approach and the OECD integrated evaluation model. These define a platform on which the research is based.

As indicated in the title, this research focuses on the governance of projects, not on project management. It takes a position with an owner's perspective and is about how projects may become more relevant and sustainable – not how they may become more efficient, effective or what other impact they have. The focus of the study is public projects, not private sector ones; investment projects, not financial transactions; and major projects, not normal, routine tasks. This dissertation represents a step towards making more successful public investment projects possible – it does not present a readymade solution. To perform this study, critical realism was chosen as an ontological and epistemological position. Critical realism encourages interdisciplinary research, and this opens up for the use of multiple research methods inspired from both technical sciences and social sciences. This dissertation represents an engineer's attempt to stretch beyond the usual approaches in the engineering field.

The first research question asked in this dissertation is: *What are the most important functions (from an owner perspective) that ought to be carried out by governance frameworks that govern the front-end of major public investment projects?* Based on the view that governance is complex, including both hierarchical and relational mechanisms, the basis for this study in terms of understanding governance and specifically governance of projects is developed. A discussion about governance functions and how they correspond to management follow-up is included in an attempt to discover what the most important governance functions in a governance framework are. The discussion is limited to governance functions supporting decision making, planning and execution of projects. It is found that: *The most important*

governance functions in the front-end of projects are defining a clear decision making process, and controlling the quality of documents used as basis for decisions.

The second research question asked in this dissertation is: *How can a governance framework for major investment projects be designed?* The first step in answering this question is defining the term governance framework. No established definition was found and to date this has not been given much attention, although many authors have described aspects of it and used several terms. Some authors question the idea of having a common framework for projects, but this author found it appropriate to formulate a definition:

> *A governance framework for projects is a set of principles and an organized structure established as authoritative within the institution, comprising processes and rules established to ensure projects meet their purpose.*

Several governance frameworks are studied as examples. We describe and analyse them to add to the understanding of their development process, structure and content. Three archetypes of frameworks are identified in the study: the lean framework (characterized as simple, flexible, control based), the integrated framework/quality system (characterized as strong on operational tools, limited in scope) and the complex framework (characterized as open, including options to fit different settings). This gives a platform for discussing how governance frameworks may be designed. The conclusion is that there are two basic design strategies: *Model framework design (copying and adaptation of existing framework elements) and unique design (developing framework elements from 'blank sheets' and based on own experience)*. Three supporting design strategies may help in this development: using a system approach (system engineering), using design criteria (criteria for how a unique framework should work) and using a theoretical model (currently only presented as an idea). No conclusion is reached as to what combination of design approaches are the best. This is a question of what fits the purpose of development, the tradition and culture in the organization in question and the situation at the outset.

Having established an understanding of governance and governance frameworks, the next research question addresses the practical situation in which the governance is supposed to work: *What are the most important problems that occur in the front-end of major public investment projects, which may lead to lack of relevance and sustainability?* These are the key problems to handle, in order to attain the objective of this study. From an owner perspective these are the most important problems and have to be fixed first. In order to identify these most important problems, the author conducted a survey. Based on answers from 80 respondents, the following conclusion is drawn: *The most important reasons for lack of* ***relevance*** *are: user needs are unknown, misunderstood or ignored, and project objectives are unknown or misunderstood. The most important reasons for lack of* ***sustainability*** *are: lack of commitment to the project from key stakeholders, conflict over objectives and/or strategies concerning the project, low economic and financial benefits compared to investment and operational costs, and business or other conditions changing between concept stage and final delivery.* The respondents were clear about the problems leading to lack of relevance. They were not clear about what problems lead to lack of sustainability. This is interpreted as a consequence of the more complex nature of the issues concerning sustainability compared to relevance.

The interpretation of the results of the survey implies that it will be easier to achieve relevant projects than to achieve sustainable effects. However, being relevant is a prerequisite for a project to have sustainable effect, which is an important finding for answering the next research question: *What characterizes an effective development strategy for improving governance frameworks?* As a consequence of the findings referred to above, the first and most important objective is to ensure relevance is secured. Sustainable effect as intended is only realistic when this is the case. These two criteria are superior to the other three criteria of the OECD integrated evaluation model (efficiency, effectiveness and impact) in an owner perspective. *To be effective the improvement strategy has to adopt following logic: first secure relevance, then sustainability and then other criteria as suitable for the purpose and situation at hand.* The next characteristic is to make sure there is a balance between values (attitudes, communication, and knowledge) and structure (process, roles, methods, and control). This is also necessary to achieve the intended improvement.

Thus far the dissertation focuses on governance and governance frameworks – the setting in which projects are planned and executed. The final research chapter addresses a research question that has to do with projects as such: *How can a public investment project be charged with an appropriate direction and the right level of ambition?* In this study, 'direction' expresses where to go – the clarification of results, the definition of goals. Similarly, the level of ambition expresses the degree to which the project organization has to stretch – the expected level of achievement. The answer to the question turns on two concepts:

1) ***Project definition*** *– the definition of objectives based on society's and users' needs*; the choice of which objectives to define on strategic, tactical and operational levels determines the direction of the project;
2) ***Project design*** *– the definition of the means to achieve the objectives*; the choice depends on identifying the possible means and their anticipated effect.

The most critical issue is securing consistency. The constraints that lie in combinations of availability of resources and present uncertainties determine what is realistic and thus contribute to defining the right level of ambitions. The results of a survey including responses from 76 international experts indicate a need for more systematic approaches to defining project objectives. There is considerable nonconformity when comparing what the experts actually recognize in practical life and what they hold to be the ideal way to define objectives and evaluate alternatives. An analysis of empirical data from 51 Norwegian major public investment projects revealed that approximately one-third of the projects were well designed, approximately one-quarter of the projects had technical faults in their definition (missing one level of objectives), and the remaining projects, less than half, had strategic faults in their definition (mirroring the political process rather than the instrumental logic). These results confirm the need to increase the effort to check fundamental qualities such as consistency and logic in the documents and methods used to support decisions about, and planning and execution of, major public projects.

The concluding chapter of this dissertation includes identification of many potential areas for further research – too many to be mentioned here. A main question that remains is why people continue making the same mistakes despite relevant knowledge

and good guidelines and instructions being available. The research in this dissertation has many limitations and the validity of the results varies from research question to research question, as discussed in each chapter. The main conclusions seem valid, although many details are missing. The following specific areas are where this dissertation contributes new insight:

- Governance of projects – the interplay between governance functions and management functions and how governance frameworks regulate and stimulate this interplay.
- The theoretical and practical challenges in the development and implementation of governance frameworks in different contexts.
- The current reality in major public investment projects in Norway in terms of the lack of fundamental logic and consistency.
- Added new knowledge to improve governance by potentially help create relevant projects with sustainable effect.

1 Introduction

The ultimate purpose of this research is to contribute to making public investment projects more relevant and sustainable. The objective is to develop a deeper understanding of how governance frameworks can contribute to such development. The study aims at developing new knowledge about governance frameworks and how they influence major public investment projects. Governance of projects is currently not closely defined and does not draw on one specific line of research or published scientific papers. Rather, it covers several disciplines and research areas. In this introduction a map of this landscape is drawn by explaining some key contributions to relevant areas. The dissertation is then placed on this map by explaining its starting point and approach. This study goes beyond project management and puts itself among an emerging body of literature with a strategic perspective on project owners and benefits for society in focus. The issues identified in this introduction will be addressed in the research chapters and papers in this dissertation. This chapter further gives an overview of definitions used in this dissertation, and explains the content of all of the chapters and accompanying papers.

1.1 Establishing problem awareness

The focus of this study is not how management should improve the performance of ongoing projects by the use of tools, techniques or even leadership skills, nor is it about how project planning activities should prepare projects for efficient execution. Rather, the focus is on the decision making process leading to the definition of a project and the control mechanisms which an owner or investor may use to ensure that a project will be successful. The following sections describe the starting point of the research.

Several researchers, such as Morris and Hough (1987), Nijkamp and Ubbels (1998), and Flyvbjerg et al. (2002; 2004), have studied a large number of major investment projects, and found that such projects often fail to meet expectations and agreed goals. The most frequently reported shortfalls are the failure to meet deadlines, exceeding budget and not delivering the specified quality. These shortfalls are usually linked to problems in planning or executing activities within a project. Another common category of shortcomings is the failure to deliver the functionality, benefit or contribution to business objectives intended upon initiation of a project. Projects sometimes do not deliver what the users need (Frame 1987, Kreiner 1995) This seems to be a more serious category of shortfalls and may also be more difficult to solve.

In Norway, similar studies have been performed by Berg et al. (1999), Odeck (2002), Torp et al. (2004), and Magnussen and Samset (2005). Such studies have identified a number of common problems in the planning and decision making process:

- Hidden agendas, not openly expressed or used publicly to argument decisions that might contradict available analyses and advice.
- Bias among planners and decision makers, resulting in only parts of available information being used to support the preferred alternative.
- Poor or incomplete planning and analysis, due to lack of knowledge, planning resources or time.
- Inconsistency or invalid assumptions concerning prognoses, analyses, estimates, or planning.
- Misrepresentation, either conscious (tactical budgeting) or unconscious (planning optimism).
- Lack of good planning data.
- Inadequate ability to terminate unviable public projects to minimize loss (once started, it is difficult to stop).
- Projects often grow larger over time, and substantial cost increases are usual.
- Too few alternatives are presented in the decision making process.
- Missing or poor evaluation of the benefits of public investments.
- Frequent change of managers, reducing the ability to gather experience and build competence, especially in some sectors.

The choice of concept and the fundamental design of projects are vital tasks in the front-end phase. Downey (1969), Pinto and Slevin (1992), the World Bank (1996), Miller and Lessard (2000), Hopkinson (2007), and others have documented that low quality-at-entry resulting from low performance in the front-end phase corresponds to limited success rates, whereas high quality-at-entry more often results in successful public projects. This clearly indicates the importance of the early phases in a project's life cycle. The above listed problems combined with the importance of the early effort seems to indicate a need for more knowledge about the front-end phase of major projects and the corresponding planning and decision making processes.

A separate study by Miller and Hobbs (2005), based on re-examining 60 large engineering projects (first published by Miller and Lessard 2000) highlights some additional success factors concerning the relations between a project and its governing party:

- Anchoring of the project in institutional frameworks, and having strong sponsors.
- Construction of coalitions within networks of relations.
- Strategic flexibility to cope with uncertainty and changes over time.
- High performance projects are subjected to intensive scrutiny.

These factors indicate the importance of governance and the need for a strong governing party. Traditionally, project management literature does not have much focus on governance, but currently research literature in this field is emerging (Dinsmore and Cooke-Davies 2007; Shannon 2007; Crawford, Cooke-Davies, Hobbs,

Labuschagne, Remington and Chen 2008) indicating a growing awareness. More knowledge is needed about the functions and systems used on a governance level.

In investment projects, a fundamental but often unresolved issue is 'What is success and how is it measured?' In general terms, success is a question of obtaining maximum utility from a given amount of resources. To be more precise, one has to consider given target groups. One question might be: 'Success for whom?' Each target group will have their own objectives and measures of success. In this research, the choice is to look at the governing party's success. In the case of a public project the decision makers have to agree upon what the objectives are. This should reflect relevant needs in society, such as expressed in policy or international agreements, for instance. It is the responsibility of professionals assigned to make plans for projects or review the quality of projects to make sure that the basis for decision making sufficiently highlights the right needs, identifies relevant alternatives, and takes into account the effects and consequences of the investment. For the decision maker, success may be seen simply as making the right decision.

Based on the above account, the key to higher success rates in major public investment projects might then be to find solutions to the problems listed above, within existing governance frameworks and public decision making. The Norwegian Government, along with many other governments and international organizations, has already recognized this and has made an effort to increase its probability of success, as will be shown in the next sections.

1.2 Current trends in project management

The heading of this section reflects the fact that both the research and definitions presented in this dissertation are characterized as 'current', meaning they are used here as they are commonly described in literature today and discussed in a contemporary setting. There is no such thing as a setting that never changes or an answer that gives the same meaning independent of place and time. Even definitions change over time, as shown by Dahlsrud (2006) and Artto et al. (2007).

Project management – tradition and current development

The classic project management (PM) literature that was dominant up into the 1990s focussed on individual projects as the object of study. With this came a strong focus on planning, control and progress in the project context. This is still relevant today (Rolstadås 1997; Kerzner 2000; Antvik and Sjöholm 2007). As changes seem to come faster and faster and business is becoming more global, an increasing focus on projects as a tool for handling this dynamic context is seen (Olsson 2006; Olsson 2007). In contrast, there is also a lot of focus in the PM world on how this increasing complexity creates risks and uncertainty for projects, and how PM has to improve to handle this effect (Chapman and Ward, 2003; Hillson and Murray-Webster 2007; Remington and Pollack 2007).

During recent decades, single projects have been increasingly linked to their parent organization, and not seen as isolated phenomena (Lundin 1995; Lundin and Söderholm 1995; Engwall 2003). They are frequently seen as a temporary

organisation more than a way of managing a unique task (Packendorff 1995; Lundin and Steinthórsson 2003). Projects are becoming the dominant way to manage business (Gareis 1990; Turner 1999). There is also growing recognition that it is important to understand the connection between projects, namely the multi-project setting defined by programme- and portfolio management (Eskerod 1996; Archibald, 2003; Morris and Pinto 2007).

The establishment of project management offices (PMOs) is an important development in recent years for strategic strengthening of project management as a company-wide strategic tool (Aubry et al. 2007; Patel 2007). This development has been associated with the term 'project governance', which has been introduced with several meanings, thereby adding strategic perspectives to project management (Turner 2006). A large body of literature has emerged focussing on the strategic dimension of projects (Morris and Jamieson 2004; Shenhar et al. 2005; Artto et al. 2008). Throughout, this development has maintained the management focus – the main research interest is in developing theory and analysing empirical data leading to better understanding, and methods and tools for planning and controlling projects, whether single or in a multi-project setting. The professional community of Project Management (PM) is dominated by practical concerns, meaning best practices in project execution. This is, of course, essential, as it results in increased ability to manage large complex projects, such as public investments in infrastructure, hospitals, system development, and military equipment.

The PM research community saw a pronounced shift in focus from project execution towards front-end management during the 1990s and early 2000s, more or less initiated by a series of papers and books revealing that even well-managed projects often turn out to be failures from the perspective of society, investors, users and other stakeholders (Kharbanda and Stallworthy 1983; Kreiner 1995; Kharbanda and Pinto 1996; Miller and Lessard 2000; Flyvbjerg et al. 2003). Lately, this recognition has sparked an increasing interest in project sponsors and project sponsorship (Cooke-Davies et al. 2006; Dinsmore and Cooke-Davies 2006; Crawford and Cooke-Davies 2007), thus widening up the perspective of project management.

Decision making – a source of correctional signals for PM

The fact that even well-managed projects may fail raises a more significant question: What are the best practices for securing the choice and development of the best project concepts and solutions? There has been considerable attention paid to this kind of problem in economic research and within the field of decision making for a long time. A lot of research has been (and is still being) performed on the psychology behind investment decisions, and many methods for systematic analysis and underpinning of rational choices have been developed. Some 'classics' in this field are the studies conducted by Arrow (1951), Tversky and Kahneman (1974), Edwards and Newman (1982), Keeney (1996), Goodwin and Wright (1998). However, the problems of making the right decisions still occur. Empirical studies have continued to identify problems relating to the early phases and the decisions made early in the development of projects (Pinto and Slevin 1992; Samset and Haavaldsen 1999; Youker 1999), and have confirmed that this is the most critical phase of any project (Stahl-Le Cardinal and Merle 2006; Hopkinson 2007).

The awareness of the importance of early decisions has reached the project management area, resulting in an important correction to direction, and shifting more focus towards the front-end (Samset 2001). This in turn shifts the focus towards early decisions and analysis in the period from when an idea emerges until the decision to execute a project is made. The greatest potential for improved value or benefit of investments is found in this period. One result of this development is a growing focus on making decisions based on scant information (Primeus et al. 2008; Williams et al. 2009) and how to correct the consequences of biased planning and decision making (Lovallo and Kahneman 2003; Flyvbjerg 2006a; Chapman, Ward and Harwood 2006). This indicates that project management and governance of projects are influenced by decision making theories.

Governance – beyond management

The term governance has many meanings. In the specific context of the research for this thesis there are links back to general governance and specifically to corporate governance. Traditionally, governance has been linked to government and international institutions (public governance) and also to the link between companies and their owners and stakeholders (corporate governance). See paper 1 for a more comprehensive discussion of the development within governance in public and private sectors.

Recently, the concept of governance has also been linked to projects. Some relevant aspects have been covered previously: guidelines have been developed for how owners and sponsors should support and guide projects by 'governance of project management' (APM 2002; 2007; Shannon 2007). Others look at the way corporate governance influences and contributes to the management of portfolios, programmes and projects (Turner and Keegan 2001; Müller 2009). These new developments indicate that project management is being applied in wider contexts and taking into account other considerations than have traditionally been part of project management. The origin of this development can be found within corporate governance and may be seen as a different way of connecting projects to their parent organization – the owner or the financing party. This development looks at, among other aspects, governance systems (Monks and Minow 2004) and the role of the owner (Olsson et al. 2007).

In addition, in some countries there is increasing focus on the role of government in public investment projects (Downey 1969; Berg et al. 1999; Gershon 1999; Cowi 2006; Agrapidis 2009). Within the past decade, several countries developed and implemented governance frameworks, defining how they are to improve their initiation and execution of projects through means of control and support (Klakegg, Williams and Magnussen 2009). Such developments have been part of government reforms (Christensen 2007). These frameworks, alongside similar systematic approaches by international organizations such as the World Bank, bring a new dimension to this area of research (World Bank 2003). This development will be given attention in this dissertation.

Politics, economy, society and environment – trends in a post-modern world

Understanding the wider context in which major public investment projects are defined and executed includes politics and other social phenomenon. The

development of society has been given attention by many researchers and authors. Earlier, much of this focus had its basis in economics, questioning why some countries achieve economic growth while others do not (Galbraith 1958; McClelland 1961). In this early period, achievements in terms of preferred development seemed to be mainly linked to economic growth and entrepreneurial behaviour. Today, this line of thinking about development still has its followers, but the main impression is that the view on what is a good development is wider and more critical (growth is no longer necessarily the preferred development) and it has a much wider perspective, including political, social and environmental aspects. For instance, economic growth is a means to achieve other ends, such as 'happiness' (Oswald 2000). Recent changes in the world financial markets may trigger a new rise in this discussion.

The world is said to be changing at an increasing rate and the changes influence us all. Examples of such changes are technological development, the globalization of business, safety issues originating in religious and social unrest, and the rate at which we consume natural resources. The consequences typically involve the quality of life and economic development. Some examples are:

- technological development influences the efficiency and size of health care spending (CBO 2008)
- urbanization influences the cost of infrastructure investments (Austeng et al. 2006)
- climate change influences the quality of life and imposes the need for a wide range of global policy changes (Stern 2007).

A major consequence of this acknowledgement is that governance and decision making related to major projects are not only a question about rational logic and optimizing technological and economic solutions, but also about power and negotiation, networks and alliances. Politics and social sciences thus become more important than ever – also for understanding major public investment projects, and Hall (1987), Winch (1990), and Altschuler and Luberoff (2003) give some examples and arguments in this respect.

The megatrends mentioned above raise the question of what sustainable development means. This is a complicated question and different authors and organizations have given many different answers. For now, it is sufficient to establish that it concerns the balance between economy, environmental and social development in a long-term perspective. See paper 2 for a discussion of sustainable development in the beginning of the 21st century.

Introducing explicit research methodology in project management

The developments described above do not only imply a more complex, changing and unpredictable world. They also raise questions about what we know and how we know. The modern period in history was dominated by rational approaches, where the use of the senses, strict logic and causality determined what was true. In post-modern times this is no longer the situation. Today, truth is relative and belongs to each observer. Everything has to be interpreted within its context and truth is constructed by understanding an object and its interactions with its surroundings. This is discussed

further in the methodology chapter and paper 3. Some developments are mentioned as a completion of the description of current development in project management.

The tradition of project management (and the engineering sciences) often did not include an explicit discussion of research methods and research questions. Winch (1990) held that the sign of good research is clear specification of the issue being addressed and careful selection of an appropriate conceptual and methodological framework for the analysis. Melgrati and Damiani (2004) challenged the dominating rationality in project management and suggested rethinking the framework for project management. They pointed out the dominating rational foundation of project management, but also how other perspectives emerge over time. Cicmil, Williams, Thomas and Hodgson (2006) held the view that there is a need for more knowledge of the 'actuality' of project management, whereas the traditional project management is well covered. Smyth and Morris (2007) noted that the epistemological base for research and practice in project management is weak and asked whether enough careful consideration is made in the selection and application of methodologies. They concluded that a unified theory of the management of projects does not exist and that projects are context-specific and located in open systems. They noted that researchers seem to acknowledge this, but still research methodologies often overlook this. Hodgson and Cicmil (2006) put forward an interesting collection of contributions from a constructivist point of view, illustrating that new perspectives and empirical evidence challenge the traditional positivist rationale – the fundament of project management – from projects within organizations and from inter-organizational projects.

This dissertation finds its place in this development as it is explicit on research methodology, acknowledges both the rational foundation and the social construct interpretations of projects, and focuses on the 'actuality' of projects based on the available data from Norwegian major public investment projects undergoing front-end quality assurance.

1.3 Positioning this dissertation among current trends in PM

Considering the current trends in project management literature and research described in section 1.2, this dissertation takes a position in the new fields of interest emerging from the traditional project management approach and which are influenced by new perspectives and research areas. This author has gone through the same stages of development as the PM community over the last two decades: from traditional execution focus, through a period of influence by decision making theories and focus on activities in the front-end of projects, to a different level: governance.

This dissertation goes beyond project management. The perspective is strategic and focuses on the owner's and financing party's position – it represents a version of the world view of the permanent organization or the representative of society. The project organization and the operational perspective are given little attention here. Still, the author acknowledges his background from many years in PM research and practice. The language used is close to the PM community jargon, and where there is variance, the differences in language will be explicitly mentioned in the dissertation. There is

no room to focus on the users and their more tactical view either, due to resource and time constraints.

Governance literature dominates the literature studies in this dissertation. Governance perspectives are also dominant in the discussions and analysis of the institutional frameworks (governance frameworks) installed by project owners to secure successful investment projects, rather than the management systems used to execute them. This indicates that the approach here comes from a different angle than many contributions coming from the PM community. Contributions from the PM community tend to focus on the link between a project and permanent organization on an individual level, such as how to be a good project sponsor, i.e. secure success for the project. This study focuses more on the perspective of organizations and society: How can we define and design a project to secure benefits for the owner and society? Regardless of whatever approach is chosen, the systems implemented, the defined organizational functions and the qualities of individuals will determine the outcome.

This study takes a position in between the traditional positivist, rational path and the modern constructivist, relational path, trying to combine the best of two worlds, and maybe even bridging the gap. The governance framework with structured decision making, evaluation criteria and rational analysis is an instrumental phenomenon. This phenomenon cannot be understood without looking at it through positivist glasses, but it is better understood if it is seen through constructivist glasses too. None of these perspectives gives the whole picture, but a mix gives more.

1.4 Starting points of this research

This author follows in the footsteps of important research contributions in the study of mega-projects (see paper 10 for an introduction). The findings in this area inspired and generated ideas for new approaches and investigations. This source of inspiration is, of course, an important starting point, but formally the following aspects are more important for the reader to be aware of from the beginning.

The Norwegian quality assurance scheme

Many major public investment projects in Norway showed signs of failure during the 1990s. As a direct consequence, the Norwegian Government decided to start an investigation into the then established practices of government agencies planning and executing such projects. The study looked into both successful projects and some failures, and documented a number of shortcomings (Berg et al. 1999). Based on these findings, in the year 2000 the Norwegian Ministry of Finance initiated a quality assurance scheme under which all proposed major public investment projects with an expected total cost of more than NOK 500 million (USD 80 million, March 2009), financed by the State, had to be subject to critical scrutiny before being presented to Parliament for a final decision on financing and execution. Only the oil and gas sector was excluded. This scheme was later been expanded in 2005 and developed into a new governance framework for major public projects in Norway. The current quality assurance scheme includes two interventions:

QA1: Quality assurance of the choice of concept.

QA2: Quality assurance of the basis for project execution including cost estimation.

The early intervention (QA1) is designed to secure that the right concept is chosen before project planning starts. This leads up to the first gateway in the governance framework: the decision by the Cabinet to acknowledge the project and accept the use of resources in planning and start-up of the pre-project phase. Important aspects of this intervention are to make sure the decision is made on the appropriate political level, that the decision is made early enough to have real options (not to invest is one of these options), to stop projects that are not relevant or not sustainable, and finally to make sure the best possible alternative concept is chosen.

The late intervention (QA2) is designed to ensure that the chosen concept is developed into a mature project proposal before it is accepted to pass the second gateway: to be presented to Parliament for final approval and financing. Important aspects of this intervention are to make sure the cost estimation is realistic and that an appropriate basis for execution is established.

The Norwegian quality assurance scheme is taken as the main starting point of this research. The quality assurance scheme is presented in papers 4 and 6, and discussed as a governance framework in papers 7 and 9.

The Logical Framework Approach

As shown in paper 6, the basis for the QA scheme includes intervention logic similar to that of the Logical Framework Approach (LFA) (Samset 1999), although not referring explicitly to the LFA. The logic of the LFA is the second starting point of this research. Paper 6 includes a description of the logic of LFA. This logic includes the hierarchy of objectives defined by the sequence from resources put into activities, through the creation of outputs, to the harvesting of benefits. For all of these steps, or levels, there are uncertain assumptions and risks that may threaten the success of a project. This instrumental logic is frequently built into methods and tools for evaluating projects and similar logic also seems to be form basis of many project management (PM) concepts. This logic is also built into the Norwegian quality assurance scheme.

The OECD integrated evaluation criteria

A third starting point of this research is the OECD integrated evaluation criteria. As described in paper 6, this evaluation model includes five criteria and six cross-cutting issues which have to be considered for each criterion (OECD 2006), as shown in table 1.1. The model is an integral part of the philosophical fundament for the Norwegian quality assurance scheme.

The OECD evaluation model is used in several ways in the research reported in this dissertation. It is used to limit the scope and create a profile for the whole dissertation by choosing to focus on relevance and sustainability. The other criteria are simply left out. The argument is that these two are the superior criteria in a strategic perspective because failing to fulfil these cannot be compensated by good performance in the other criteria (see papers 6 and 10 for further discussions of the evaluation model). The OECD advises that for each of the criteria, all of the cross-cutting issues have to

be considered carefully. The OECD standard or the integrated evaluation model is not explicitly mentioned in the Norwegian quality assurance scheme, but the inherent logic is part of the fundament of the quality assurance scheme.

Table 1.1 Evaluation criteria and cross-cutting issues of the OECD integrated evaluation model. Each cross-cutting issue is assessed for each criterion. Assessments relevant for this dissertation are marked. The dissertation is limited to the criteria relevance and sustainability.

OECD's Integrated Evaluation Model		**Evaluation criterion**				
		Efficiency	Effectiveness	Impact	Relevance	Sustainability
Cross-cutting issues	Economic and financial aspects				✔	✔
	Policy support measures				✔	✔
	Institutional aspects				✔	✔
	Choice of technical solutions				✔	✔
	Socio-cultural aspects				✔	✔
	Environmental matters				✔	✔

The choices of starting points were a natural consequence of the situation from which the research emerged. The Norwegian Ministry of Finance saw the learning potential of the situation they created in year 2000: all major public projects were going through a mandatory scheme where the projects where systematically analysed by independent, external consultants. By gathering and analysing all the quality assurance reports and following up the projects through their life cycle, an obvious opportunity to learn about these projects would be available. In 2002 the Ministry of Finance thus established the Concept research programme to be responsible for this research. The Preface describes the author's relations to the research programme.

1.5 The research area

Objective and assumption of the PhD project

The ultimate aim of this research is to contribute to making public investment projects more relevant and sustainable. To achieve this we need to better understand how governance frameworks can contribute to such a development. This implies that more knowledge is needed about governance, how it is implemented through governance frameworks and how this in turn influences public investment projects.

The underlying assumption in the research reported here is that in order to improve the probability of success in major public investment projects, the government in power will establish certain governance principles and a regulatory framework to ensure that the intentions of the financing party are met (see chapter 4 and paper 7 for arguments and definitions). A natural ambition for such a government initiative would be to secure the quality of the output of major public investment projects. As indicated

in the introduction, a necessary fundament for this is securing good governance in the front-end. This inherently sets the scene for this dissertation, which is about how to establish and improve governance of projects and governance frameworks for major public projects.

This research aims at improving knowledge about governance of projects. The focus of the study is the structure and development of governance frameworks and how major public investment projects are best prepared in the early stages of development. The long-term effect of improvements as indicated by the ultimate aim of this work would be better utility of scarce public funding and better use of taxpayers' money. The level of ambition for this work is to improve the possibility for such development to take place.

The governance of projects

The scope of the present study extends far beyond the traditional limits of project management. Taking the executing party's perspective, project management usually focuses on the execution of projects. In this dissertation the focus is shifted to the purpose of the project from the owner's perspective. The object studied is, in other words, an investment or intervention; it is a means of obtaining future benefits on a higher level than the project itself.

Project management may be regarded as based on theories drawn from management and economics. Researchers studying mega-projects (e.g. Hall 1982; Morris and Hough 1987; Collingridge 1992; Miller and Lessard 2000; Flyvbjerg, Bruzelius and Rothengatter 2003; Altshuler and Luberoff 2003; Primeus, Flyvbjerg and van Wee, 2008) add new perspectives and theoretical fundaments to the field. When introducing social sciences and politics as equally important as management and engineering, the owner and the sponsors of a project comes more in focus and the importance of a wider perspective in terms of the project is obvious: even well-managed projects may turn out to be failures, while badly managed projects may sometimes be successful. In the governance of projects, a project is not an objective in itself but a means of achieving strategic change or future benefits. The question is no longer whether a project is well executed or managed, but whether it is possible to create long-term value for the owner and financing party. This points more towards choosing the right investment opportunities and defining the best possible fundamental design for the project.

The wide area covered in this research can be understood by looking at the approaches to mega-projects used by different researchers (see the aforementioned original references or the summary in paper 10). The work of Hall and Collingridge represents decision making. They look at projects as a decision making problem from the viewpoint of psychology and economy. Morris and Hough examine projects from a more traditional management perspective, albeit a wide one that includes a strategic perspective. Miller and Lessard, as well as Flyvbjerg, Bruzelius and Rothengatter are more occupied with projects as a governance problem. Miller and Lessard look at the problem from an engineering and industry perspective, while Flyvbjerg, Bruzelius and Rothengatter approach projects from their position in planning and social sciences. Altschuler and Luberoff study projects from their position within political science. This dissertation draws on approaches from all of these disciplines. Some of the

approaches are obvious (governance, decision making), while others are less explicit (social sciences, political science), but the research process has been influenced by all of them and thus they have contributed to the findings.

The title of the dissertation – chosen success criteria and limitations

The title of the dissertation is *Governance of Major Public Investment Projects – In Pursuit of Relevance and Sustainability*. The word 'governance' describes the main focus of the work, and 'major public investment projects' describe the chosen setting. As already mentioned, restricting the study to the two main criteria of relevance and sustainability was a choice made to limit the work to a realistic scope, and to give the dissertation a specific profile. It may seem self-evident that relevant, sustainable projects are desirable, but why is this really important? The chosen success criteria for major pubic investment projects used in this study are: *choosing a relevant alternative, delivering it efficiently and with sustainable effect.*

The above success criteria are simplified from the OECD criteria described in section 1.4. Unfortunately, due to capacity and time limitations, it has not been possible to present a comprehensive or more complete study of how to achieve relevance or sustainability. Achieving efficiency is an executing party perspective that has been deliberately excluded from the scope of work. Consequently, from the perspective of this dissertation, the aim is to achieve an improved basis for successful governance – through the pursuit of relevance and sustainability.

1.6 Definitions

The most important definitions used in this dissertation are listed in table 1.2. Definitions are discussed in the consecutive chapters as indicated in the table. Unless stated otherwise in each chapter or paper, these definitions apply throughout the dissertation. In addition, standard project definitions apply (PMI 2004).

Table 1.2 Definition of terms used in the dissertation.

Term	Explanation	Source	Comment
Business case	A recommendation to decision makers to take a particular course of action for an organization, supported by an analysis of its benefits, costs and risks compared to the realistic alternatives, with an explanation of how it can best be implemented.	Gambles (2009, p. 1)	Used in Chapter 8.
Concept	Principle solution in accordance with specified requirements and higher priorities.	Ministry of Finance (2008, p. 2)	Translated by the author
Corporate governance	Corporate governance involves a set of relationships between a company's management, its board, its shareholders, and other stakeholders. Corporate governance also provides the structure through which a company's objectives are set, and the means of attaining those objectives and monitoring performance are determined.	OECD (2004, p. 11)	Discussed in Paper 1
Effect	Intended or unintended change due directly or indirectly to an intervention. Related terms: results, outcome.	OECD (2002, p. 18)	

Term	Explanation	Source	Comment
Effectiveness	The extent to which the development intervention's objectives are achieved or are expected to be achieved, taking into account their relative importance.	OECD (2002, p. 18)	
Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted into results.	OECD (2002, p. 19)	
Governance	See public governance. In this dissertation there is no preferred single definition of governance.		Discussed in Paper 1
Governance framework for projects	A set of principles and an organized structure established as authoritative within an institution, comprising processes and rules established to ensure projects meet their purpose. Also associated with institutional framework.	Chapter 5	Developed in this dissertation
Governance of projects	Governance of projects concerns those areas of governance (public or corporate) that are specifically related to project activities. It consists of formal and informal arrangements by which decisions about projects are made and carried out. Good governance of projects ensures relevant, sustainable projects and alternatives will be chosen, delivered efficiently and cancelled when appropriate.	Chapter 4	Developed in this dissertation
Government	Government is characterized by its ability to make decisions and its capacity to enforce them. In particular government is understood to refer to the formal and institutional processes which operate at the level of the nation state to maintain public order and facilitate collective action.	Stoker (1998, p. 17)	Discussed in Paper 1
Impacts	Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.	OECD (2002, p. 22)	
Investment	Financial policy instrument for planning and executing a specific action. It involves the acquisition of assets (capital or financial). Investment is defined by a high-level strategic description of the intended outcomes, and an economic scale accordingly.	Ministry of Finance (2008, p. 2)	Translated by the author
Major project	A major project is a project which is sufficiently big and important to be significant to the owner in its own right. The complexity, size and project cost are relative to the specific setting in each case. Major projects are characterized by some degree of uniqueness, complexity and considerable risk.	Chapter 2	Developed in this dissertation
Outcome	The likely or achieved short-term and medium-term effects of an intervention's outputs. Related terms: result, outputs, impacts, effect	OECD (2002, p. 27)	
Outcome	The products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.	OECD (2002, p. 27)	
Public governance	'Governance' refers to the formal and informal arrangements that determine how public decisions are made and how public actions are carried out from the perspective of maintaining a country's constitutional values in the face of changing problems, actors and environments.	OECD (2005, p 16)	Discussed in Paper 1 and Chapter 4
Project definition	The process of defining the objectives of a project.	Turner, (2006, p. 93)	Discussed in Chapter 8

Term	Explanation	Source	Comment
Project design	The process of defining the means to achieve the objectives of a project.	Turner, (2006, p. 93)	Discussed in Chapter 8
Purpose	The publicly stated objectives of a development programme or project.	OECD (2002, p. 31)	Strategic level perspective
Quality assurance	Quality assurance encompasses any activity that is concerned with assessing and improving the merit or the worth of a development intervention or its compliance with given standards. Note: examples of quality assurance activities include appraisal, reviews during implementation, and evaluations. Quality assurance may also refer to the assessment of the quality of a portfolio and its development effectiveness.	OECD (2002, p. 31)	
Relevance	The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country's needs, global priorities, and partners' and donors' policies. Note: retrospectively, the question of relevance often becomes a question of whether the objectives of an intervention or its design remain appropriate given changed circumstances.	OECD (2002, p. 32)	Discussed in Chapter 6 and Paper 10
Reliability	Consistency or dependability of data and evaluation judgements, with reference to the quality of the instruments, procedures and analyses used to collect and interpret evaluation data. Note: evaluation information is reliable when repeated observations using similar instruments under similar conditions produce similar results.	OECD (2002, p. 32)	
Result	The output, outcome or impact (intended or unintended, positive and/or negative) of a development intervention. Related terms: outcome, effect, impacts.	OECD (2002, p. 33)	
Sustainability	The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time.	OECD (2002, p. 36)	Discussed in Chapter 6 and papers 2 and 10
Validity	The extent to which data collection strategies and instruments measure what they purport to measure.	OECD (2002, p. 37)	

The definitions formulated by the OECD concerning the integrated evaluation criteria (relevance and sustainability) indicate the setting they are defined within: development projects (e.g. words such as 'development assistance', 'beneficiaries' and 'donors'). In this dissertation the setting is not development projects but public investment projects in developed countries. The contents of these definitions are still valid, as long as the use of wording is carefully considered when the definitions are applied.

1.7 Outline of the dissertation

Open questions and broad sets of problems dominate this dissertation. In order to develop deeper understanding of how governance frameworks can contribute to more relevant and sustainable public investment projects, several aspects are chosen and discussed. Each chapter and paper adds pieces to the puzzle.

The chapters at a glance

Chapter 1 explains the purpose and structure of the dissertation. An explanation of the current trends identified in relevant areas of research help the reader to understand how this dissertation relates to many different research areas. In addition, this chapter present basic definitions used throughout the work. This chapter sets the stage for the remaining part of the dissertation.

Chapter 2 explains the scope and limitations of the dissertation, in order to ensure the limits of this work are clearly defined and well understood. This is intended to make the analysis and conclusions of the research easier to understand, interpret and recreate.

Chapter 3 discusses methodology and explains the main choices made in this PhD work. As this is a paper-based dissertation, each of the papers contains a methodology section. To avoid unnecessary overlap, chapter 3 only contains an explanation of the broader perspectives on the chosen methodology. The detailed choices are explained in the respective papers, with the exception of papers 1, 2 and 3, which contain literature studies. Note that the background to chapter 3 is paper 3, which includes a general overview and discussion of the philosophy of science and methodology as seen from this author's perspective. All in all, this makes the structure of methodology descriptions quite complicated, with three levels: general in paper 3, outline for the dissertation in chapter 3, and varying detailed methods in each paper.

Chapter 4 explains governance in the front-end phase of projects. It explains how governance and projects link together, and discusses several important aspects of governance related to the early development phase in investment initiatives. The major issues examined are the importance of governance, aspects of ownership, and criteria for making front-end decisions about future investment projects. The main issues in this chapter are developed further in papers 4 and 5. The purpose of this chapter and its associated papers is to develop deeper understanding of governance and some of its aspects.

Chapter 5 discusses governance frameworks and how they may be designed and implemented. Based on in-depth studies and comparisons of existing governance frameworks, conclusions are drawn on how to describe governance frameworks, how they may be designed to adapt to a given situation, and possible strategies for implementation. Several of the main aspects of this work are developed further in the papers presented in papers 7, 8, 9 and 10. The purpose of this chapter and the associated papers is to further develop the concept of governance frameworks and to understand some practical consequences of recent developments.

Chapter 6 investigates the most important challenges in the front-end of major projects based on real-life experiences of experts. The fundamental assumption in this chapter is that relevance and sustainability are superior criteria, and that governance should aim to secure fulfilment of these. The choice to limit the scope to only these two superior criteria is decisive for this chapter. Identifying these challenges forms the basis for choosing effective improvement strategies. A corresponding working report (Klakegg 2009) documents further details. The purpose of this chapter is to understand better the most important challenges, which the governance frameworks have to address. A major point here is to identify the most important problems, not the most common ones.

Chapter 7 looks at possible improvement strategies for existing governance frameworks, given that (from chapter 6) the most important problems to solve are now known. Most elements put together in this chapter are well known, except the consequence of the conclusions in chapter 6. Paper 10 presents and discusses the research from chapters 6 and 7 jointly. The purpose of this chapter and corresponding paper is to indicate how existing governance frameworks can be improved and further developed to achieve relevant and sustainable public investment projects.

Chapter 8 leaves the governance frameworks and turns to projects. It discusses the fundamental concepts of definition and design of investment projects in theory and practice. Public investments are goal-oriented measures to achieve benefits. Aspects of this basic causal logic are explained. The chapter includes discussions of how to define and describe goals, and what levels of ambition are appropriate at the outset of new investment projects. The research behind this chapter is presented in paper 11. This research investigates the reality of public investment projects to see whether it is consistent with the theory discussed in previous chapters. The purpose of this chapter is to bring more structure and clarity into the discussions in the front-end of public investment projects.

Figure 1.1. shows the way chapters 4 to 8 (the research chapters) are organized. This indicates that chapters 4 and 6 are independent starting points and that the consequence of all the input collected and discussed through the two independent routes are joint in chapter 7. Chapter 8 are the chosen next step in this work - one of several possible, as discussed in the introduction to chapter 8. The arrow from chapter 7 to 8 is dashed to symbolize this loose connection.

Chapter 9 contains the conclusions and recommendations for further research. The conclusions are based on all of the chapters and papers collectively and summarize the main findings of this research. There is also a summary and discussion of which areas need more research, as identified in this dissertation: which questions are answered and which are not. This chapter attempts to pull together all the ends and clarify the contribution of this research.

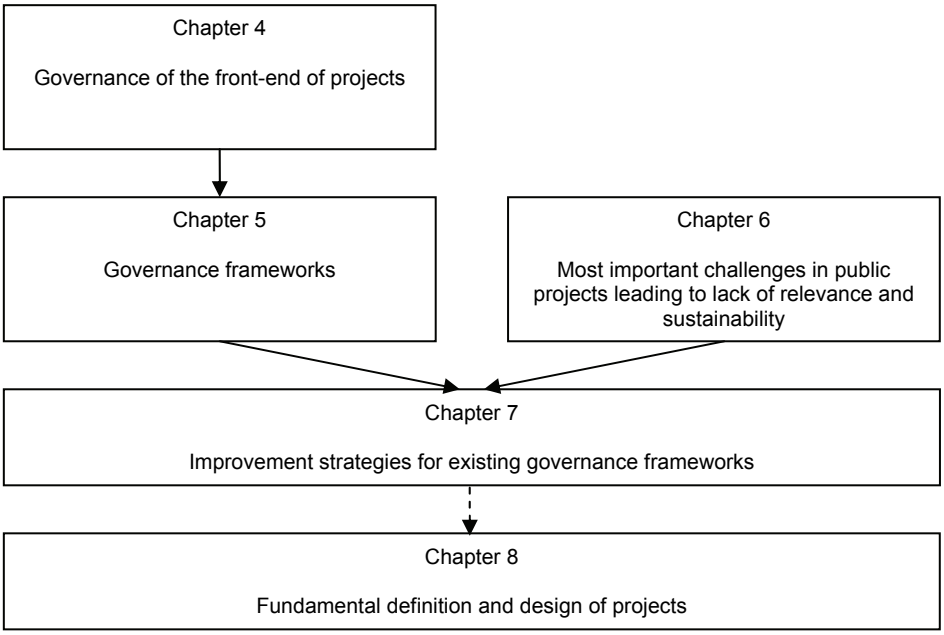

Figure 1.1 Organization of the research chapters in this dissertation.

Table 1.3 Chapters in this dissertation and description of the contents.

No	Heading	Contents
1	Introduction and definitions	Explains the purpose of the work and structure of the dissertation. Gives an explanation of current trends in relevant areas of research and definitions.
2	Scope and limitations	Describes the scope and limitations of the dissertation, to ensure the limits of this work are clearly defined and well understood.
3	Methodology	Presents the author's methodological platform and methodological choices.
4	Governance in the front-end of projects	Explains how governance and projects link together, and discusses several aspects of governance related to the early development phase in investment initiatives.
5	Governance frameworks	Discusses governance frameworks and how they may be designed and implemented. In-depth studies and comparisons of existing governance frameworks lead to conclusions on how to describe governance frameworks, how to design them and to adapt to a given situation. Possible strategies for implementation are presented.
6	Challenges in public projects	Investigates the most important challenges in the front-end of major projects. Identifying these challenges forms the basis for choosing effective improvement strategies for future public investment projects.
7	Improvement strategies for governance frameworks	Looks at possible improvement strategies for existing governance frameworks, given that the most important problems to be solved are now known. Indicates how to develop existing governance frameworks in order to achieve relevant and sustainable public investment projects.
8	Fundamental design of projects	Discusses the fundamental concepts of definition and design of investment projects. The chapter includes discussions of how the goals should be defined, description of goals and appropriate levels of ambition at the outset of new investment projects.
9	Conclusions and further research	Summary of the main findings. Also contains a summary and discussion of which areas need more research, as identified in this dissertation.

The papers in brief

Paper 1 gives a broad presentation of governance as a background for understanding the primary area on which this dissertation is based. It is a literature study aimed at giving the reader the insight into the basics and current research trends in this specific area. Paper 1 relates primarily to chapters 1, 4 and 5. The purpose of this paper is to increase understanding and add to the knowledge of governance. Previously, this area has received little attention in the engineering community.

Paper 2 gives a presentation of sustainability as a background for understanding a secondary but crucial area on which this dissertation is based. It is a literature study similar to paper 1, and relates primarily to chapters 1 and 6. The purpose of this paper is to improve the overview and add to the knowledge of sustainability. Although this area has received increasing attention in the engineering community, there is still need to improve the understanding of it.

Paper 3 presents the author's methodological platform. It is a literature study and discussion, concluding on an epistemological and ontological position and platform for choice of research methods. This paper explains fundamental methodological choices in this dissertation but also goes beyond, in the sense that this platform also applies to other work by the author. Paper 3 relates specifically to chapter 3 but also to the whole dissertation and all research papers. The purpose of paper 3 is to increase the knowledge of philosophy of science and the current methodological developments in the project management community. This paper goes beyond what is currently established practice in the engineering community.

Paper 4 explains governance in the front-end of major public investment projects. It links investment projects to policy and governance, using the Norwegian quality assurance scheme (QA scheme) as an example. The main structure of the Norwegian initiative is described and discussed. It is concluded that governance regimes are a necessity and the need for further development is identified. Paper 4 relates to chapter 4. The purpose of this paper is to describe an important fundament for the work in this dissertation.

Paper 5 presents the strategic functions of a public project owner. It contains a descriptive model of public (state) ownership and discusses several aspects of strategic importance for an owner. This discussion is based on nine case projects from Norway. Paper 5 relates to chapter 4. The purpose of this paper is to increase the understanding and add to the knowledge of governance functions important to project owners.

Paper 6 presents evaluation criteria for front-end governance of projects. It is based on consensus among 82 experts participating in facilitated group discussions, supplemented with a few established methods and well-known criteria. This forms a structure and adequate framework for appraisal and evaluation of investment opportunities. It is intended to be used in decisions about future public investment projects. Paper 6 relates to chapter 4. The purpose of this paper is to document important aspects of the basis for the thinking on which this research is based.

Paper 7 discusses governance frameworks for public project development. The paper sums up a large portion of research work performed in a research project co-funded by the Project Management Institute in USA and the Concept research programme in Norway. It systematically compares three existing frameworks in Norway and the UK, discussing and analysing differences and similarities from a high-level perspective and in the light of many different methods and theories. The paper is based on a number of in-depth interviews and studies of public documents, as well as four case studies (major investment projects). Paper 7 relates to chapter 5. The purpose of this paper is to add to the understanding and knowledge of governance frameworks.

Paper 8 investigates the practical implications of governance frameworks for public projects. This paper is based on the same research project as paper 7. Based on four cases from Norway and the UK, conclusions are drawn on the importance of governance frameworks, early interventions in long development processes, the value of quality assurance, and the interface between the rational planning process and the political decision making process. Paper 8 relates to chapter 5. The purpose of this paper is to increase the understanding of the effect of governance frameworks on public investment projects.

Paper 9 studies how governance frameworks can be improved by redesign. By redesigning the existing Norwegian quality assurance scheme with system engineering methods new aspects may be highlighted and help to identify strengths and weaknesses in the existing regulatory framework. Potential improvements are suggested. Paper 9 relates to chapter 5. The purpose of this paper is to show how an existing governance framework can be redesigned. This illustrates one of the available improvement strategies for governance frameworks.

Paper 10 investigates the most important challenges in the front-end of major public investment projects, with a focus on relevance and sustainability. The paper presents the results of a survey among 80 experts on different aspects of major public investments. The survey identifies the most important problems and suggests countermeasures. The findings confirm the conclusions of important literature on mega-projects. The findings also form the basis for developing improvement strategies for public project owners, which are also presented in the paper. Paper 10 relates to chapters 6 and 7. The purpose of this paper is to add to the understanding of the most important challenges faced by public investment projects, and how governance frameworks can be purposefully developed to improve the situation.

Paper 11 investigates the fundamental definition and design of public investment projects. A sample of 51 public investment projects from Concept's research database is analysed to see whether their fundamental design is flawed. The objectives and levels of ambition are systematically analysed. The analysis confirms that the overall quality of the fundamental design in many projects is adequate, but many designs have significant shortcomings. This knowledge is useful for discussing how planners should purposefully define and design major public investment projects in order to form a consistent description of direction and level of ambition. Paper 11 relates to chapter 8. The purpose of this paper is to contribute to improving future investment projects

Table 1.4 Papers collected for this dissertation, with description of their contents.

No	Title	Contents
1	Governance: Recent developments of a 'messy' concept	Gives a broad presentation of governance as a background for understanding the primary area on which this dissertation is based. It is a literature study aimed at giving the reader knowledge about the basics and current research trends in this specific area.
2	Fundamentals and current measures of Sustainability	Gives a presentation of sustainability as a background for understanding an important area on which this dissertation is based.
3	A Robust Position in Epistemology and Ontology	Presents the author's methodological platform. It is a literature study and discussion, concluding on an epistemological and ontological position and platform for choice of research methods. Explains fundamental methodological choices made in this dissertation but also goes beyond, in the sense that this platform also applies to other work by the author.
4	Front-end Governance of Major Public Projects	This paper links investment projects to policy and governance, using the Norwegian Quality Assurance Scheme (QA scheme) as an example. The main structure of the Norwegian initiative is described and discussed. It is concluded that governance regimes are a necessity and the need for further development is identified.
5	An Empirical Illustration of Public Project Ownership	Contains a descriptive model of public (state) ownership and discusses several aspects of strategic importance for the owner. This discussion is based on nine case projects from Norway.
6	Complex Projects: Evaluation Criteria for Front-end Governance	Describes a structure and adequate framework for evaluation to be used in decisions about future public investment projects. Based on consensus among 82 experts participating in facilitated group discussions, supplemented with a few established methods and well-known criteria.
7	Governance frameworks for public project development and estimation	The paper sums up a systematic comparison between three existing governance frameworks in Norway and the UK, discussing and analysing differences and similarities from a high-level perspective and in the light of many different methods and theories. The basis is a number of in-depth interviews and studies of public documents, as well as four case studies.
8	An investigation of governance frameworks for public projects in Norway and the UK	Based on four cases from Norway and the UK, conclusions are drawn on the importance of governance frameworks, early interventions in long development processes, the value of quality assurance, and the interface between the rational planning process and the political decision making process.
9	Framework redesign: An Industrial Ecology Perspective on the Norwegian Quality at-entry Regime	A study of how governance frameworks can be improved by redesign. Redesigning the existing Norwegian quality assurance scheme with system engineering methods highlighted new aspects. These may help to identify strengths and weaknesses in the existing regulatory framework and suggest improvements.
10	Pursuing Relevance and Sustainability: Improvement Strategies for major public projects	The paper presents the results of a survey among 80 experts on different aspects of major public investments. The survey has identified the most important problems and suggested countermeasures. The findings confirm the conclusions of important literature on mega-projects and form the basis for developing effective improvement strategies for public project owners' governance frameworks.
11	Goals and ambitions: Fundamental design of public investment projects.	A sample of 51 Norwegian public investment projects is analysed to see whether their fundamental design is appropriate. The objectives and levels of ambition are systematically analysed. The analysis confirms that the overall quality of the fundamental design in one-third of the projects is adequate, but the remaining projects have significant flaws.

2 Scope and limitations

The words in the title define the scope of this study: *Governance of Major Public Investment Projects – In Pursuit of Relevance and Sustainability*. Each word has a specific meaning for this work, as explained in this chapter. The limitations define the system boundaries and have consequences for the study in terms of workload and validity for analysis and conclusions. Defining the system makes the research possible to reproduce and understand with scientific language and models. On the other hand, these limitations may limit practitioners' possibility to recognize that it represents 'real life'. The following issues are discussed in this chapter: scope and limitations, megaprojects versus major projects, success criteria, governance versus management, and the meaning of holistic. The chapter concludes with a summary of expected consequences of the limitations. It reveals that the limitations are necessary and acceptable.

2.1 Defining the scope

Background of the study – setting the scene

This research is associated with and financed by the Concept research programme. Hence, it was necessary for the choice of dissertation topics and research questions to fall within the programme's field of interest. The Concept research programme describes its mandate such as this on the programme's web pages (Concept 2009) as follows:

The Concept research programme focuses on front-end management of major investment projects. It aims to develop know-how to make more efficient use of resources and improve the effect of major public investments.

This points towards the early phases (front-end) and improving the effect of money spent on projects (public investments). The programme is working under the auspices of the Norwegian Ministry of Finance and consequently primarily focuses on the benefits for society. This is an owner's perspective. Accordingly, the focus in this dissertation is on the governance of projects, and problems within decision making for public investments.

The setting in which the Concept research programme was initiated was the introduction of the Norwegian quality assurance scheme described in section 1.4. The

Ministry has developed the QA-scheme into an institutional governance framework during its working period. This development also set the scene for the dissertation.

The dissertation does not cover the whole range of problems and questions connected to major investment projects. The limitations described in this chapter are important in order to define a realistic scope for the work, defining the chosen perspective of the investigation and the research questions (see chapter 3, Methodology).

Detailed scope and limitations – dissecting the title of the dissertation

The wording of the dissertation title, *Governance of Major Public Investment Projects – In Pursuit of Relevance and Sustainability*, implies a very wide research area, but also some important limitations, as indicated in table 2.1.

Table 2.1 Dissection of the dissertation title – identifying scope and limitations.

Word in title	**Scope indicated**	**Limitation indicated**
Governance	Formal and informal arrangements determining how decisions are made and actions carried out in the perspective of the owner	Not management – not the specific actions initiated to follow up on decisions made Not the perspective of the executing party
of	The word 'of' is used to strengthen the focus on a strategic level (owner)	Not the operational level (management) which would be indicated by using the word 'in'
major	Important to the owner in its own right, stands out in the crowd, not routine	Not a normal, routine everyday task, event or entity Not small projects
public	Financed (all or partly) by public funding. In this dissertation also limited to the State	Not regional or municipal level of public sector Not private sector or non-governmental organizations (NGOs)
investment	Allocation of funds to develop or acquire a physical/digital and/or organizational change. Normally, some sort of infrastructure (buildings, roads, railways, information- and communication systems, and military equipment)	Not purely financial transactions (trading stocks and shares, etc.)
projects	The initiative is organized as a project – a temporary organization.	Not routine operations in the permanent organization
in pursuit	This is a step on the way to make it possible	Not a ready-made solution
of relevance	Suited to the priorities and policies of the target group, users and financing party (owner)	Not the three remaining criteria in the OECD integrated evaluation model; efficiency, effectiveness and impact
and sustainability	Producing benefits in the long term, continuing after the project is completed	

The main source of project information (data) for the study is projects included in the Norwegian quality assurance scheme. Hence, the limitations of these sources are also valid for this research, unless stated otherwise in the chapters. The oil and gas sector in Norway is excluded from the QA-scheme and hence also here.

As indicated in sections 1.4 and 1.5 of this dissertation, there are several practical reasons for the choice of research area and the focus of this study. Table 2.1 gives indications as to the main characteristics. In the following, further some aspects of limitations and the definition of the system of analysis are discussed.

2.2 Discussion of some important aspects of limitations

Cost as a determinant

By definition the Norwegian QA-scheme applies to investment projects with an expected cost of more than NOK 500 million (approximately USD 80 million)[1]. In Norway these projects are considered 'major'. A similar cost limit would probably be too high in a small economy (e.g. a developing country) and too low in a large economy (e.g. USA, UK, China). Size is relative. Therefore, size as a determinant of how important the project is not enough. To come closer to a firm understanding of the scope and limitations in this dissertation, the distinction between the terms 'mega' and 'major' frequently associated with projects will be examined briefly.

The Federal Highway Administration defines 'megaprojects' as major infrastructure projects that cost more than USD 1 billion, or projects of a significant cost that attract a high level of public attention or political interest because of substantial direct and indirect impacts on the community, environment, and state budgets. 'Mega' also connotes the skill level and attention required to manage such projects successfully (Capca 2004).

The following 'six Cs' characterizes mega-projects (Frick 2008, pp. 240–241):

- Colossal in size and scope, highly visible and monumental.
- Captivating due to size, aesthetics and achievement – attraction.
- Costly – typically at least USD 250 million – 1 billion.
- Controversial due to vast impact on nearby businesses, residences and the physical/built environment.
- Complex in many dimensions, which breeds uncertainty and risk.
- Control laden – subject to restrictions and regulations.

These characteristics are interrelated and evolve during development. They tend to attract significant political interest. Such projects often include engineering and construction of physical infrastructure and generate considerable media attention. Large engineering projects are included in this category of projects. They are unique, dedicated and usually involve one-off products with intensive interactions between sponsors and contractors (Miller and Lessard 2000, p. 6). Some of the projects included in the basis for this study are mega-projects and large engineering projects, but only a small number of them are of a scale and complexity that makes them 'mega'.

[1] An exchange rate NOK 6.25 to USD 1 (March 2009) is used. The Papers were written at different points in time and include reference to amounts based on other exchange rates as well as different currencies.

The term ‘major’ also points to the size and the project cost, and is an indication of importance and a certain degree of complexity. Projects in this category may be performed as standard routine operations with resources that execute similar projects on a regular basis (e.g. normal road projects or office buildings). Important indicates that a given project contributes to its owner’s success in business. The term ‘major’ indicates that the project is significant to the project owner in its own right. The owner would never hide a major project in a portfolio or bundle it together with other projects. Such projects are important enough to be mentioned in long-term plans and state budgets. One definition may be as follows:

> *A major project is a project which is sufficiently big and important to be significant to the owner in its own right. The complexity, size and project cost are relative to the specific setting in each case. Major projects are characterized by some degree of uniqueness, complexity and considerable risk.*

Cost alone is not an adequate determinant of major projects. The definition above describes a more ideal determinant for accepting a project as part of the data sample than is used in this dissertation. The projects were chosen from a sample of major Norwegian investment projects where cost was used as the only determinant. This was not a problem for the research, because the only potential consequence would have been including some projects that were not major, i.e. less complex, less risky, etc. However, none of the included projects were significantly less than ‘major’.

Defining the system for analysis

Although this research does not include a formal system analysis, defining the system for analysis offers a lot of advantages with respect to clarity. In accordance with the theory and practice of Systems Thinking (Ackoff and Emery 1972; Gharajedaghi 2006), some aspects of the system for analysis are defined in the following. Figures 2.1, 2.2 and 2.3 show important system boundaries (i.e. their limitations). They illustrate what falls within the system for analysis, and hence what falls outside the system, and consequently outside scope of the dissertation work.

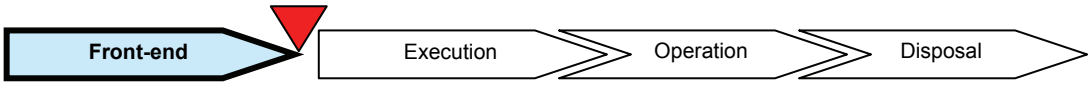

Figure 2.1 On the timeline, the dissertation is limited to covering the front-end (idea-, pre-study, and pre-project phase, often referred to as the early phases) up to the point where the decision makers (the owners) perform the final approval of a project (the GO/NO GO decision).

In figure 2.1 the timeline cover the whole life cycle of the product or delivery (result) of the project. The project itself is normally limited to the execution phase. The figure shows how the dissertation is limited to the front-end of the life cycle. The front-end phase stops at the time when the formal decision is taken to finance and execute the project. However, the decisions made in the front-end have a bearing on what happens in later stages in development. This means the considerations in front-end decision making have to take into consideration all future phases throughout the life cycle of the solution delivered by the project.

Within the front-end phase there is one major milestone: choice of concept (not shown in figure 2.1). This is the single most important choice within this early stage of development and this will be a focal point on the timeline.

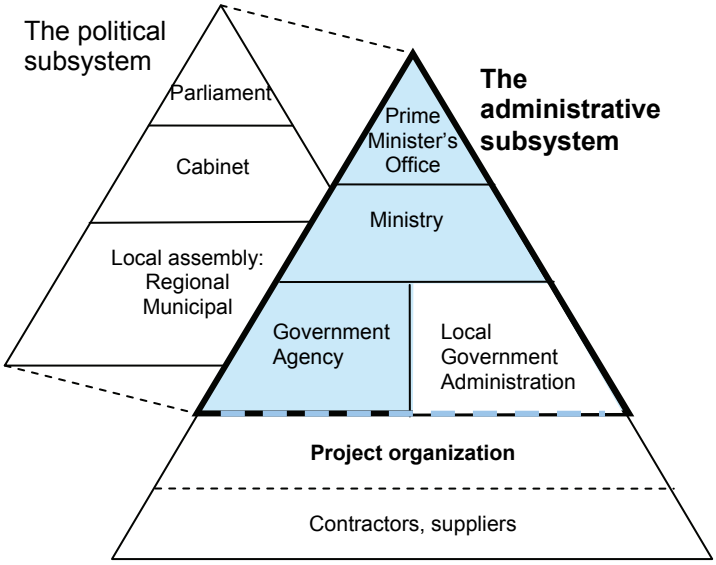

Figure 2.2 The scope of this dissertation is limited to the public sector and focuses on the administrative subsystem. The levels above project organization are relevant because these are the ones involved in front-end decisions.

The public sector is characterized by a division between the political subsystem (decision making), and the administrative subsystem (executive functions). In a democracy elected decision makers make the formal decisions. This is the political subsystem. The executive functions follow up and execute the decisions. This is the administrative subsystem in the public sector. The decision makers are typically invited to make decisions based on documents and plans produced in the administrative subsystem. These two subsystems constitute what is necessary to initiate and execute major public investment projects. The focus in this dissertation is the administrative subsystem. However, this is an open system which does not work in isolation or without contact with the political subsystem and civil society. However, problems occurring in the interfaces between these systems are highly interesting and will be considered in this study.

Purely political issues such as power distribution and access to political decision making will not be discussed here, nor will problems occurring in civil society without direct connection to public investment projects. Business and industry is only included as a stakeholder and participant in public projects. The focal point in the dissertation with reference to figure 2.2 will be ministry and government agency levels. Local authorities are included as stakeholders and regulating authorities, but not as project owners. There will be no explicit focus on local government administration, although their position towards regional and municipal projects indicates that they are likely to meet the same challenges. One reason not to focus these public entities in this research is that their projects are generally smaller than the

category of projects included here. Further, a practical reason is that these projects are not part of the empirical database.

The main perspective in this study is that of society, as represented by public owners and financing parties. For practical purposes, the discussions on public owners are limited to those of the state, and do not include regional and local authorities. Society, represented by the general public, is involved as users of the results, and as taxpayers they are legitimate stakeholders in the spending of public money. Of course, members of the general public also constitute the ultimate owners and voters in the political subsystem. These issues fall outside the scope of the study but some aspects of ownership are discussed in paper 5.

The systems shown in figures 2.1 and 2.2 are open systems. Thus, understanding the interfaces between the inside and the outside of a system, and similarly interfaces within a system (between different levels and organizational units) is crucial. There might be several semi-open subsystems within these open systems. The present study focuses on the roles of the actors, the relations between them, the tasks they perform in the front-end, and the documents forming the basis for decisions. The process of developing these roles, tasks and documents will be analysed. The parallel political processes, with their interplay based on power distribution, political tactics and bargaining, will not be analysed as such, but it is necessary to understand well the interactions between these subsystems.

Success as a goal for investment projects

The objective of the research reported in this study is to develop deeper understanding of the nature of governance involved in major public projects. This may contribute to more successful public investment projects in the future. In this setting it is necessary to clarify the meaning of the word success. Success is a wide and multifaceted concept and also context dependant. Ultimately, success can be any perceived benefit as seen from a given party's position and perspective. An example of complex evaluation criteria for successful governance is the OECD's assessment criteria for development projects. The OECD's criteria for the evaluation of success (Samset 2003; OECD 2006) are:

Efficiency
Effectiveness
Impact
Relevance
Sustainability

In this investigation into public investment projects the perspective of *society* (the financing party and public project owners) is selected. In this perspective, *relevance* and *sustainability* are more important criteria than the other three (see paper 10 for arguments). Therefore it was decided to limit the study to these two criteria. Here, it is implicit that the choice limited the scope of the research to a feasible amount of work. As mentioned in section 1.5 it was decided to apply simplified success criteria here:

> *Success means choosing a relevant alternative, delivering it efficiently and with sustainable effect.*

Relevance and sustainability are associated with the perspective of the owners and users, whereas efficiency is associated with the executing party's perspective and falls outside the scope of this study. In a public sector setting the governance of investment projects is a tool for maximizing the value of public funds; in other words, being able to choose the right (relevant, affordable) alternative which delivers sustainable effect gives success in achieving the purpose of investing public money.

Governance and management

When discussing performance in major projects, an important distinction often emerges: the distinction between principles of governance and best practice issues. In this dissertation, the focus is on the principles of governance and how these construct an institutional framework around decision making and project execution processes, as illustrated in figure 2.3. The focus of this study is governance functions and governance principles. The issues concerning best practices or recommended practices in project management or operational management are not given any attention.

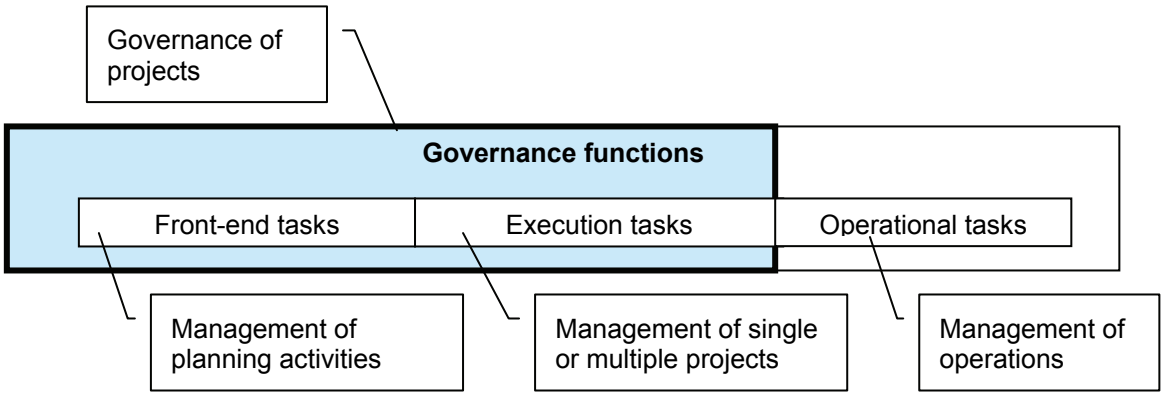

Figure 2.3 The distinction between governance functions and management tasks. The dissertation focuses on governance of projects and not management tasks. Further, the focus is on the front-end, not the execution or operations phase.

The symbolic representation in figure 2.3 shows governance functions as enveloping the management tasks. This is by intention. The formal structures (principles and regulations) make up the governance framework, whereas the development and acceptance of social relations and values make up the culture. Both are examples of contexts in which management has to work. Governance and management are different spheres – 'boards govern and managers manage' (Otto 2005). A clear definition of the interface between these two worlds – governance and management – is difficult to define since they are both associated with making decisions and controlling activities. Here, the wider perspective – governance – is the sphere in focus, as illustrated in figure 2.3.

Holistic views

The aim is to present a holistic view of the issues in question. Does 'holistic' imply that every aspect and every issue within the scope has to be covered? Gharajedaghi concludes that holistic thinking includes looking at the structure, function, process, and context of the problem at the same time and understanding the interactions between them (2006, pp. 110–112). This implies:

- When studying the front-end it is necessary to take into consideration the whole life cycle of the project results. Consequently, the execution phase and the operational phase will also be important in understanding what is important in the front-end. This contributes to understanding how the documents and decisions in the front-end influence the execution of the project and the benefits from the operation phase.
- Actors in the front-end contribute to the success of project organization in execution, and users in operation. To some extent, these actors are both contributors to and recipients of the results of the front-end process. Society as a whole, including all interested parties and stakeholders, is relevant to understanding the complexity and the dynamics of major investment projects.

The answer to the question above is, no – we do not need to cover everything to have a holistic view. It is possible to satisfy the requirements defined by Gharajedaghi without including every aspect and answer every possible question. Holistic is a matter of understanding and taking into consideration the whole picture - including phases and actors not included in the focus theme of the study. We do this by considering the requirements that come from later stages but have to be included in front-end planning, and defining actors not included in the focus of the study as stakeholders. The discussions in the research chapters look at the structure, function, process, and context of the problem and in an attempt to understand the interactions between them.

2.3 Expected consequences of the limitations

Introducing limitations clearly has the practical effect of reducing the scope and thereby the amount of work. This is obviously useful when time and resources are limited. Still, the more important reason to introduce limitations is the effect this will have on the quality of the results. As mentioned above – defining clear limits of the system for analysis is important in order to achieve precise discussions and conclusions. This is also fairly obvious: If one cannot describe its limits, one cannot analyse it properly. Thus, there is a need to discuss the consequences of the limitations introduced earlier in this chapter.

The purpose of these considerations is to make good, relevant research possible. Research using assumptions and limitations creating an 'ideal world' may certainly create interesting theoretical models and clear answers, but it does not help much the understanding of real life with its complexity and non-ideal premises. To be of practical relevance, the research needs to be performed within limits that still make it possible to recognize the situation as experienced in real life. A summary of important

limitations and their expected consequences is shown in table 2.2 and commented on in this section.

The study focuses on the public sector. However, the private sector is relevant as a source of knowledge concerning principles of governance and institutional frameworks. By looking into private organizations in parallel with the public sector examined in this study, it may be possible to generate both inspiration and knowledge relevant to the issues studied here. Experience from the private sector is represented through existing literature and expert input. Businesses, organizations, groups and individuals represent active participants in the public investment projects as stakeholders. Members of the private sector are also important as suppliers to the public sector. Such positions' influence is considered in the research reported here. The supplier perspective and the private sector perspective fall outside the scope of this work.

Table 2.2 Expected consequences of limitations to the analysis.

Limitation	Why	Expected consequences
Public sector only	Focus of the Concept Research Programme Access to empirical data	Findings and conclusions will be limited to public sector only
Major projects only	Relevant for Concept Research Programme Access to empirical data	Findings and conclusions will be limited to major projects only
Investment projects only	Avoid mixing with purely financial transactions	Findings and conclusions will be limited to investment projects Improved validity for this type of project
Front-end only	Focus the study, reduce the scope of work	Improved validity for conclusions on the front-end of projects Execution of projects and operations not included
Administrative subsystem only	Focus the study, reduce the scope of work	Improved validity of administrative aspects, but excludes an important side of public decision making, the political side
Relevance and Sustainability only	Focus the study, reduce the scope of work	Conclusions do not include all success criteria – limitations to validity
Governance of projects only	Focus the study, reduce the scope of work	Findings and conclusions do not include all aspects of governance, and do not include project management

Including only major projects excludes a large number of small projects. Odeck (2004) showed that the share of large projects (> NOK 350 million) was less than 2% of 620 Norwegian road projects completed in the period 1992–1995. The amount of money invested in smaller projects also exceeded the cost of the large projects at the time. Odeck even concluded that the small projects have bigger cost overruns than the large projects, indicating they may have an even bigger need for improved governance. This suggests that an important aspect may be lost in focussing only major projects. However, the policy has changed in favour of larger (major) projects, increasing the share of projects and the share of budgets invested in them. Thus, this

choice mirrors a trend in Norwegian public sector. Major projects have a lot of attention and interest at present, not least from the Concept research programme which also holds the key to accessing empirical data on these projects. This makes this choice a natural and necessary one.

Including investment projects only helps avoid mixing investments in fixed assets such as physical infrastructure with financial transactions such as trading shares. These two types of investments have different procedures and regulations attached (different governance regimes) and represent completely different risks and challenges. The positive effect of such a limitation is that the discussions and analyses can be based on a more uniform set of problems and data. This increases the validity of conclusions for this uniform subset. There are no negative consequences of this choice.

Focussing only the front-end has the positive effect that the study becomes more focussed and realistic in scope. It is also necessary according to the mandate of the Concept research programme. Execution of the project and operation of the result is not included. Not including operations may possibly be seen as negative in the sense that all projects are developed and built for the operational phase; this is where the benefits are harvested. I acknowledge this, and include this perspective fully in the discussions about the front-end. Execution of projects is not included. One potentially negative effect is the risk of losing interest among members of the Project Management (PM) community. This seems not to be a problem, since there is currently a wide and growing interest in, and attention to, governance in the PM community, as pointed out in section 1.3.

Other limitations clearly have a negative impact on validity. An example is the limitation of looking only at the administrative subsystem, leaving the political dimension outside the analysis. To the degree the analysis considers a part of public decision making, this is obviously not adequate. Therefore the analysis and discussions necessarily lead to limited conclusions accordingly. In an ideal world without time and resource limitations, the totality of political and administrative subsystems might have been in focus. In reality, capacity forces to the omission of politics here. The discussion has to be limited to the administrative subsystem and its interactions with the political subsystem.

The choice of looking only at relevance and sustainability of the two superior criteria has already been discussed in section 1.4 as well as papers 6 and 10. On the positive side, this choice gives the study a realistic scope and a distinct profile. On the negative side, the findings and conclusions might have been different if the other criteria in the OECD integrated evaluation model (efficiency, effectiveness and impact) had been included. However, seeing that good performance on these criteria could not compensate for bad performance in the two superior criteria, the effect is probably more positive than negative. This makes it possible to extract some clear signals about what is more important without having to sort out a vast number of less important issues at the same time. Any issues that fall outside this discussion because of this limitation can be studied and corrected more easily when the two chosen criteria are secured.

Looking only at governance of projects, not at all aspects of governance and not at management, may have both positive and negative consequences. The limitation towards governance in general implies limitations towards governance in other settings or concerning other tasks. Examples of such excluded issues are ethics or other aspects of social corporate responsibility, financing and bookkeeping. The limitation towards management tasks (including planning activities and project management) implies that important issues concerning the way governance is followed up and put into action is excluded. These limitations may have several effects. A positive one is the improved validity due to not mixing governance with practical operational issues. The negative side to this is that the discussion and conclusions may no longer seem relevant or real to those involved in executing operational tasks and projects.

These limitations place the focus of the dissertation clearly outside project management. However, the purpose of this work is to understand better how to ensure that major public investment projects serve society well. This is a question about how to define projects well and how to choose the right ones, and in particular how to secure relevance and sustainability.

The issues studied in this research are clearly relevant to the project management community. The success of project management will always depend on good governance of projects and governance of project management. The successful execution of projects depends on how well the front-end is understood and governed. How successful the projects are in a wider sense depends on to what degree people involved in the projects and their organization are able to support the strategic perspectives of the owners and financing parties.

As shown, the limitations defined for this study are necessary. They have some negative and positive effects on the validity of the conclusions and the possibility to reach some potentially important groups. The specific validity of the conclusions will be discussed further in each research chapter of the dissertation.

3 Methodology

The choices most researchers have to make when designing a research task, includes deductive versus inductive approaches, positivist versus relativist or realist orientation in epistemology, and objectivist versus constructivist orientation in ontology. This ultimately adds up to choosing adequate qualitative or quantitative methods or a combination of these. A robust position is one that can address a wide range of research questions in a multidisciplinary area. This calls for pluralism in approaches and methods. This author has chosen critical realism as platform for the research strategy. Critical realism encourages interdisciplinary research. It has some features in common with natural sciences and other features in common with social sciences, making it possible to combine the best of two worlds.

3.1 Research paradigm – the platform for a research strategy

In paper 3 this author argues that a 'robust' position in epistemology and ontology is needed to be able to address the full breadth of issues in the current research area. Major public projects are obviously multidisciplinary challenges. Their products and effects include a wide range of elements which have to be understood using knowledge from nature and technical sciences as well as a wide range of social sciences. The investment itself is a political and economic issue and its execution depends on an additional range of knowledge from disciplines such as management, psychology and law. For additional arguments as to why this is the case, see paper 10. This dissertation touches upon all of these disciplines. Although the disciplines are not equally important in the perspective of this dissertation, there is clearly a need to look at scientific traditions in a very wide perspective to find out what kind of knowledge and research is most relevant in this case. Paper 3 provides a perspective on choice of positions ontology and epistemology. It is intended to cast light on the choices made with regards to research design for this study, but before the conclusion from Paper 3 is presented, a brief look at one specific challenge; the interdisciplinary nature of the issues studied in this research.

As pointed out by Hess (1997), sciences in general become more and more interdisciplinary, and thus our thinking about sciences also needs an interdisciplinary perspective. One problem is that no single author can be interdisciplinary in himself. All researchers come with a background from one or a few disciplines. How then can a single researcher deliver interdisciplinary research? According to Sørensen (2008, p. 16) interdisciplinary approaches is about producing holistic, integrated knowledge. This started in the 1950's and has accelerated up till today. Gibbons et al (1994) suggested the traditional discipline-based knowledge (modus 1) will be replaced by the interdisciplinary production of knowledge (modus 2). This implies problem

solving in a context of application. Such connection to practical use puts focus on the dialogue between scientists and the users of the new knowledge. This may potentially change the relations between science and society. Nowotny et al (2001) pointed out that there is an increasing demand in society to understand the basis for scientific conclusions and increasing transparency to research. This will make the knowledge more 'socially robust'. Sørensen (2008, p. 18) summed up that there seems to be two reasons for current development;

- An urgent need for solutions to problems in society that no discipline can solve alone.
- A development of a norm in society that knowledge is a common asset, based on democratic dialogue over what the truth is.

This adds up to an understanding of interdisciplinary research, not as the analysis and discussions of a single researcher (independent of how many disciplines he or she is educated in) borrowing methods, tools and knowledge from several disciplines, but a dialogue through which knowledge is created and knowledge shared. Taking part in such dialogues will be one aspect of this author's methodological platform.

The description in paper 3 addresses the macro-perspective on research strategy. In this paper the author concludes that he chooses the position of critical realism as position for developing a research strategy. As mentioned this position not only accepts, but encourages interdisciplinary research. It has some features in common with nature science and thus the traditional basis of management with a positivist epistemology, objectivist ontology and a tendency to choose quantitative methods in order to explain specific causal relations. Other features are more in common with social science with constructivist epistemology and relativist ontology with a tendency to choose qualitative methods to explore general patterns. This position invites to try to bridge the gap between these two paths, and this author will try to contribute to building this bridge.

3.2 Research design – the research questions

As described in the introduction and description of research area in section 1.5, the general objective of this work is to develop a deeper understanding of the research area and not to solve a specific problem or issue. This opens up for a wide range of research questions. To narrow this down, the context is defined as front-end governance of public investment projects and is limited to the administrative system, including the interface with the political system (see chapter 2). There is a need to examine in more detail the present status of governance in the front-end of major public investment projects. This research area can not be reduced down to a few questions by any simple reductionist approach, and there is not enough time to cover it all. Hence, the research questions are simply chosen according to the author's interests and availability of empirical information. The following first research question is:

1. **What are the most important functions (from an owner perspective) that ought to be carried out by governance frameworks that govern the front-end of major public investment projects?**

This could be expected to lead to a number of functions which have to be put into a systematic and purposeful structure: a governance framework. The next question is:

2. **How can a governance framework for major investment projects be designed?**

The purpose of the framework design is to make governance functions work together and ensure that society is well served by the project. In order to do this, the projects have to be relevant and sustainable (see the argumentation for this in Paper 6) and the improvement strategy has to be directed towards the most important problems at hand. Resources should not be allocated by chance or ideas of the moment. Hence, the next research question is:

3. **What are the most important problems that occur in the front-end of major public investment projects, which may lead to lack of relevance and sustainability?**

The answer to this question tells us what type of problems can be attributed to the front-end phase when major public investment projects are designed, which are commonly occurring and have the greatest negative consequences. The natural next step to take would be to consider what type of measures can be applied to counteract such problems. A research question could be: What can we do to avoid these problems or counteract them? A general answer will be given to this question, but not as a thoroughly researched contribution. This problem is simply too wide and outside the range of what is obtainable here. Instead, a more limited question is chosen, still related to governance frameworks:

4. **What characterizes an effective development strategy for improving governance frameworks?**

The answer to this question indicates where development resources should be assigned first, in order to maximise the effect of the governance framework, and in keeping the existing governance framework up-to-date with emerging challenges.

At this point the dissertation leaves the governance frameworks and shifts focus to the investment projects as such. The whole point is to make sure the projects are successful in the owner's perspective. This success depends on the ability to obtain relevance and sustainability in a practical setting – it has to do with the way we define objectives and the means to achieve them:

5. **How can a public investment project be charged with an appropriate direction and the right level of ambition?**

Public investment projects follow the basic logic that the present and future needs of users and society should guide the design of a project in order to ensure that the outcome is relevant and sustainable. The initial definition of the direction of development and the level of ambition is expressed through a project's objectives. For this reason, project objectives are worth studying in this context.

3.3 Research design - research tasks and data sources

Each research question in section 3.2 can be viewed as a more or less independent study. Figure 1.1 indicates how the different chapters (each focussing one of the research questions) theoretically build on each other. In reality the only chapter that logically could not be written before other chapters are chapter 7 which is dependant on chapters 5 and 6. Otherwise they are only loosely coupled. The original plan was to address the research questions chronologically. In practical life some research tasks were dependent on other people and thus out of the author's control. Finding respondents and gather answers to the survey in chapter 6 took a lot of time. This was no surprise and therefore this activity started early. All papers, except no. 4, were written or updated during the year in England. The progress of published papers were decided by the reviews and publisher, and more or less outside the authors control. Findings in some chapters and papers pointed to other chapters, introducing cross-links and need for some changes elsewhere. This introduced many interdependencies, although most of them rather weak. The consequence was that none of the chapters were finished before the others. Still, the research behind each research question was defined, planned and executed independently.

Some of the studies can be performed as one research task, others divided into several sub-tasks. In the following, each research question is described more in detail, accompanied by considerations of research methods and data sources.

For question 1 — *What are the most important functions (from an owner perspective) that ought to be carried out by governance frameworks that govern the front-end of major public investment projects?* — the answer will be of an exploratory or descriptive nature. It will rely on a set of inductive studies in order to identify the relevant functions of governance. The research will include using multiple methods: literature study, document studies, cases, interviews, expert groups and theoretical analysis. It is relevant to look at both what the governance literature says about the governance functions and what is actually done in practical settings. Documents describing established public governance frameworks are available through the Concept research programme and internationally on the internet (public documents). A study of these may help identify important governance functions. To make sure deep insight is obtained; several interviews will be performed with key people informed about the background and practical implications of these frameworks, and even investigated in specific real life cases. The research method is qualitative. Research question 1 may include sub-questions like these:

- What does governance in the front-end of projects really mean?
- What governance functions are characteristic of the public project owner?
- What governance functions are needed to make sure the right project concepts are chosen?

For question 2 — *how can a governance framework for major investment projects be designed?* — the answer is also mainly of a descriptive nature, although some normative elements may be identified through the process. The approaches may be characterized as mainly inductive but also with some deductive elements. The question invites exploration of the possible options and narrowing down to suggested choices. The research will include using multiple methods: literature study, document

studies, cases, interviews, and theoretical analysis. Some of the information sources will be identical to the ones used for question 1. In addition it will be relevant to look at both project literature and what is done to implement governance frameworks in practical settings. The study will cover several established governance frameworks. The research method is qualitative. Research question 2 may include sub-questions like these:

- How can we characterize and describe governance frameworks?
- How can we understand their intended and actual influence on projects?
- How can governance frameworks be designed to have the intended effect and to improve their performance?

In the case of question 3 — *what are the most important problems that occur in the front-end of major public investment projects, which may lead to lack of relevance and sustainability?* — the answer is descriptive by nature. The approach is inductive, but also has some clearly retroductive elements. The question calls for theoretical studies of literature presenting conclusions from other scientific work. A comprehensive body of literature can be found within this field, which is both theoretically and empirically based. Whereas the focus of the existing literature is on the most common problems, the original research contribution in this work is to identify the most important challenges. Apart from the partial coverage in published scientific literature, the information about what the most important problems are is difficult to get to in real life. Only through getting the original documents from the front-end of projects as well as documentation of their end results can first hand information be of help. Some information was available at the Concept research programme, but not enough to make this strategy realistic (see discussion in paper 10). The realistic approach is asking informants with access to such information through their own experience. The main approach in this study is a survey, supplemented by in-debt interviews and a literature study. The research method is qualitative. Research question 3 may include sub-questions like these:

- What usually goes wrong in the fundamental design of concepts for major investment projects?
- What problems in the front-end of public investment projects have the most critical negative consequences?
- Which challenges in the fundamental design of concepts are the most important to tackle in order to avoid the aforementioned problems?

For question 4 — *what characterizes an effective development strategy for improving governance frameworks?* — again an inductive approach is chosen. This question originally came out as a consequence of the previous question 3 as a follow up question. The basis for answering the question is mainly the result of the preceding studies connected with question 3 and some theoretical basis added from literature. No new information sources needs to be added for this research question. The research method is qualitative. Research question 4 may include sub-questions like these:

- What makes an improvement strategy effective?
- What elements of a governance framework have to be addressed in an effective improvement strategy?

- What aspects have to be considered to make sure the improvement is possible to implement?

Finally, for question 5 — *how can a project be charged with an appropriate direction and the right level of ambition?* — the answer is both descriptive and normative by nature. The question points towards understanding the fundamental design of a project and the objectives guiding the planning and execution of the project. Based on such understanding, some guidelines for good design of projects may be deduced, though the main approach remains inductive. In this part of the dissertation an analysis of a large sample of data from a significant number of public investment projects in Norway is the main research task. First hand documentation from a large number of public investment projects is available for the researcher at the Concept research programme. These data are theoretically analysed and conclusions are drawn. The research method is mainly qualitative, but the analysis includes some quantitative indications, although without entering the world of statistical methods. Research question 5 may, for example, include sub-questions like these:

- How well are current public investment projects defined and designed?
- How should government formulate the goals and targets for the project?
- How should the right level of ambition be set for the project organization?

This last research question is significantly different from the previous four. Whereas the four initial questions focus governance and governance frameworks in general, this last question rely on looking into the reality of projects within one specific governance framework. The question of how to initiate projects is clearly a front-end matter. The key to success is to understand what the purpose of the project is, and what future expectations and conditions will have to be met. A good start to the project is supposed to charge the project organization with the appropriate direction and ambitions. There is a large body of literature suggesting that objectives are important and also giving good recommendations as to how they should be formulated to give maximum effect (this literature is summed up in Klakegg 2004). The research presented in this dissertation aims to answer this question from a different angle.

3.4 Research strategy - methods used in this dissertation

Most of the methods indicated in section 3.3 points towards descriptive, qualitative, inductive approaches where the researcher forms theories about this reality on the basis of empirical indications and the work of other researchers through literature. Some of the research tasks are experiments with a relatively open agenda. This follows naturally because governance of major public investment projects is a fairly new research area and the objective of this study is to improve the knowledge of this area.

Much of the knowledge is developed in dialogue with practitioners through interviews and other researchers in discussions and analysis through this research process. This makes the research interdisciplinary according to the modern understanding referred in section 3.1.

As already indicated in the previous section, a wide range of methods will be used in this investigation. It is a multi-methodological (pluralist) approach. There is a need for plurality in method. The ontological positions of objectivism and constructivism both cover important sides to social phenomena. Using the strong qualities of both these positions and embrace the potential of cross-disciplinary research seems to be the best way forward. This makes the robust position of critical realism highly valuable.

The following section highlights some micro-perspective issues of methodology. The basic methodologies used in this research are explained and discussed in some detail. There is also a separate methodology section in each paper. For this reason, specific comments on each paper are omitted here.

Literature study: Basic knowledge areas

The basic areas of knowledge necessary for preparing this dissertation are covered by the authors education, previous knowledge and expanded by literature studies. When studying governance of major public investment projects in pursuit of relevance and sustainability, three separate areas have to be addressed: governance, relevance and sustainability. Especially governance and sustainability call for clarification of terms and concepts, as these two areas are frequently mentioned as unclear and ambiguous. Relevance, on the other hand, seems to be well defined and more easily understood. Governance and sustainability are very complex issues and some basic knowledge of these areas is documented in papers 1 and 2. In the literature studies, the author has chosen to look back to the origin of the concept as well as at the fundamental meaning of the respective words. Paper 3 covers methodology and follows the same pattern. All other papers also include a minor literature section. The literature studies do not cover all aspects of the development of the concepts, they are however made comprehensive enough to present an adequate picture of the knowledge area in question.

The literature study was guided by Internet searches, where important nodes of knowledge were quickly found. From there, it was relatively easy to follow references in current documents back to the origins of the line of research examined in the literature study. A large share of the papers and books referred to is available online. Since web-based searches have been important in this work, an example of a database and search keys used is given in the following (in this case, one for the study of governance frameworks), while similar searches were conducted for the other issues examined in this study:

> Database: Compendex (Ei Village 2)
> Search keywords: project governance, project framework, project regime, regulatory regime, regulatory instruments, regulatory framework, regulatory measures, project context, project environment, project sustainability, project relevance.

In addition, Google Scholar was used to track authors and titles, with good results. Searches for specific documents, papers and books referred to by other authors was effective. Many of the searches generated a large number of hits. The difficult part was trying to sort out the most relevant ones from a long list of titles. This was

sometimes very time-consuming and inefficient, which is why my preferred method of search was to follow up references already pointed out as relevant in previous research.

Interviews: The opinion of individuals

The 'Governance Framework' part of the study is based on a research project performed in collaboration between the Concept research programme at NTNU and School of Management at the University of Southampton. In-depth interviews with key informants having deep inside knowledge of each governance framework at executive level were a main source of knowledge for this study. The original project report (Klakegg et al. 2009) goes into detail as to how the specific frameworks was initiated, developed and implemented. A very rich base of information was gathered, structured and analysed. Data collection was made through a questionnaire that was prepared and sent to the respondents well in advance of the actual interviews. The interviews lasted between 2 and 4 hours. The interviewees were able to comment on the interview notes before the analysis was finished to remove misunderstandings. Similarly, they were given the opportunity to look at the finished text. Their comments allowed some additions and adjustments to be made to the text. The results are documented in papers 7 and 8 and in the original research report (Klakegg et al., 2009). Similar interviews were conducted as part of the 'challenges' study documented in paper 10.

There are methodological challenges with this approach: choosing to rely only on interviews of a few key people will risk omitting other views, leaving only a subjective impression of the frameworks. This could in theory undermine the validity of the data. Interviewing only key people involved in developing the frameworks or projects (cases) in the studies may also threaten to undermine the reliability due to their own position, defending or 'selling' the existing framework or project. Although these interviews are valuable sources of information, a second source was vital in the research on governance frameworks: public documents describing the frameworks.

Public documents: What is formally communicated

Public documents were included as a source to add a more balanced and official representation on the information. Typically such documents provide concepts, terms and requirements to which the users of the documents are expected to conform. These documents describe and communicate the government's view (extracted from the views of individuals within government and administration) to the users of the documents, stakeholders and the public. This reduces some of the subjectivity, but still leaves only one side of the picture described, namely the side of the party that imposes the regulations (e.g. a governance framework) as an instrument to which other parties have to comply. Public documents are defined as a different kind of source than the direct view of individuals, even when the documents may be written or at least heavily influenced by the same individuals as those interviewed.

The process of developing and approving a public document serves as a filter that reduces subjectivity. In an open democracy the document goes through a political process and will come out with a politically balanced description. In other countries, public documents may have a stronger flavour of communicating the views of the

ruling powers. For instrumental reasons some aspects may be under-communicated and others may be purposely exaggerated. Regardless, this process removes details and intentions and this cannot be the only source.

Case studies: What actually happens in projects

The practical consequences of introducing a governance framework are studied in projects chosen for case-studies. A main source of data from these cases is the study of project documents. The view of independent external assessors is documented in evaluation reports. In addition their view of the effect of the intervention is checked through interviews. Similarly the views of individuals directly involved in the projects are also gathered through interviews. The views are highly subjective, as each individual was asked about their personal opinion. However, together with the views expressed by the owners and decision makers, this adds to the richness in the information, and can reveal gaps in the interpretation of the intervention. To make the interviews effective, the interviewees were presented with a questionnaire before the interview was held. The interviewees were also able to comment on the case descriptions before the report was finished. Their comments led to some additions and adjustments to the text.

As such these interviews (in case studies) have the same problems with validity and reliability as described for other interviews above. The documents from inside the case-projects are expected to have even more of the problems discussed concerning public documents. The parties involved in projects obviously have an agenda, a position to defend. By looking at several documents and documents over time these problems are reduced by retrieving more nuanced information than available in one document or one point in time. More important however is the access to third party assessments of the projects. These gave a more balanced, professional view of the project – although not 'objective' – they express the views of individuals.

Surveys and group techniques: What the expert group has to say

Using structured interviews for a group of experts is expected to give a differentiated picture. The result is expected to give a balanced view when the different contributions are put together and analysed as a whole. Doing this face to face individually is difficult and costly due to the time and place restraints. Fortunately, there are practical alternatives.

A group technique approach was used to gather information as basis for paper 6. This approach involves placing experts together in the same room at a specific point in time and is dependant on good facilitators and a secretary to document the responses, but it is very efficient in terms of time. It was only realistic due to the opportunity offered by having a wide selection of experts attending a conference on the specific topic of the paper. Group techniques include a specific procedure (a structure and a set of rules) in order to avoid well known group effects like group think and polarization etc. In this case 5 different international experts performed a group process of their individual choice. The process and the results where documented by researchers from the Concept research programme. The authors of paper 6 analysed the results after the conference. A well performed group process reduces negative group effects. The process produced a rich material in an open dialogue. There is not much weight put on

these processes in the material, but the methodological choice is presented here to give a complete overview.

Another alternative is to prepare a thorough questionnaire for each expert to answer without any intervention from the researcher. A well-prepared survey gathers information efficiently, without demanding anyone to be present at the same time or place. The challenge is, on one hand, to make the questionnaire self-explanatory and on the other hand explicit and sufficiently thorough to ensure that the respondents are able to interpret it correctly. A good survey is very difficult and time-consuming to prepare. This kind of approach was used to gather the basis for paper 10. See chapter 6 and the methodology section of paper 10 for more details. The reliability and validity of survey results depend on many factors. The most important ones are the choice of respondents and the preparation of questions. The choice of respondents is critical for both reliability and validity. They need to be representative of the group of people able to answer the questions – they need to have the right knowledge, experience, positions etc. and not systematically have self-interest in the results (reliability) and many enough to make the combined answers actually give a representative profile (validity). This is difficult to achieve. The researcher can control who he or she invites but not how many or who actually responds before the responses are actually analysed (not even then if the responses are anonymous).

In this particular case the number of respondents is low, but they represent the right knowledge and experience, giving an acceptable result. The quality of the questions is critical for both reliability and validity. Questions may be clear or unclear, leading or not so, confusing or not understood at all. In this case the analysis of the results revealed a few questions were not well formulated. These where excluded. The rest gave acceptable results. See chapter 6 and paper 10 for a more detailed and comprehensive discussion of the quality of the survey results. A few questions from the survey was used as information source in chapter 8 too. To test the findings from the survey, the results are compared to findings of other researchers and discussed in light of literature studies – see the triangulation below.

Use of empirical databases: What measured facts says

The Concept research programme maintains a large research database called Trailbase. It includes a total of more than 100 Norwegian major public investment projects and is still growing at the time of writing. This database includes a wide range of data, structured and made available for researchers connected to the programme. Some of these data are highly relevant to this study and thus represent one of the most interesting possibilities in the current research. The limitations in this data material stem from the fact that most of the projects are still only represented by data at one milestone; the QA2. Each project-entry is supplemented by facts about the decisions made at that particular point in time. For the remainder of the project life cycle no data are systematically available yet. This dissertation focuses on governance of projects in the early phases (front-end). Only a small number of projects were represented by data from this phase (currently approximately 10 projects registered at the milestone where the concept is chosen – QA1). This limited the possibilities. The available choice was to study to the basis for execution of the projects. There are plenty of data concerning objectives. This point towards research question no. 5: How can major public investment projects be charged with an appropriate direction and the

right level of ambition? The database contains data useful in this respect. This is why this research question was chosen in the first place.

The primary source of data for Trailbase is the QA report made by quality assurance consultants under framework contract with the Norwegian Ministry of Finance (see either chapter 4 or paper 4 for an explanation of the Norwegian QA scheme). These reports are readily available and represent a primary source for this research. Some of the reports include all data on goals, while others do not. In the latter case, other primary sources (public documents and project management plans, etc.) provide additional information. A few single projects for which these data were not available were excluded from the study sample. The potential size of the sample at the time of analysis was somewhere in the range of 70 projects. For capacity reasons, the sample size was limited to 51 projects. In order to make sure all of the relevant types of projects are equally represented it was decided to use the primary sources (original documents) and not examine the database for this specific research. As the primary sources were available, going through a secondary source (the database) was considered unnecessary and would have added distance between the researcher and the data in the study.

Teams of professional consultants prepare QA2 reports. They are external to make sure they have little self interest in the results, and are specially qualified to do the assessments defined by the Norwegian Ministry of Finance. They follow a predefined set of guidelines and procedures. This makes all reports across sectors and projects include the same information and analyses the project with equivalent methods. All in all these reports are a good source of reliable data, although not only objective facts. Most of the added elements of information come from project documents prepared by the project management team. In general well qualified, serious PM professionals manage the projects in this specific sample. These projects have more resources than the average project organisations in Norway. The information about objectives is reliable – the intention was to analyse the goals as they are actually defined and formulated. This information is easily available in most cases. The ones where this was not the case were excluded.

Analysing data from such primary sources can yield considerable information about the realities of major public investment projects in Norway. A wide range of questions can be answered and trends in the data material over time can be identified. For the purpose of this dissertation there was no need for or desire for these analyses to be quantified to use statistical methods. Only simple categorizations and counting of occurrences, that is basically qualitative analysis, is used and the analyses are limited to what can be concluded by contextual interpretation of the information. The results were checked against findings in the survey mentioned above.

Theoretical analysis: How to understand a system

Analysing a system (in system engineering tradition) is based on the ability to define the system by describing its structure and interfaces, limitations and contents. Using techniques such as feed-back loops, diagrams and flowcharts etc. to explain and model the system properties constitute a formal toolbox for analysing systems. In this dissertation only simple system analysis is attempted. There was no need for sophisticated analysis here. In the study of governance frameworks, it was important not only to understand why and how such a framework was implemented. The researchers needed to be able to define and describe what main elements the governance framework consists of and how the elements of the framework (system) interact. An example of how frameworks may be described in a simple way as a system is shown in paper 7. Further, by looking more closely at the construction process (how to design a framework), different aspects rise. As part of this dissertation, a study was carried out in accordance with Ackoff's (1981) comprehension: '*The best way to understand a system is to redesign it*' (see paper 9 and also chapter 5). A redesign (reconstruction) of the existing Norwegian framework based on an industrial ecology perspective gives hypothetical insight into the design process. Systems engineering is used as a gateway to understand the framework, and to identify improvements in the new perspective. This is illustrated in paper 9.

An example of a different form of theoretical analysis of the construction process of a governance framework (Klakegg et al., 2009) reveals how theory may be seen as a potential explanation for the design of such a framework. However, the real arguments behind the design of the frameworks are proved to be different. Therefore, this is not the actual way to design a system, but interesting as a step to increase the understanding of it. Part of a theoretical analysis (preliminary to the final report) is indicated in paper 7 and in more detail in section 5.5.2.

The reliability and validity of analysis of systems depends on the quality of the information on which they are defined and described. The more sophisticated the model, the more critical is the precision of data. In this case the 'models' are only structured descriptions of the empirical reality. There is no quantified models or attempted optimizations, only structured information. Therefore the theoretical analysis in this dissertation is as good as the information it is based on and the logic used to interpret it. The researcher did not add or remove content, only structure and meaning. The quality of the information from documents and interviews are discussed above. The quality of the researcher's logic and analysis is discussed in each of the subsequent chapters, where appropriate.

Triangulation: The balancing of individual views/different perspectives

Comparing research results from different perspectives and sources are used as an important method throughout this dissertation. This meta-method is used to check results against other sources and to compare different perspectives in order to reveal gaps and differences. This adds to the discussions and analyses as well as increases the credibility of the results. Triangulation includes using two or more of the methods/sources discussed above to balance individual views or different perspectives on the same issues.

An example from the collaborative project mentioned above (Klakegg et al. 2009): The research strategy illustrated in figure 3.1 was used in the study of governance frameworks in the UK and Norway. Individuals with three different positions or relations to the governance frameworks were interviewed. This gave three different perspectives on the phenomenon studied. Each side expressed their views directly through interviews and through documents prepared as a part of their role connected to the projects (no separate documents were produced for this research by the parties). Public documents are illustrated as a fourth position. As argued above, personal opinions are filtered out when public documents are produced.

The left-hand side represents the 'input' side: the introduction of governance frameworks as an intervention to improve the success in major public investment projects. The right-hand side represents the 'output' side: the effect as perceived by the people subject to scrutiny in projects. The position in the middle represents the individuals actually carrying out reviews according to the governance framework from a neutral position.

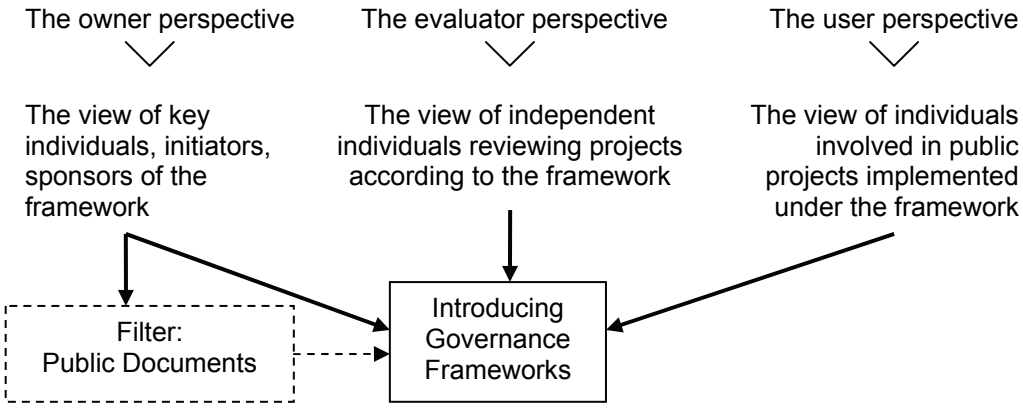

Figure 3.1 The strategy used for balancing individual (subjective) views on introducing formal governance frameworks for major public investment projects in this dissertation: using three different perspectives.

The results of this study are documented in papers 7 and 8. In the survey reported in paper 10, the same positions are found, although divided into sub-categories: the owner perspective is held by decision makers, the user perspective is held by project managers, and the evaluator perspective is held by project evaluators and researchers. Project planners are in a special position in this perspective as they may have either the owner perspective or the user perspective depending on their position/duties.

3.5 Overview and concluding remarks on methods used

This study is designed to be a multi-method (pluralist) approach to a set of chosen problems derived from five relatively wide research questions. By choosing different approaches to each problem in the study, looking at the issues in different perspectives and using several independent sources, new knowledge can be found. The results are checked by using triangulation. Studying the same phenomenon from different angles and based on different sets of data and information, as well as using

different methods, should increase the validity and reliability of the research results to acceptable level. A summary of the different methods used and where they are found in the chapters and papers in this dissertation is given in table 3.1.

Many of the questions and topics investigated in this dissertation are highly complex, contextual and prone to judgemental subjectivity. Therefore the research design includes strong control mechanism in each of the main studies. In each case, the conclusions are compared to similar studies made by other researchers elsewhere, or separate studies based on alternative methods and data to test assumptions. Another mechanism used to secure the result is consulting reliable sources of information. Hence, interviewees who had first-hand experience of the phenomenon in question were always chosen. For the survey, a lot of emphasis and time was invested in identifying and contacting competent respondents with a high degree of credibility. The empirical data were gathered from primary sources where the background and methodology is well documented.

Table 3.1 Overview of methods used in each chapter and paper.

Method	Used in Chapter no.	Used in Paper no.	Research question	Comments
Literature study	1, 3, 4, 8	[1], [2], [3], [10]	1, 2, 3, 4, 5	Also present in all other chapters and papers
Document studies 1	4, 5	[4], [5], [7]	1, 2	Public documents
Document studies 2	5, 8	[5], [8], [11]	2, 5	Project documents
Individual interviews	5, 6	[7], [8], [10]	2, 3	
Group interviews	4	[6]	1	
Group techniques	4	[6]	1	
Survey	6, 8	[10], [11]	3, 5	
Case studies 1	4, 5	[4], [7], [8], [9]	1, 2	Cases = Governance frameworks
Case studies 2	4, 5	[5], [8]	1, 2	Cases = Projects
Data analysis	8	[11]	5	Project data
Theoretical analysis	5, 7	[7], [9]	2, 4	Design, Redesign
Triangulation	4, 5, 6, 8	[6], [7], [8], [9], [10], [11]	1, 2, 3, 5	

The aim of this study is not to prove any general principles or present quantitative evidence for any generally applicable principles or mechanisms. The conclusions in each of the papers are limited and represent a descriptive approach to the issues in question. As a whole, the dissertation makes up a somewhat fragmented picture of the governance of major investment projects. The topics studied are more a result of choosing what could be considered to be the most interesting problems, than the result of a strategy of building up a complete account from start to end. Describing the whole problem area in full detail would not be possible, due to limitations in terms of capacity (hence, the chosen strategy was the practical choice).

3.6 The methodical structure of the dissertation

Table 3.2 gives an overview of the dissertation in terms of research questions, assumptions, methods and results.

The first research question (on governance) is based on the assumption that a government will establish a regulatory framework to ensure the investment projects meet the intentions of the owner and financing party. The question is related to which functions ought to be carried out by the systems that govern the front-end phase of public projects. Based on literature and document studies, as well as some secondary methods, the answers come out. A main finding is that defining a clear decision making process and how to control the quality of documents and basis for decision about projects are the most important functions of a governance framework.

The second research question (on governance frameworks) is based on the assumption that a governance framework has to be carefully designed to be effective, taking into account its aim and the context. The question is related to what design strategies may be used to design such a governance framework. Based on interviews and case studies as well as several secondary research methods, the answers come out: The design strategies are either to develop a unique design based on current situation, or to use a model framework from which solutions may be copied and adapted. The design methods available are a systems approach, the use of design criteria or a theoretical framework.

The third research question (on most important problems in the front-end) is based on the assumption that once a framework is established it has to be maintained and improved to stay effective in a changing world. The question is related to the most important problems in the front-end leading to lack of relevance and sustainability (defined as the most important criteria for project success). Based on a survey and other research methods the most important problems are identified together with their root causes. The most important problems related to relevance are ignoring users' needs and unclear objectives. The most important problems related to sustainability is not identifying weak support, not solving conflicts, and the planning optimism.

The result of the previous research question leads to the fourth research question (concerning the identification of effective improvement strategies): The assumption is that relevance and sustainability is the most important success criteria and that logically, relevance is a prerequisite for sustainability. Based on inductive logic, the results of the survey leads to the conclusion that the most effective strategy is first to ensure relevance, then sustainability and than other criteria. Always balance values and structure.

The fifth research question (on appropriate direction and level of ambitions) is based on the assumption that objectives are decisive in the fundamental logic of projects. The question concerns how a project can be given appropriate direction and the right level of ambition. Based on data analysis and several supporting research methods, the answers come out: Most projects do not meet best practice criteria and should be defined and designed more systematically. Direction is given by the objectives and ambition by the probability to reach these objectives.

Table 3.2 Structure of the research: assumptions, research questions, methods and results.

	Research question 1	Research question 2	Research question 3	Research question 4	Research question 5
Formulated assumptions	Government will establish certain governance principles and a regulatory framework to ensure projects meet the intentions of the owner and financing party.	To be effective the governance framework has to be carefully designed, taking into consideration its aim and the context.	The existing governance framework has to be developed and improved to keep up with emerging challenges.	The most important success criteria for the project owner are relevance and sustainability. Relevance is a prerequisite for sustainability.	Objectives are decisive in the fundamental project logic; the needs-goals-means-results-effect causal chain.
Research questions	What functions ought to be carried out by governance systems that govern the front-end of major public investment projects?	How can a governance framework for major investment projects be designed?	What are the most important problems that occur in the front-end of major public investment projects, leading to lack of relevance and sustainability?	What characterizes an effective improvement strategy for developing governance frameworks?	How can a project be charged with an appropriate direction and the right level of ambition?
Methods used (main method in **bold**)	**Literature study** **Document studies** Group interviews Case studies Triangulation	Literature study Document studies **Individual interviews** **Case studies** Theoretical analysis Triangulation	Literature study Individual interviews **Survey** Triangulation	Theoretical analysis **Inductive logic**	Literature study Document studies Survey **Data analysis** Triangulation
Results/Answers	Fundamental governance functions: - Defining a clear decision making process - Controlling the quality of documents/basis for decision	Design strategies: - Unique design - Model framework design Design methods: - Systems approach - Design criteria - Theoretical framework.	*Relevance:* - Users needs are ignored by planners and decision makers - The objectives are not stated or unclear *Sustainability:* - Not identifying that the outcome has weak support - Not solving conflicts over priorities among key stakeh. - Planning optimism (cost and benefits)	First you need to ensure relevance, then sustainability. When these criteria are met, focus other criteria. Always address and balance: - *Values (*attitudes, communication, knowledge) - *Structure* (process, roles, methods, control)	The fundament is knowledge of society' and users' needs, initial state and the wider context, possible means and their effects. *Direction* is defined by choice of objectives. A*mbitions* are defined by the probability to achieve those objectives. *Most projects do not meet best practice criteria. Apply systematic approaches to definition and design of the projects.*

4 Governance of the front-end of projects

This chapter specifically addresses the first research question put up in chapter 3.1: *What are the most important functions (from an owner perspective) that ought to be carried out by governance frameworks that govern the front-end of major public investment projects?* The chapter explains governance as complex, including both hierarchical and relational mechanisms. Governance of projects is defined as a background for studying governance functions of the front-end. Governance of projects is developed from a project owner perspective. It includes functions of policy making and/or strategy development (core functions), and functions to support decision making, and to support planning and execution of projects (support functions). The functions include on one hand command and control, and on the other hand support and empowerment. The most important governance functions in the front-end is *defining a clear decision making process,* and *controlling the quality of documents used as basis for decisions.*

4.1 The governance concept

The fundamental meaning of 'governance' found in literature is discussed in paper 1. At the outset, paper 1 gives a rather confusing picture of the subject. This is a consequence of the many different meanings attributed to the word governance by different authors. Some authors seem to hold that governance is a hierarchical phenomenon (Hirst 2000; Kaufmann and Kray 2007). Others only describe governance as a network or transaction-based phenomenon (Rhodes 1998; Feldman and Khademian 2002;Winch, 2006). I argue, along the lines described by Jessop (1997); Lynn, Heinrich and Hill, (2000); Abbott and Snidal (2001), Shah (2006) and others, that the concept of governance is not limited to either the hierarchical, 'multi-level' governance which was predominant several decades ago, or the network-based, relational 'multi-actor' governance that has dominated the contributions of recent years. Figure 4.1 shows how the change in focus adds new depths of meaning to the concept of governance.

The hierarchical aspects of governance are visible in the definitions of levels in any organization, from the assembly of owners and/or shareholders and the boards of directors in corporations, down to management, middle management, teams, and the individual employees in departments at the 'bottom' of the organizational pyramid. In projects the hierarchical pattern is similar, with formal command structures top-down through the organization and reporting lines returning upwards.

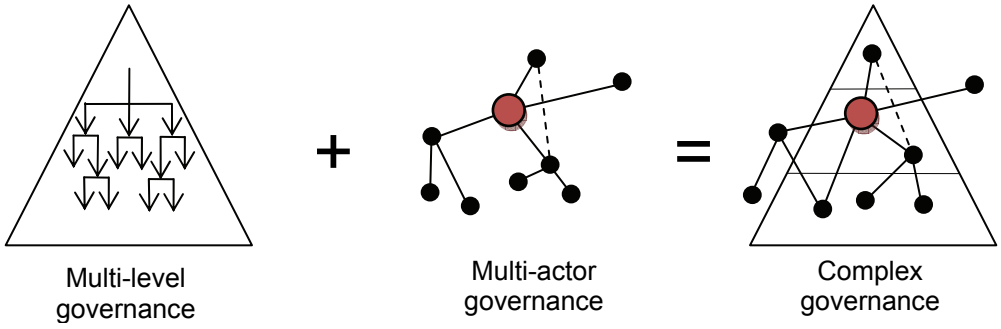

Figure 4.1 The multifaceted meaning of the governance concept: Many levels in hierarchies and many actors are connected in networks at the same time. Some of these actors may be outside the formal organization.

The network aspect of governance is exemplified by the fact that many actors (organizations, groups and individuals) are connected in several ways (formal and informal). In the project context this is normally through contract arrangements, but also here informal network relations are important. The hub of the network is important, and there may well be sub-nets and several hubs. As an individual, a project participant is likely to be part of a hierarchy in at least two dimensions; the permanent organisation and the project. The same individual will at the same time be part of multiple networks and single relations inside and outside the project. The reality is complex, and so too is governance: governance works through both hierarchical arrangements and network arrangements. Network arrangements are relational and based on market or alliances. This understanding of governance is used in the following.

Frequently, governance is associated with higher level perspectives. For example, governance in a corporation is typically associated with the board of directors, while governance of projects is associated with the project owner's perspective, in some cases evident in the form of a project board. The understanding of governance as explained above is wider and includes functions beyond the responsibilities of boards and top management. In this dissertation the focus will be on the owner's perspective.

Governance is relevant in all sectors, whether public, private or non-governmental. Paper 1 illustrates this clearly. The OECD (2005, p. 15-16) confirms what was also found in paper 1 – that the governance concept, and of course the way it is implemented, is constantly changing – it is 'work in progress'. OECD uses the following description of governance, which is also useful as a definition:

> *'Governance refers to the formal and informal arrangements that determines how public decisions are made and how public actions are carried out, from the perspective of maintaining a country's constitutional values in the face of changing problems, actors and environments.' (OECD 2005, p. 16).*

4.2 Linking governance and projects

Based on the examples and discussion in paper 1, there is little doubt that governance can be recognized at all organisational levels, and is obviously relevant for projects.

There are many ways of making this connection more explicit, as will be done in the following.

Thiry (2006, p. 3) shows how the traditional value distribution focus of shareholder models in corporate governance should be replaced by a stronger stakeholder value focus in a strategic value creation model. This, he claims, will lead to a stronger focus on sustainable results and effectiveness. This is a direct link to projects because this puts focus on what investment alternatives are chosen and to which stakeholder or group's benefit. This will directly influence the front-end of projects. More details in paper 1.

Referring to Williamson (1992), Miller and Floricel (2000, p. 136) point to the economists' search for optimal governance structures: efficient contractual relations may range from markets for standard products to bilateral governance for recurrent products and hierarchical governance for specific assets. This provides a link to projects because the acquisition of these products is often organized as projects. Specific assets of significant size are normally always acquired through some form of project organisation, and even acquisition of standard products is often seen as projects when the size of the contract is very big (for example buying ammunition for the defence). Similarly one could make the connection by pointing out that any policy programme or change following strategic decisions normally is planned, executed and evaluated as a project. Another influential author working with optimizing governance structures from a transaction economy angle is Graham M. Winch, his work focus governance in the project process (Winch 2001; 2006).

Project management reflects the perspective of the executing party and is a discipline with strong and explicit connections to corporate governance – a branch of governance specific to the private sector. The Association of Project Management (APM 2008) has established a special interest group (SIG) and published two separate guidelines on the governance of project management for single-owner projects (APM 2002) and multi-owner projects (APM 2007). The GoPM (Governance of Project Management) SIG refers to OECD's definition of corporate governance as the fundament of their own definition of governance of project management:

> *Governance of project management (GoPM) concerns those areas of corporate governance that are specifically related to project activities. Effective governance of project management ensures that an organisation's project portfolio is aligned to the organisation's objectives, is delivered efficiently and is sustainable.* (APM 2002, p. 4)

The GoPM SIG focuses on the governance of project management, not on the project itself. The reason is that 'purpose and understanding of the problem with the governance of projects – that there is insufficient understanding by boards of the significance of project management'.[2] They illustrate the contents of the concept with an intersection between corporate governance and project management. This is a limited governance perspective but illustrates some of the important issues in this field. In a meeting, the SIG expressed directly to this author the clear attitude that they do not work in the field of 'project governance' and pointed out that this is a matter

[2] David Shannon. Chairman of the GoPM Special Interest Group in a personal e-mail to the author, October 2007.

for the projects themselves. This contributed to the choice of words in describing the research area in this thesis: 'Governance of projects' indicates an owner perspective, not the executing party's perspective. This chapter uses the term 'governance of the front-end of projects'. As explained in chapter 2, the front-end stage occurs before the traditional project even exists and thus before there is a project organization in place. Still, the development at this early stage has great importance for the outcome of the project. The front-end obviously has to be subject to governance.

A new definition of 'governance of projects' was developed by Klakegg et al. (2009) and is cited in paper 7. It is based on APM (2002). The following is a reformulated definition, which will be used in this thesis:

> *Governance of projects concerns those areas of governance (public- or corporate) that are specifically related to project activities. It consists of formal and informal arrangements by which decisions about projects are made and carried out. Good governance of projects ensures that relevant, sustainable projects and alternatives will be chosen, delivered efficiently and cancelled when appropriate.*

The important implications embedded in this definition are the notion that the concept is equally useful in the public and private sector. It is limited to project activities, and the purpose of the governance of projects is to make sure that such projects are chosen wisely among relevant alternatives, executed efficiently without spillage of resources, and an outcome is delivered with sustainable effect.

4.3 Project governance?

The phrase 'project governance' sounds good – the word 'governance' has great appeal, as pointed out by Lynn, Heinrich and Hill (1999, p. 2). But it is used in many meanings and thus not easy to use. In the previous section the APM Governance of Project Management SIG explained their choice of name, and this author chose to build on their line of thinking. When this author asked the members directly about project governance in a SIG meeting in October 2007, the answer came humorously; 'Oh no – we don't do that. Let the project management people deal with that.' In the previous sections are a few examples of authors working in fields that might, and might not, be defined within project governance (Thiry, Miller and Floricel, Winch). Here are a few more examples – this time given as definitions. Project governance is;

- 'a process oriented system by which projects are strategically directed, integratively managed, and holistically controlled, in an entrepreneurial and reflected way, appropriate to the singular, time-wise limited, interdisciplinary, and complex context of projects.' (Renz 2007)
- 'the management process that ensures a project is completed according to plan and its ultimate business objectives or benefits are delivered.' (Raterman 2003)
- 'the process-driven system that allows management, shareholders, board of directors, and other stakeholders to have timely, relevant, reliable, and transparent information on all enterprise investments made via projects, programs and portfolios. Project governance is a subset of corporate governance by which projects, programs, and portfolios are directed and

> controlled, in order to implement the organisation's strategy. The executive management and board of directors are accountable for project governance.' (Alvarez Dionisi 2008)

Alvarez Dionisi builds on the definitions of APM, Renz and Raterman in search of the ultimate definition of project governance. In this authors view this strategy has not succeeded, although he has improved on some of the previous contributions. Both Renz (projects are the context) and Raterman (clear management focus) defines themselves (unintentionally?) into the project sphere. By adding elements of the GoPM definition (see section 4.2) Alvarez Dionisi elevate his suggested definition up to explicitly address boards of directors and corporate governance, but his definition is still focussed on the system. Too much in this authors view.

The new version of the PMBOK® Guide – Fourth edition says (PMI 2008, p 20): *'Project governance provides a comprehensive, consistent method of controlling the project and ensuring its success… A project's governance must fit within the larger context of the program or organization sponsoring it.'* Not much to go on, but seems fairly consistent with this author's line of thinking.

The intention built into the definition of 'governance of projects' in section 4.2 has three main elements: The name itself – governance OF projects – indicates that the position is outside the project (implicitly the owners position). The definition is wide enough to include all relevant elements of governance (public or private – the only limitation is that it is related to projects). Finally, the main point, the definition is clear on its purpose (good governance of projects ensures that relevant, sustainable projects and alternatives will be chosen, delivered efficiently and cancelled when appropriate). This opens up for any strategic objective the owner may have associated with his project. It does not limit to information or any project-related definition or any form of organization of the project. In chapter 6 and paper 10 an argumentation for the importance of relevance and sustainability is presented.

This author is aware there might be several more definitions of this term in other literature[3], and the critic of the above definitions are made in a state of awareness that they are analysed in the context of this dissertation, not the context for which they where intended. The purpose is to establish an understanding of the concept and to argue for a different concept. Most notably the concept 'governance of projects' is developed from a governance perspective, not a project management perspective.

4.4 Functions included in governance of projects

The research question asks for 'functions' of a governance system in the front-end. The word functions may require some explanation. The intention is to discuss the purpose or intended effect of the tasks included in governance, and not how they are executed or by whom. The choice is to call them governance functions. The following discussion may be expanded later on subjects such as who should be responsible for

[3] A recent contribution by Ralf Müller (Müller 2009) includes a comprehensive and structured overview of project governance terms including 'governance of projects'. Unfortunately this book came too late for this author to fully incorporate in this dissertation.

these functions, how they should be organized for maximum effect, and what the best ways of solving the tasks are. The discussion in this chapter is limited to identification of the functions.

To make the picture more complete, and thus easier to follow, governance is compared to management – as in 'management functions'. This is done to clarify the limits of governance and to understand the interface between what is called governance and what is called management here in this dissertation[4]. Management is concerned with the specific planning, organizing, resourcing, directing, and controlling of an organization or efforts for the purpose of accomplishing a goal, i.e. from within the project organisation. The two concepts governance and management are clearly related. The functions embedded in management are often more specific and fill the need for following up chosen strategies and priorities with actions, keeping track of and utilizing resources to their full potential. In the following sections, more details will be added on governance functions, and subsequently the differences and similarities between governance and management will be clarified.

To start the work of identifying governance functions, here are a few chosen examples from other authors:

De Wit and Meyer (2005) describe 'organisational purpose' as the reason for which the organisation exists, it is influenced by organizational believes, values and the business definition or identity. 'Corporate mission' as the definition of principles that guide strategic choices. In addition they use the following concepts; 'strategic vision' – that shapes the future to which the company aspires and 'governance' - which provides the structure to achieve those. They define three main functions for governance (p. 595):

a) Forming: Influencing the forming of the corporate mission.
b) Performing: Contribute to the strategy process with the intention of improving the future performance of the corporation, and
c) Conforming: Ensure corporate conformance to the stated mission and strategy.

Crawford, Cooke-Davies, Hobbs, Labuschagne, Remington and Chen (2008; 2008b) studied the project sponsorship role and developed a very interesting analytical framework: the Situational Sponsorship Model (p. 76). They describe the sponsorship role as having two dimensions; governance and support. The 'governance' dimension is described as covering accountability, giving directions, critical progress review etc. The 'support' dimension is described as utilizing network ability, provide leadership, maintain relationships and support etc. This is an important contribution. It clarifies many aspects of the sponsoring role – the link between the permanent (business) organization and the temporary (project) organisation. However, their choice of words does not find support in the governance literature. It may be coloured by the language tradition of traditional hierarchical governance. As shown in paper 1, the recent governance literature highlights relations and networks as the most prominent features of governance. Crawford et al. has put the label 'support' on that. The opposite side of support is probably 'command and control' which has the label 'governance' in their

[4] A different approach is found in management literature where governance mechanisms are seen as an integrated part of management, i.e. management has a wider meaning in this literature.

model. This coincides with the more traditional hierarchical governance. In this authors view, the Situational Sponsorship Model is an excellent framework for discussing governance when the complex governance understanding developed in paper 1 is applied, and the dimensions of the model is relabelled as shown in figure 4.2.

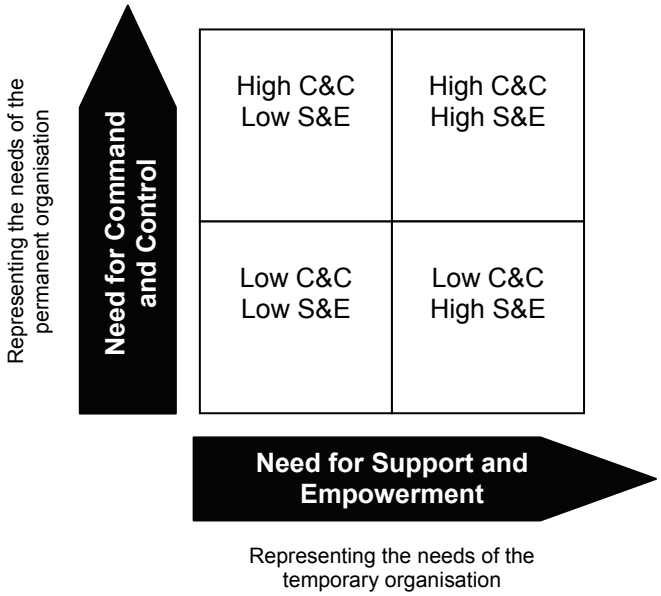

Figure 4.2 The Situational Sponsorship Model (Crawford et al. 2008), relabelled to fit the current meaning of governance represented in governance literature. Both dimensions in the model are included in governance.

The report (Crawford et al. 2008) describes an empirical study of sponsorship in 36 projects in 9 organisations on 5 continents. The conclusion sums up a wide range of different aspects of sponsorship that can indicate governance functions (p. 17-18). Since they basically agree with this author's analysis in the following sections, they are not listed here. Their work confirm the importance of the governance functions and conclude that the role of sponsorship (the 'project executive') is very important, but there remain a need for substantial exploration, particularly in terms of its qualitative effect on project success (p. 18).

Crawford et al. (2008, p. 2-4) describes sponsorship as a link, on the organisational level between the permanent organisation (in this dissertation called the project owner) and the temporary organisation (the project organisation). On an individual level this means a linking function that includes the sponsor ('executive manager', representative of the permanent organisation) and the project manager (representative of the temporary organisation) – of course this function can be divided on more than one person from each side. There is a separate literature concerning the project sponsor. Paper 5 mention some examples but are not included further here. There is also a substantial literature on how projects are linked to the owner/permanent organisation as means of operationalisation of strategies and alignment of projects to strategies. Papers 5 and 10 mention some examples but they are not included further her. In the following, the indications of governance functions found in the papers accompanying this dissertation are described:

Paper 1 includes a discussion of the purpose of governance in the public sector. The benefits to society are created through shaping public policy and providing public goods and services (Kaufmann and Kraay 2007). In private sector, the ultimate purpose is to create value for legitimate stakeholders, shareholders in a shareholder value system (Carver 2001) and a wider set of stakeholders in a communitarian model (Jacoby 2005). The way these values are created is through the selection of goals and the means of achieving them (Jenkins 1978, Thiry 2006), or the ability to make decisions and the capacity to enforce them (Stoker 1998). These indications give direction to the search for the necessary governance functions to make public investment projects beneficial and purposeful. One important issue here is that governance has to support both decision making and execution of projects. But the main indication is pointing towards the core of what governance is about: pointing out the direction, defining purposes and choosing development objectives.

In paper 4 the nature of front-end governance is discussed. Several relevant concepts are described: policy instruments; regulations, economic means and information (Bemelmans-Videc et al. 1998); mechanisms to enhance state capability; and regulations and restraints, competitive pressure, voice, and partnership (World Bank 2000). These findings indicate what measures are available for the responsible part governing development. Paper 4 also cites principles of good governance as accountability, transparency, efficiency and effectiveness, responsiveness, forward vision, and rule of law (OECD 2005b). These are the principles which governance functions have to enhance and support.

Paper 5 discusses the public project owner and uses the Norwegian state as a case. Based on seven project cases, the strategic functions of the public project owner are identified. In the paper the link between governance and ownership is treated as a main issue. Ownership gives control and responsibilities (Foss and Foss, 1999). Control rights point to the right to use, possess and dispose of a resource or asset. Profit responsibility means being responsible for both the cost and income (benefits) related to the resource or asset. From this perspective one conclusion is a strong need for control functions in governance.

Paper 10 focus the pursuit of relevance and sustainability, shown in paper 6 to be the two superior criteria for success as seen from the owner's perspective. Relevance has to do with whether the users actually gets the output they need and uses it. Sustainability has to do with the longer time perspective, whether the effect continues and the benefits for the owner and society is achieved. This point to the need for governance functions focussing operation phase.

Project management literature, one example is Crawford et al. (2008), frequently conclude that the success of projects in general is very much dependant on the actions of owners and sponsors. The findings of National Audit Office in the UK confirm this also for public projects (OGC 2005).

Combined, the aforementioned papers and contributions indicate that there are four categories of governance functions necessary for implementing the governance of projects: one set of core functions and three sets of support functions:

- Functions of policy making and/or strategy development (core functions)
- Functions to support decision making
- Functions to support planning and execution of projects
- Functions to support operations and asset management.

The first level of functions includes the decision making done by the governing party itself. This is superior to the three following supporting categories covering all stages of project development, and extends beyond projects as well. The second category supports the decision making in the front-end, decisions that might lead to projects being started. The first two categories are both vital to the front-end of projects. The third category is concerned with the project itself and is partly relevant to the front-end because a lot of planning activities start early and this is an important part of front-end activities. The discussion in the next sub-sections includes these three categories.

The fourth category is not directly relevant for the front-end as such, though a few comments may be appropriate: There are at least three reasons why one should not overlook operations and asset management. First of all, investment decisions should not allow sub-optimization or wasting of resources. This makes the consideration of a whole life cycle necessary, and in this context the point is that the governance in execution, operation and even disposal stages of the development have to be a part of front-end considerations. Second, the governance in the operation phase has to include considerations of whether the resource or asset invested is still appropriate, adequate or suitable for the further operation in the short, intermediate and long-term perspectives. Hence, disposal of existing assets is an important issue in governance. In some cases this may be the process that sparks the idea that a new initiative or project should be considered and thus initiates the front-end of a new project. Third, the analysis in the front-end is dependent on assessing the effect of the future initiatives. Only by having knowledge about earlier initiatives and their effect can this be realistic. Thus, assessing the effect of previous projects is important for the ability to plan new ones. Still, this falls outside the scope of this chapter and the thesis as a whole, and is not discussed further.

In the following sub-sections governance functions are identified, based on the findings in literature, the papers in this dissertation and the authors own experience. The process represents a top-down approach, in contrast to bottom-up approaches found in most of the project management literature in this field.

4.4.1 Functions of policy making/strategy development

The wording of this section heading points towards both political decision making processes (policy development) and the development of visions regarding what and where an organization wants to be in a future situation (strategy development). The intention is to underline the relevance to both the private and public sector and to allow for limitations according to the scope of this thesis. Chapter 2 concludes the scope of this work does not include the political subsystem, thereby leaving out the political decision making processes as such. Nevertheless, on the administrative side, the governance functions to support this process are relevant and thus included.

The strategy processes to actually formulate and decide on the future visions and objectives, whether at political level or corporate level, are important functions of

governance. Decision making is a core function of governance and thus dominates this category of functions. Table 4.1 shows the most important governance functions of policy making and strategy development.

Making decision is only mentioned briefly, keeping the focus on the support functions, i.e. the methodological side. This is in accordance with the overall purpose of the work. The formulations shown in table 4.1 have no explicit reference to projects, due to the superior level of these functions. They cover all projects, are not linked to any specific project, and not necessarily to projects at all. At this level projects are only one of several ways to organize an initiative. The words chosen in the following comments are directed more towards the public setting than private sector. This mirrors the focus on public investment projects in this thesis.

The functions listed in table 4.1 are all important in supporting the development of a wanted future and creating maximum benefits for society. The first three functions decide the objectives and priorities, based on political processes where representation, power and influence are crucial. The first one is actually internal to the governing body. We will not comment further on these functions here.

The next three functions are the ones covering decision making in the front-end and continue as projects develop, throughout execution and operation. These are the functions primarily supported by the governance functions described in the next sections. From an owner perspective, these functions are the engine that make the wheels go around, choosing development direction and level of ambition, follow-up with making the necessary resources and mandates available for those chosen to execute the decisions, maintaining this empowered position by staying informed, keeping necessary control, and finally having a back-up strategy and responding to the information emerging throughout further development.

The function which makes an efficient development possible (i.e. which reduces friction, controls risks, creates possibilities) is the network aspect, the development of strategic relations and conflict resolution on this strategic level. These strategic relations may be financial (banks and institutions), powerful stakeholders (decision makers, strategic users, authorities, industry level, international, and local), allies (in case of shared ownership), competitors (other parties aiming for the same or similar objectives or resources), or ‘internal’ (the planning party, executing party or operating party). This sums up the governing body’s direct involvement in the development. As pointed out by Bucero (2008, p. 1), sometimes there may be too much involvement from project sponsors, at other times too little. Obviously, there is a balance which has to be found. How to find this balance is a possible topic for further research.

Deciding on the contents of the framework of regulations, the incentive structures and participation comprise what we could describe as the ‘rules of the game’. The term ‘business’, as used in the table heading, covers all aspects of the organizations activities in both public and private sector. As pointed out above, the framework is the main structure of policy instruments and mechanisms to enhance capability to choose and execute successful projects. Establishing a governance framework and supporting system is vital in order to be able to implement these functions. These functions will be in considerable focus in consecutive chapters. Each one of the functions is by

Table 4.1 Governance functions in policy making and strategy development. The first three functions are policy/strategy development, the next three are decision making, and the last five are development of the framework for business.

Governance function	Description	Management follow-up
Empowerment and maintenance of the possibility to act as an effective governance body	Define competence requirements and recruit the right members, organize the governing team.	Support governing body as required
Develop future visions and development objectives	Establishing a setting that makes creation and development of visions possible is an important function	Support governing body as required
Make decisions on priorities between alternative visions and objectives. Communicate chosen option.	The alternatives have to be described and consequences assessed	Alignment to chosen visions and development objectives
Choose development directions and levels of ambitions	Choose among relevant alternatives; choose to stop non-viable or irrelevant alternatives. Make decisions on appropriate basis and in due time.	Secure decisions are followed up with the appropriate use of resources and actions
Empower and maintain efficient follow-up on decisions	Make appropriate resources and mandate available, sufficiently flexible and robust. Develop strategic relationships and resolve conflicts.	Apply resources efficiently and execute mandate. Support conflict resolution.
Respond to emerging information	Have necessary reserves. Respond to new relevant information, making appropriate decisions to maximize potential benefit.	Execute changes to mandate efficiently, securing continued accountability
Decide the framework of regulations	Judicial independence, defining principal roles and responsibilities, budgeting rules, etc.	Adapt to the defined framework and make sure the relevant procedures are put in place and enforced
Decide on the structure and level of economic incentives	Rules for using networks, markets, competition and contracts, etc.	Make efficient use of networks and markets, incentives and contracts
Decide on structure of participation	Decide how, when and at what level which stakeholders are legitimate participants in the development process	Secure the legitimate participation, gathering signals from relevant parties, alignment of expectations and objectives
Decide on the level of requirements for professional standards	Set expectations for how well the work should be done and clarify the values on which they are built	Adapt to the requirements and values; make sure they are assimilated into procedures and practices.
Decide on how compliance to the 'rules of the game' should be confirmed	Define roles and objectives for different watchdog bodies; auditing, reviews and other necessary scrutiny	Ensure that the organization is open to scrutiny, willing to learn, and make relevant documentation available

nature very complex, and will not be explained in detail here. Chapter 5 of this thesis explains these functions more in detail as part of the 'governance framework'.

Deciding on the level of requirements for professional standards is essential on this superior level, not in terms of deciding the details in the standards but in deciding and communicating the expectations as to which requirements have to be met. This includes 'setting the standard' for transparency, accountability, openness to scrutiny, efficiency, and sharing information for improvement and learning. In this respect,

when choosing to focus on the decision, it is indirectly indicated someone has to develop (design or write down) the basis for the decisions and communicate the result in some form of document or management system. This is a management support task which is not mentioned in table 4.1, although the communication part (system development) obviously could have been included as it is a follow-up task.

In the following sections, the functions to support decision making, and planning and execution of projects are on a secondary level compared to the ones explained above. Consequently, some of them are linked to or may even be a sub-division of the functions mentioned in this section. There is an overlap in the sense that making resources available is already mentioned in table 4.1, but these will be specified in tables 4.2 and 4.3. It may also be possible to develop a whole set of functions on several sub-levels, as a hierarchy of governance functions. However, at this point the purpose is to emphasize important governance functions, not to develop such a complete structure in detail. Indeed, the details on lower levels would become context dependant.

4.4.2 Functions to support decision making

The governance functions to support decision making are specifically designed to shape the decision making process and ensure that it is effective. Table 4.2 shows the most important governance functions to support decision making. The formulations do not reveal any explicit connection to projects. In this context the focus is on project-related decisions, but in the front-end these decisions relate more to choosing among relevant alternative projects than one specific alternative. The chosen alternative later becomes 'the project'.

Table 4.2 Governance functions to support decision making.

Governance function	Description	Management follow-up
Design of the decision making process	Define decision gates. Ensure political control with fundamental go/no go decisions	Adapt to the defined process and make sure the relevant basis for decision is prepared
Clarity in priority of issues	Focus on essential matters, not on details. Decide on an evaluation – or design criteria.	Develop documents in accordance to the evaluation – or design criteria
Make resources for planning available	Adequate mandates and resources (budgets) need to be given for the necessary planning and preparation of the basis for decision making	Secure efficient planning processes in accordance with professional standards and expectations
Quality control of documents	Ensure an adequate basis for decisions, making sure professional standards are met	Secure adequate identification of relevant alternatives and proper consideration of their consequences

The governance functions to support decision making appear surprisingly simple when the superior functions listed in the previous section (table 4.1) are in place. The main points are making good decisions possible by ensuring that there is clarity in processes and priorities, resources to do a good job in the front-end, and a formal assessment of the results of planning efforts to make sure the quality of the documents is of high quality and continue to improve over time. However, it is important to note that these functions depend on the wider governance framework, as indicated in the

previous section. If there is no reference to what the professional standards and expectations are, there is not sufficient basis for making these functions work.

The function relating to clarity of issues is an especially important aspect. This function has several meanings in different contexts. In the political decision making process it may point to the individual values and motivations of each person or group involved. In this context it has to do with giving clear signals as to what takes precedence in situations of resource conflict or other situations where a choice is necessary. Paper 6 looks into this issue in more detail, indicating how project evaluations may be handled, both at what are appropriate criteria as part of governance and what methodological options are good choices as part of management. Paper 6 examines the issues in more depth than this chapter and hence it is not accorded more attention here. Rather, it supplements the issues covered here. Further, the content of paper 6 is referred to, and is also relevant to the discussions in chapter 7 on projects, yet still the natural place to comment on this paper is here. The reason is that paper 6 covers the process of evaluating and the evaluation criteria themselves, which is on a level above any single project.

4.4.3 Functions to support planning and execution of projects

While functions to support planning and execution of projects are specific to projects, they may also have parallels with other initiatives which are not organized as projects. Some of them are part of a bigger issue where the project or programme is just a small part of the total equation (just as the financing of a project is part of a budget process, or when a certain investment in an environment friendly technology is part of a wider development of an environmental policy). Table 4.3 shows the most important governance functions to support planning and execution of projects. With reference to the upcoming discussions in chapter 7, the execution of projects also includes detailed designs for the project results.

The functions listed in table 4.3 are not described in detail. This mirrors the superior perspective of the governing party, which in this setting is specifically the owner. The perspective is wide and the functions are principal. Most details should be handled on a lower level (at an appropriate level of management). Still, there are elements that may be broken down into more detailed sub-functions. Some of them may be context dependant.

Most of these governance functions are well known from management and project literature. A frequent problem is understanding the interface between governance and management. What functions are supposed to be matters for governance and what functions are matters for management? In table 4.3 this becomes clearer. The main focus in table 4.3 is the description of the core aspects of the governance functions. The column headed ‘Management follow-up’ is similar to what are described as the principles of project management. It is important to understand this divide between governance and management when trying to make roles and responsibilities clear. This is an important issue which deserves more attention than it usually receives. However, it is not discussed further here. Still, it would be worthy of a separate study in its own rights.

Table 4.3 Governance functions to support planning and execution of projects.

Governance function	Description	Management follow-up
Decision on project definition	Choose the relevant objectives and communicate priority	Secure alignment of objectives; operationalisation into goals and targets.
Approval of project design (choice of concept)	Approve the choice of appropriate means to achieve the objectives	Further develop a consistent project design, realistic cost estimates, strategies for execution and adequate plan (steering document).
Approval of the steering document	Ensure the basis for managing the project is complete, realistic and adequate	Secure the appropriate means are used in an efficient way, producing the intended output.
Decision on project financing	Make the necessary resources available (budget), with clear terms and preconditions (assumptions)	Secure access to the decided resources; secure accountability and transparency on their use
Draw up the mandate for commissioning of new assets	Adequate mandate needs to be given for the commissioning of the project, committing the owner	Secure efficient execution in accordance with professional standards and expectations
Monitor progress	Continuously awareness of the development, ensuring progress is as planned	Keep track of progress in delivery (quality, cost, time), measure progress and report
Being prepared to make changes	Watch for signals of unexpected development, early warning signals, look for potential added benefits. Keep an emergency plan.	Inform the owner when there is information indicating potential need for significant changes, and also their implications. Assess the consequences of change. Execute changed mandates.
Benefits realization	Ensure potential benefits (both anticipated and new ones) are being followed up and made a reality	Prepare to phase outputs into operation

Besner and Hobbs (2006, p. 14) concluded that the activities in the initiation phase (in this dissertation the term ‘front-end’ is used) and other phases are very different, pointing out that current project management standards (such as the PMBOK® Guide (PMI 2004)) underestimate these differences and thus generate confusion. A comparison between table 4.2 and table 4.3 supports this view. The governance functions described for these two stages of development is very different. Attempting to implement governance in accordance with the descriptions presented in table 4.2 in project execution would certainly not be sufficient, whereas implementing governance as described in table 4.3 in the front-end would probably be too rigid for development.

The most important governance functions in table 4.3 are probably the initial decisions and issuing of the mandate. If mistakes are made here, nothing will be able to compensate for the bad start. Later in execution, the different governance functions may to some degree compensate for each other. It is possible to have success with a rigid monitoring and control-based governance, and it is possible to have success with an agile, flexible adaptable approach without rigid monitoring and control. The art is finding the right mix of these functions in accordance with the needs in the actual situation.

The functions at the bottom of table 4.3 are mentioned in order to ensure there is a complete picture of principal governance functions to support the planning and execution of projects. These are rarely part of the front-end. The last function listed points towards the involvement of management, users and resources from the operational stage. Again, a reminder may be appropriate: assessments in the front-end have to take all stages of the life-cycle and all aspects of the situation into consideration.

4.5 Conclusions on governance functions

As the discussion in the previous sections has shown, there are several levels of governance, which correspond to multiple levels of management. In this dissertation the scope is limited to the superior level; the owner perspective down to the level of organization where the project links to the permanent organisation. The discussion also finds governance important in all stages of development throughout the life-cycle. In this thesis the scope is limited to the front-end. This makes it possible to simplify and illustrate governance by only having two levels:

- the superior level which defines the development objectives and decides the 'rules of the game'
- the project-related level which makes decisions about projects (and supports the planning and execution of them).

The focus in this dissertation is public investment projects. This choice influences the choice of words in the following. It can be translated to a private sector context.
On the superior level, the most important governance functions from a general perspective are to develop visions of the future and choose the direction and level of ambition of development. Without this there can be no governed, purposeful development. Further, in a perspective limited to projects, the decision about how regulations, incentives and information are supposed to create purposeful initiatives on behalf of society is most important. Without this the rules of the game are not predictable, and there cannot be any control with the use of society's resources. This will surely lead to projects which are out of control, resources being wasted, and individuals and groups making fortunes at others' expense. This set of principles and structures are implemented through the governance framework. After the governance framework has been established and put to work, the other functions may take the lead as most important. The governance framework comprises a wide set of governance functions which will be explored more in detail in chapter 5.

The research question at the outset of this chapter asks what functions ought to be carried out by governance systems that govern the front-end of major public investment projects. Given that a governance framework (the system) has been designed and implemented, the following governance functions are important for choosing the right concept/alternative and successful initiation and execution of a project:

Governance functions supporting decision making in projects have to include:

- defining a clear decision making process

- making priorities of vital issues clear and communicating them
- making resources for necessary planning available
- controlling the quality of documents used as the basis for decisions.

Governance functions supporting planning and execution of projects have to include:

- deciding on project definition
- deciding to finance the project
- approval of project design
- a mandate to commission the new asset
- monitoring progress
- being prepared to make changes
- making sure benefits are realized once the outputs are delivered.

Which of the functions supporting projects are most important cannot be logically deduced from this context-free basis. This depends on the state of things at the outset. If one of these functions is not established, then the other ones will hardly make sense. Rather, they constitute a whole body of integrated functions. Any of these governance functions can be performed differently, organized in several ways, different units may be responsible for them, and so forth. These issues are not discussed here. The functions should all work through the most effective combinations of (formal and informal) hierarchical arrangements and relational network arrangements (markets and alliances).

From the above, the most important functions expected to be carried out by the supporting governance system are identified as:

- *defining a clear decision making process*
- *controlling the quality of documents used as basis for decisions.*

More aspects of governance functions are discussed in the consecutive chapters and several of the papers in this dissertation.

4.6 Validity of the study of governance functions

The research reported in this chapter includes the use of several methods and perspectives. The content is based mainly on written sources such as literature and documents. More specific elements of governance are investigated in all the accompanying papers, but specific findings from papers 1, 4, 5, 6 and 10 are mentioned here. Each one of these papers include the use of a wider set of methodologies, including case studies, group interviews and group techniques. The results of all these approaches are combined in this chapter.

The analysis process was performed like this: First a general understanding of the concept front-end governance where established through literature studies, ref. paper 4. This formed the basis for, at the same time, defining the research questions and which subject was going to be focussed in papers. Then a period of more comprehensive literature study gave more intimate and detailed knowledge of the issues in focus (governance). This happened for several papers in parallel, and papers

1, 5 and 6 was most important here. As indicated in section 4.4, the over-all pattern became evident by overlooking the results of all the papers. When first the main categories of governance functions were identified, it was fairly easy to identify the potential governance functions by deduction. This was then 'tested' by comparing against documented case studies in literature and the authors own experience. This inductive process mostly gave confirmation but also initiated some changes in tables 4.1, 4.2 and 4.3. These tables are the main result of the work reported in this chapter. Then in the end, the author assessed tables 4.1 and 4.2 in particular to find, logically, with the chosen assumptions, which was the most important.

The validity of this study is considered to be good. The study into governance literature is rather comprehensive and covers a wide range of contributions. Major contributors to the governance literature are included, as well as major contributors to project management literature on governance related issues. The available material is enormous. There is no chance to cover it all. The literature sample is believed to be adequate. The access to documented cases is limited, and so is the author's own experience in this field. This limits the strength of the triangulation effect, since one side is stronger than the other.

This analysis was mainly performed during the authors stay in UK, the winter 2007-08. During the PMI research conference in July 2008 the work by Crawford et al. was announced and their report, although with a different focus (sponsorship), a different approach (bottom-up) and from a project management perspective comes to a quite similar result (2008, p. 18-19), although without the structure present in this dissertation. The author considers this a strong confirmation that the results are valid and reliable.

5 Governance frameworks

This chapter specifically addresses the second research question referred to in chapter 3.1: *How can a governance framework for major investment projects be designed?* This chapter defines the term governance framework, and discusses governance frameworks for projects. A governance framework is needed to implement regulations, incentives and information in the owner's perspective. Governance frameworks are described by the development process (the story), the embedded governance principles (the values), and the framework elements (the structure). This description is also useful as an analytical tool. The research question is approached on a basis of established understanding of governance frameworks built up by studying existing frameworks in Norway and UK. The two basic design strategies are; *unique design* (starting with 'blank sheets') and *model framework design* (copying and adapt from existing frameworks). Several support strategies are available; a system approach, design by 'design criteria', and design based on a 'theoretical model'.

5.1 Definition of the term governance framework

There is an amazing plurality of terms used to describe relevant aspects of governance in terms of structure, regulations, markets, etc. Some examples are as follows:

- Koch and Buser (2006) use the term 'metagovernance' to describe a 'regulatory framework', and point out that it originates from political science, where it overlaps with 'governance of networks' (p. 551).
- Several authors hold that 'institutional regulatory frameworks' are vital to allow sustainable development of economy and environment together (Stiglitz 1998; Kovel 2002; French 2004; Næss 2006).
- According to Miller and Lessard (2000, p. 7), 'Front-end engineering of "institutional arrangements" and "strategic systems" is a far greater determinant of the success or failure of Large Engineering Projects than are the more tangible aspects of project engineering and management'. Later, Miller and Hobbs (2005) used the terms 'governance regime' in a similar meaning.
- Flyvbjerg et al. (2003, p. 118) write 'The "regulatory regime" is here seen as encompassing not only the economic rules regulating the construction and operations of a possible major project and other economic rules which have a significant bearing on the financial and economic performance of the project, but also the rules regulating the complementary investments that will be required in order to ensure a rational use of the project.'.

- Winch (2006) says a project belongs to a broader 'governance framework' that includes the context of incentive systems and distribution of risks and resources in the market. Such a context includes both economic actors and political actors.
- Turner and Simister (2001) argue that selection of appropriate 'governance structures' for a project should be based on incentivization through contracts. Turner and Keegan (2001, p. 263) follows up by pointing out these governance structures may be based on market, hierarchy or a hybrid form.

In addition to these examples, are of course the many different forms of management systems on different levels, 'project management systems' being an obvious example. In the following, an attempt is made to simplify the use of terms. As already evident in previous chapters and the headline of this chapter; this author chooses the word governance framework (on one or two occasions 'institutional framework' is chosen for specific reasons).

Governance and other terms related to this subject are defined in paper 1 and chapter 4, where several meanings have been identified. This chapter focuses more on the operational side of these issues. As shown in chapter 4, the view in this dissertation is that this context should include hierarchy, market and partnerships as regulating mechanisms. Governance refers to both formal and informal arrangements, and it involves a set of relationships between management and owners, other stakeholders and the structure to set objectives and means and monitor performance. Governance is complex, but understood from chapter 4 and paper 1.

The term 'framework' also has more than one meaning. It may refer to a 'theoretical framework' – a tool for analysis, or a reference for discussion. The description of the generic structure of a governance framework shown in figure 5.1 (the distinction between frameworks and system, and the implicit-explicit dimension) is an example of such a theoretical framework. It may also have a more specific meaning, namely a framework within which a function or set of tasks has to be operated. In this chapter and in the corresponding papers the latter interpretation is used. This is similar to the many examples above. The differences between the examples are in most cases found in the description of scope (content of the framework) and purpose of the discussion it originates from. It would probably not be appropriate to use the term governance framework in all the settings represented above.

In its specific meaning, a framework may have many dimensions and aspects. It has informal dimensions (implicit and not based on written regulations) and formal dimensions (structural elements and written regulations). Figure 5.1 show some of these aspects in summary. It is relevant to make a distinction between the 'value' aspects (ideas, beliefs, norms, and principles) and the 'system' aspects of a framework (rules and structure). The reason for this will become clearer later on.

Figure 5.1 shows that structure is the dimension where frameworks and systems meet. A system intended to work within the framework should have compatible structure with the framework and even more fundamental, its procedures should be based on compatible values and principles. As shown by Klakegg et al. (2009), the framework typically defines *what* to achieve and the system typically defines *how* to achieve it. In the context of this dissertation (public investment projects), a governance framework

is installed by a government (the owner) to secure successful investment projects. As a consequence the management of a subordinate entity (organization, corporation or project) installs an appropriate management system to control operations within their area of responsibility. Thus, a governance framework is a set of fundamental values and a structure containing regulations, economic means and information through which governance is implemented.

	Implicit		Implicit or Explicit			Explicit			
	Ideas	Beliefs	Norms	Principles	Rules	Structure	Procedures	Methods	Tools
Framework:	X	X	X	X	X	X			
System:						X	X	X	X

Figure 5.1 Relations between the concepts 'framework' and 'system'. X marks elements included in frameworks and systems. Structure is the one element found in both. Framework in the meaning used here belongs to a superior level compared to systems. A framework specifies principles and rules whereas a system operationalizes them as procedures and tools etc.

5.2 Governance frameworks for projects

In the following, governance frameworks are discussed in the specific context that they apply to projects. There may be other governance frameworks established by relevant authorities which the project management also has to accommodate. The governments of several countries have chosen to establish a formal governance framework for major public investment projects. The general purpose seems to be improving their way of handling these projects to secure more value for the public funds spent on investments. As shown in paper 7, both Norway and the United Kingdom believe in a framework established as a common resource and support for all major projects within a portfolio. This is clearly a case of instrumental-structural initiatives backing up an economic-rational perspective. At the same time, they have elements which are best explained in a cultural-institutional perspective, in the sense that they are implemented to modernize and improve the governing organization. Klakegg et al. (2009) discuss these aspects more in detail.

In the same report is also proposed the following definition of a governance framework for projects: 'an organized structure established as authoritative within the institution, comprising processes and rules established to ensure projects meet their purpose'. An organized structure means it is put there for a purpose, defines structures, roles and responsibilities, etc. The meaning of 'authoritative within the institution' is that it is anchored on a high level and has a strong position, but is limited to the institution within the boundaries of which it is supposed to work. The words 'comprising processes and rules' refers to its explicit content to ensure 'projects meet their purpose', which is the purpose of the framework. The project meeting its purpose is a way of defining its success – the governance framework is successful if the projects meet their purpose. It implies both delivering the relevant solution in an effective way and achieving a sustainable effect. The definition covers

the system aspects of the framework very well, but the value aspects are not explicit in the definition. Thus, the following adjusted definition is proposed here:

> *A governance framework for projects is a set of principles and an organized structure established as authoritative within the institution, comprising processes and rules established to ensure projects meet their purpose.*

It is important to note that 'principles' have to be understood in a wide sense; from implicit ideas to explicit procedural rules. The terms 'governance principles' and 'principles of good governance' have been used with a similar meaning by several authors. 'Structure' also has a wide meaning, and includes key roles and responsibilities as well as more systemic elements, although clearly not including detailed methods and tools (see figure 5.1). A governance framework for public investment projects may represent a common framework for all (major) projects, such as in the one implemented by the Office of Government Commerce in the UK and Ministry of Finance in Norway, or it may represent a sector-specific framework such as the one implemented by the Ministry of Defence (MoD) in the UK or the Health Regions in Norway. See papers 7 and 8 for more details on these frameworks, with the exception of the Norwegian Health Regions' governance framework, which is only mentioned here as an example.

Referring to Prince2 (CCTA 1996), Turner and Keegan (2001, pp 262-263) gives a strong argument for a governance framework by pointing out that governance mechanisms need to be in place across the entire project process. They address the interrelationship between the client, supplier and project. There is a need for governance framework because there is a bilateral (multilateral) interdependency and contracts are inevitably incomplete. This creates an environment for opportunistic behaviour. To secure a holistic view of the process and to be able to manage the risk involved, there is a need for controlled adaption (using configuration management) and a governance structure. This argument is based on transaction cost economics, and holds also in the wider perspective of this dissertation.

Eskerod et al. (2004) show that, in practice, small projects are excluded from governance, upper level decision making and portfolio management. In practice, smaller projects are not included when implementing governance frameworks, for operational reasons (mostly lack of resources). Accordingly, this dissertation does not discuss smaller projects. However, governance of projects (as a concept) has to be relevant to projects of all sizes and characteristics, and thus the accompanying governance frameworks should ideally be able to handle projects of all sizes. A typical element of a governance framework is a 'stage-gate' or 'gateway' process in which the projects are subject to scrutiny – typically at decision points in the development process. Cooper et al. (2003) suggest that all projects should be subject to a stage-gate[5] process due to the fact that all projects take up resources.

[5] Stage-gates are also called gateways, gates, decision points, authorization points etc. Stages in the development where there usually is some sort of assessment and a decision whether to continue.

Some authors question the idea of having a common framework:

> A specific governance regime must adapt to the particular project and its context. The approach taken is, therefore, not the design of a governance regime but rather the identification of design criteria that should be brought to bear when developing a governance regime for a mega-project. Several of the criteria contrast to the traditional conception is that governance is a static, binary, hierarchical process. Governance regimes for mega-projects are time-dependant and self-organizing. They involve a network of actors in a process through which the project concept, the sponsoring coalition, and the institutional framework co-evolve. (Miller and Hobbs, 2005, p. 49)

Miller and Hobbs used the description of project governance to enter into a 'systems thinking' approach, not unlike the one used here. Their work was based on large engineering projects of a scale equivalent to mega-projects (definitions are discussed in chapter 2). This dissertation includes, but is not limited to, mega-projects. The focus follows that of the Concept research programme; major projects (projects with a proposed budget of NOK 500 million (USD 80 million or more).

In this dissertation the fundamental assumption is that there is a need for the stability and common regulations embedded in a governance framework. At the same time, the idea that the real mega-projects are of a different class which in many cases may demand individual adaptation is accepted. Mega-projects often cross boundaries between different governance frameworks (countries, states, etc.), and if for no other reason, adaptations may have to take place to handle this. On the other hand, a governance framework may be flexible enough to handle mega-projects as well. Arguing for flexibility, I suggest that a governance framework should be so fundamental that all parties involved accept it as a necessary basis and expression of the expected level of governance. Additional elements should be added to provide for extra reporting and control needed to concur with demands in the multi-owner situation (i.e. two countries, etc.), and small projects may be treated by simpler means.

The dissertation focuses on governance, and uses single projects as examples, not programmes or portfolios. Governance of projects needs to look at the overall portfolio of projects and projects that are interlinked in a programme of projects. These contexts are implicitly included. The governance framework is the basis for handling all levels of management systems. One future challenge would be to develop an integrated management framework appropriate to handle all these levels.

5.3 The structure of governance frameworks

Governance frameworks are defined, designed and described very differently (Klakegg et al. 2009). There is no standard format available. Framework elements with similar purposes may seem very different and thus hard to compare and maybe even doubtful if they are suitable for comparison. In this chapter a theoretical framework for analysis and comparison of governance frameworks are presented in table 5.1. The framework was first developed and published by this author in Klakegg et al. (2009). A simplified version is shown in paper 7. It was originally developed as a set of general characteristics for describing governance frameworks.

Table 5.1 General characteristics of a governance framework (Klakegg et al., 2009).

Category	Theme	Explanation	Characteristics (examples from the complete list)
1. The process of develop-ment	Background – why and how the framework came to be	Set the stage to understand the context and explain the framework's initiation and development up to the current edition	- Political setting (who was in power, democratic system, political traditions) - Administrative setting (who was responsible for what, different sectors, etc.) - Social economics (economic situation at the time of initiation, trends) - Traditional market mode of operation (transactions or relations, sectors) - Initiators (who initiated, who made the decisions) - When the framework was officially introduced (previous and current editions)
	Explicitly stated purpose of the framework	Identify the official policy, the statement the framework is funded on	- Any explicit statement of purpose (political), made by the decision makers
	Current status and how the framework is maintained and developed	Identify how the framework is implemented, improved and developed	- Political and administrative anchoring (who is responsible, and who are the important stakeholders) - Policy/strategy of implementation - Policy/strategy of further development and assessment of the framework - Results of the implemented framework (performance measurement, evaluations)
2. Embedded governance principles	Governance principles	This part includes descriptions and characteristics of embedded governance principles	- Establishing a common world view for individuals' actions - Establishing a system to stabilize key players' orientation, expectations and rules of conduct - Differentiation between projects based on complexity, asset specificity, uncertainty, criticality, other factors. - Mechanisms (e.g. practices or models) to reduce complexity and distribute risk - Mechanism to trigger governance processes in response to turbulence in the project environment
3. The structure of the framework	Current structure of the framework	Describe and define the current framework structure	- Explicitly stated ends/goals for the framework (or/and responsible party) - Users (sectors, levels, etc.) - Framework elements (control measures, arenas for coordination, etc.) - Framework structure (how elements interact, the timeline) - Vertical and horizontal integration (level of integration, value chain/supply chain, across sectors) - Extent and control of independent/outside engagement
4. Detailed governance elements	Framework elements concerning relevance and sustainability	Descriptions and characteristics of framework elements concerning relevance and sustainability in early phases of the project	- Explicit statements or framework elements specifically addressing the choosing of a relevant project with sustainable effect. - Specific governance principles concerning control of execution in order to secure relevance and sustainability in projects - Systematic analysis of the effect of the projects
	Etc.	-	- (Expand when needed.)

Learning from history includes the need for comparing different concepts, arrangements and systems. A philosophy and systematic schema for comparison is needed in order to make relevant comparisons. The general characteristics define a structure for comparison and analysis. These three aspects of the governance framework are basic in comparison:

1. The development process (the story)

2. The embedded governance principles (the values)
3. The framework elements (the structure).

The development process is needed to understand the purpose of the framework and how it came to be, i.e. its development and status. This is the link to its history and context, the situation in the business and policy of the corporation or country in question, triggering incidents and purpose of the framework.

The embedded governance principles are fundamental for understanding how (and why) the framework is intended to work. They explain the principles or values (the 'interior'). They are often not expressed explicitly. Still, these are the important basic rules of appropriate behaviour, i.e. how business is done.

The framework elements – its elements and how they are defined and interact – defines the framework as such, i.e. the system side of it. It is the 'exterior' of the governance framework – the roles and formal responsibilities, the system and tools – as explicitly expressed by the owner or governing body. There may be reference to several systems and layers of systems and/or tools in a framework.

In a comparison it is necessary to choose carefully what to include and what not to include at the structure level. Hence, it is suggested that it is worth having a second, more detailed level of comparison of the frameworks. The general level is limited to the necessary main elements needed to recognize and understand the main function of the governance framework, leaving the second level to focus only on the specific elements relevant to the comparison in question. This defines a flexible main structure which can be adapted to any investigation into governance frameworks. Table 5.1 shows how the general characteristics of a governance framework can be presented. The flexible part is used to indicate a connection to the profile of this dissertation, i.e. the pursuit of relevance and sustainability in projects. Any governance framework can be described according to this structure and this makes several analyses possible. Such analyses are included in papers 7 and 8.

5.4 The functions and contents of governance frameworks

In order to identify the functions assigned to existing governance frameworks three different governance frameworks were studied in the United Kingdom and Norway. The analytical tool was the structure shown in table 5.1. The study was based mainly on document studies and in-depth semi-structured interviews. Even four case-studies (looking at projects) where added to make sure the way these frameworks function was well understood. Klakegg et al. (2009) report more details, including comparison of the development processes, embedded governance principles, and the framework structure and elements. Papers 7 and 8 show some of these details. The comparison here differs from that in the original report (Klakegg et al. 2009). The comparison made for this dissertation is limited to the identified main governance functions from chapter 4. Table 5.2 shows the characteristics of the frameworks compared. First, a brief introduction to each of the governance frameworks as a help to understand table 5.2:

The Norwegian governance framework – the Quality Assurance Scheme – was described briefly in section 1.2. Some of the papers accompanying this dissertation explain other aspects of the Norwegian framework. The Ministry of Finance established the Quality Assurance Scheme in year 2000, later expanded in 2005. It includes all public projects with an expected cost of more than NOK 500 million (USD 80 million), with the exception of the oil and gas sector. The core element of this framework is independent reviews of documents at two important stages of development, done by external quality assurance consultants under a framework contract with the Ministry of Finance.

In the UK, the Ministry of Defence (MoD) has established the Acquisition Operating Framework (AOF) based on the existing CADMID process from 1998, upgraded in 2007. This framework is specific for the defence sector and represents a quality system for defence acquisition activities. The focus of the whole system is contribution to defence capability in an extended life cycle. The reviews in the MoD framework, performed by defence personnel who are independent of the project in question, are critical assessments of the decision basis in the form of a complete dossier put forward to a professional decision making body, the Investment Appraisal Board.

In UK, the Office of Government Commerce (OGC), a part of HM Treasury, was set up in 2000, and introduced the OGC Gateway Reviews soon thereafter. The OGC has since further developed and expanded their methods and tools continuously. Their framework was given a major renewal in 2008 following expanded responsibilities and updated policies, but the analysed version is from 2007. It spans all public sectors and has a clear focus on the business case throughout. Value for money is what reviewers are looking for. Their job is to give good professional advice to the Senior Responsible Owner (SRO).

The following is a brief summary to illustrate the findings related to the governance framework and particularly to the supporting functions. The process of developing the governance frameworks is omitted here and only elements directly identified as connected to the supporting the main governance functions from chapter 4 are mentioned. The comparison here is limited to the specific questions addressed in this dissertation.

Table 5.2 reveals some common features and differences between the three frameworks:

- All frameworks in the comparison cover the governance functions most frequently associated with the front-end.
- All frameworks address ‘value for money’ as a superior criterion but expressed in different ways.
- All frameworks include independent reviews, with different degrees of external/internal reviewers.
- All frameworks have a main gateway addressing the final Go/No-go decision.
- With the changes to the OGC framework in 2008, all these frameworks are mandatory and include control of a defined set of documents.

Table 5.2 Comparison of three existing governance frameworks in Norway and UK.

Governance function	Norway	UK MoD	UK OGC
Defining a clear decision making process	2 gateways Roles partly defined Strong political anchoring Needs to pass control to be allowed to proceed to decision makers	2 gateways Roles explicitly defined Clear institutional anchoring Gate is a hurdle to cross	6 gateways Roles explicitly defined SRO sole contact point Recommendations given, SRO free to choose to apply them
Making priorities of vital issues clear and communicating them	Clarity in project design (needs, objectives, requirements, and anticipated effects) focussed in QA1. Benefit/Cost referred to as evaluation criteria Clarity in priority of objectives in QA2	Contribution to defence capability is main priority 'Value for money' criteria	Business case is focussed 'Value for money' criteria
Controlling the quality of documents	Mandatory control Documents defined Control rules established Review role defined External assessment Control of inputs and use of method Independent analysis of benefit/cost-factor in QA1 and cost estimate in QA2	Mandatory control Complete dossier defined Review role defined Internal assessment Assessing outcome within programme	By influence* Documents defined Review definitions and guidelines available Review role defined Mainly external assessments, partly internal in some sectors Assessing accordance with business case
Deciding on project definition	Project definition explicitly part of documents to be controlled	Project definition explicitly part of documents to be controlled	Project definition explicitly part of assessment
Deciding to finance the project	Main focus of QA2 Review report directly used to support the decision	Main focus of Main Gate Review report part of complete dossier	Main focus of Gateway Review 3 Review report available for SRO
Approval of project design	Project design explicitly part of document control. Accepted to proceed to gate if meeting professional minimum standard	-	-
Monitoring progress	-	Integrated part of system	Integrated part of system
Make sure benefits are realized once the outputs are delivered	Management of expectations – 'you will be measured against this'	Extended life cycle perspective Integrated part of system	Gateway 4; readiness for service Gateway 5; benefits realization

*This became mandatory in 2008, as the OGC position was made more powerful.

Common features, continued:

- The Norwegian QA scheme and the MoD AOF (Acquisition Operating Framework) both define formal gateways as part of a decision making process. The OGC gateway framework is more loosely coupled to the formal decision making process.
- The Norwegian QA scheme and the MoD AOF both produce review reports as a direct support for the decision making process. The OGC gateway reports to the SRO who then decides whether to apply the findings in the decision making process.

- The UK MoD and UK OGC frameworks have a more explicit whole life (expanded life cycle) perspective on projects than the Norwegian one.
- The Norwegian governance framework is limited to the front-end of projects, whereas the UK MoD and OGC frameworks also support execution of projects and have separate elements addressing operations and benefits realization.
- The Norwegian governance framework has a strong political anchoring whereas the UK MoD and UK OGC frameworks seem weaker on this point.
- The UK frameworks have a strong focus on accountability. The frameworks include governance in execution and in the operational stages of development. The Norwegian framework does not.

- The Norwegian framework explicitly addresses both the project definition (objectives) and the project design (means as part of the needs – goal – means – effect causal chain). The design is implicit or not mentioned in the two other frameworks, although project definition is clearly addressed in all of them.
- The Norwegian framework has a strong focus on transparency. Review reports are available for all decision makers, the owners and the project, as well as being accessible for researchers and even the public once the document has been presented to Parliament (QA2). The two frameworks in the UK seem weaker in this respect. In the case of the MoD framework, this is due to its position in an internal integrated system within the Defence sector. In the case of the OGC framework, it is due to its limited distribution of the review report (only to the SRO, who in turn may share the information).

These findings may be summarized as follows.

The Norwegian Quality Assurance Scheme has the characteristics of a pure front-end approach, a simple control measure in a powerful position. It can probably be described as a minimalistic and pure governance framework.

The UK MoD Acquisition Operating Framework has the characteristics of an internal quality assurance system where governance and management system is integrated. It covers the whole life cycle and has a powerful position within the organization.

The UK OGC Gateway process has the characteristics of a complex system where the boundaries between governance and management system are not all that clear. It covers the whole life cycle. The position relative to the decision making process is rather unclear, but its position will become much more powerful as a consequence of the changes taking place in 2008.

5.5 Design of governance frameworks

Governance frameworks do not just appear, they have to be designed. Once they are established, they can either continually be improved or periodically redesigned to stay up to date. There are several design strategies available. The two basic strategies are:

- *Unique design:* starting with 'blank sheets' and designing a framework to fit a specific situation guided by own experience.
- *Model framework design:* copying main structures, etc., from a preferred existing framework and adjusting and/or supplementing to adapt to the specific context.

In addition, there are several support strategies, all of which can be combined with the basic design strategies above:

- System approach: design based on existing situation and using a process and structure based on system thinking or systems engineering. The system approach may apply to the development process, the system structure/elements, or both.
- Design by 'design criteria'.
- Design based on a 'theoretical model'.

Basic design strategies:

A unique design is chosen for the process of creating something entirely new without giving too much consideration to what others have done before. This development strategy may create novelty and a well-adapted framework, but may also result in 'reinventing the wheel' and thus unnecessary use of development resources. This process is close to the process used by the Norwegian Ministry of Finance to establish the Quality Assurance Scheme. This process is partly described in paper 7 and more completely covered in Klakegg et al. (2009). It involves creating a new framework based the specific needs at hand and the situation at the time of development.

A model framework design is close to what the Office of Government Commerce adopted when taking the existing system from GEC and transforming it into a governance framework for all sectors in the UK government (Gershon 1999). This is described in Klakegg et al. (2009). This strategy is efficient, but may give some unintended effects if the adaptation is not done well. The considerations mentioned in section 5.5.1 are especially important when using this design strategy.

Support design strategies:

A system approach is represented by an example of redesign is given in paper 9. In the example the Norwegian QA Scheme is redesigned to identify potential improvements. There are several approaches available within the frame of systems thinking and system engineering, and several of them can be used. What is the most appropriate one will depend on the purpose of the development and the state of the existing governance framework. The specific approach used in paper 9 is a development process called the 'six-step model' (Fet 1997). In addition, the systems approach is used in defining systems, identifying indicators and performance criteria. The process

reported in paper 9 is a theoretical one, and has never been implemented. Using existing system thinking or systems engineering methodology is advantageous. These methodologies are well proven, systematic and supported by tools. This design strategy may be combined with both of the previous strategies.

Design by 'design criteria' was proposed by Miller and Hobbs (2005, pp. 47–49), who concluded that a flexible governance structure is needed due to the episodic nature of the project development process and the uncertainty that follows with it. Their argument is that because the governance structure will undoubtedly change, there is a need to think in terms of a flexible strategic process instead of a single mega-project governance structure. This process will produce a governance structure for the specific mega-project in question. Such governance structures are time-dependant and self-organizing. They involve a network of actors in a process through which the project concept, the sponsoring coalition and the institutional framework co-evolve. As a design strategy this is only applicable to mega-projects, or what Miller and Hobbs called large engineering projects – the category of projects so large, risky and political that such projects have to find a new path through all stages of development. Applying this strategy to a normal category of projects will create a confusing variety of governance structures and represent too much work to be efficient.

The 'theoretical model' approach has yet to be developed, but a first step is taken in section 5.5.2. One option could be to design a framework according to the structure in table 5.1. This idea is not pursued, as there is little support in this structure apart from serving as a simple checklist. However, it could be helpful as a tool in a design strategy, where the characteristics of a governance framework presented in table 5.1 could help structure information about existing governance frameworks.

5.5.1 Model framework design – transfer of framework experience

A framework or a system designed to work in one specific context may not easily be transferred to a different context. Klakegg et al. (2009) analysed three governance frameworks thoroughly and conclude that there is a need to be careful when transferring experience from one setting to another. The reason is the context-dependant nature of the frameworks involved. It is nevertheless useful to study frameworks in other contexts to learn about possible choices and solutions. This is important when designing a new framework or improving existing frameworks. When implementing elements of a governance framework in other geographical places and in different historic and cultural situations than what it was designed for, the effect is not necessarily the same as originally intended. Obviously, trying to simply copy the framework from one place, setting and point in time to another will not be a simple way to success. Some of the main considerations are identified in table 5.3, and it is indicated that there are different levels of freedom of choice in these processes.

When designing the development and implementation process, the freedom of choice is great, but it is a bounded freedom. The choices have to fit in with all of the elements already in place, the current situation, and all the bearings created by history. This is where there will be a need, not only for objective knowledge of governance frameworks and management systems, but also for the skills and talent to make it happen, taking into consideration political issues such as power and also organizational issues such as motivation for change. This is definitively the most

challenging part of the whole problem area. A failure in choosing viable solutions for the process will at best waste resources (time and implementation cost) without achieving the intended effect. At worst, it may destroy the existing positive qualities and result in an even worse situation than before.

There is least freedom of choice when it comes to governance principles. These are dependant on the whole set of thinking, i.e. the business philosophy, and any choice breaking with this would be risky. The consequences would be difficult to oversee and could lead to major misunderstandings and failure of the whole framework.

Table 5.3 Main considerations in transferring framework experience from one context to another. (Adapted from Klakegg et al 2009.)

Aspect	Considerations	Relevance
Development process	National culture Administrative culture Tradition	This is necessarily unique in each case. No country or corporation will ever have the same starting point or cultural premises.
Governance principles	Regional business and government thinking Administrative culture	This is especially important when transferring to outside Western developed countries. This basis may be developed in the direction of a standard platform for a region with a similar business philosophy.
Framework structure	Purpose/Objective Organizational structure/competence Administrative culture	These are important choices and have to work together with remainder of existing systems and procedures. In this area there is potential for developing a governance 'toolbox' with standard elements to choose from.
Governance elements addressing sustainability and relevance	Administrative culture Management culture/style Competence	As the framework structure above, but with an even wider range of potential choices.

When it comes to the framework structure elements, the freedom of choice is large, and becomes increasingly larger the further down one goes towards operative management level. At this level there are several appropriate choices and none of these has the potential to disturb the whole system; any failures can be corrected later. In this area the number of available choices is big, but not infinite. There could be potential for standardizing a set of good choices within a specific set of presumptions. In this way, each development of governance frameworks could start with a menu of proven choices to choose from, or at least be inspired by, instead of starting with blank sheets – presumably in risk of reinventing the wheel.

The considerations identified in table 5.3 are aspects to look for and consider carefully when adapting an existing framework or system to a new setting, or when designing a new governance framework by borrowing elements from existing governance frameworks. On the system levels below governance frameworks (for example in project management) there is already a tradition for standardization and transfer of system elements and methods between sectors, countries and regions. The established systems and standards for portfolio, programme and project management are valuable contributions.

5.5.2 Design based on a theoretical model

The start of a new model for governance framework design is developed in table 5.4. Originally the author developed this idea as a part of a research project (Klakegg et al. 2009), where it was used to analyse and compare three existing frameworks. The idea could possibly be developed further into a design tool. The tool would not design the framework elements as such, but would help the designer to understand what kind of framework is best suited for the kind of (theoretical) preferences present in the current context and thus identify what kind of framework serves best as a 'model' for the new framework. A basic assumption is that governance frameworks can be categorized in groups or as 'archetypes'. In the following list, one example described in this study and one additional example not described here, is given for each archetype. The archetypal frameworks identified so far are:

- *The lean framework*: simple, flexible, control based, limited in scope, only high level guidelines, few operational tools attached. Typically a very general framework used for all projects in sectors. Includes requirements which everyone has to adapt to. It sets out what to achieve, but leaves how to solve the task to those responsible for project planning and execution. (Examples: the Norwegian Ministry of Finance - QA Scheme and Oslo municipality - Investeringskontroll [Investment Control].)
- *The integrated framework/'quality system'*: medium complexity, strong on control and operational tools, Limited to one sector or to a set of similar projects. A system everyone has to follow. This system establishes both what to achieve and how the task should be performed. (Examples: the MoD - Acquisition Operation Framework and StatoilHydro - Capital Value Process.)
- *The complex framework*: complete, open, including a variety of alternative guidelines, and methods and tools to fit different settings and emerging situations. Based on control and measurement, or friendly advice by senior experts. Establishes both what, and to some extent how, to achieve. (Examples: OGC - Gateway Review and The World Bank - Comprehensive Development Framework).

The version of theoretical approach presented in table 5.4 includes descriptions of both the values and the structure elements. In table 5.4, 'strong' means 'puts a lot of emphasis on' the theory in question, and 'weak' means 'puts little emphasis on'. There is a 'moderate' position between the two extremes, and a 'mixed' position where indications both to 'strong' and 'weak' is found. The theories used in the table are assumed to be known to the readers. If not, they are explained briefly in section 2.5 of Klakegg et al. (2009).

The idea for analysis procedure is fairly simple. The basis is to know the context in which the new and/or improved framework is going to be implemented, i.e. the political preferences and administrative traditions. The next step is to go through the list of theories and aspects in table 5.4. For this purpose, table 5.4 should be further developed and simplified. The aspects which should have strong or weak emphasis have to be chosen, and then the emerging pattern should be examined: what type of framework does the chosen profile correspond with? The profiles corresponding with the identified archetypes are not yet developed.

Table 5.4 Theoretical model for design of governance frameworks with emphasis on theoretical aspects (adapted from Klakegg et al. 2009, has to be developed further).

Perspective/Theory	Aspect	Lean framework	Integrated framework	Complex framework
Instrumental-Structural Perspective				
Principal-Agent Theory	Control	Strong	Strong	Weak
	Incentive	Weak	Moderate	Strong
	Information	Strong	Strong	Moderate
Public Choice Theory	Internal scepticism/External review	Strong	Weak	Moderate
	Lean organization	Strong	Weak	Moderate
	Transparency	Strong	Moderate	Weak
	Acquisition support	Weak	Strong	Strong
Bureau-Shaping Perspective	Benchmarking professional standards	Strong	Mixed	Moderate
	Supporting plurality	Strong	Mixed	Weak
Theory of Economic Analysis / Analysis of Political Behaviour	Bulwark against illegitimate influences	Mixed	Mixed	Mixed
	Influencing decisions	Strong	Strong	Weak
	Independent evaluator role	Strong	Weak	Mixed
Theory of Transaction Cost Economics	Asset specificity	Mixed	Strong	Mixed
	Competition	Weak	Mixed	Strong
	Centralization of decision making	Strong	Strong	Weak
	Lower transaction costs by cooperation	Weak	Strong	Weak
	Expert role	Strong	Weak	Strong
General instrumental perspectives	Logic of consequence	Strong	Strong	Strong
	Clarity of roles and responsibilities	Weak	Strong	Strong
	Objectives	Strong	Strong	Strong
	Measurement	Weak	Strong	Strong
Cultural-Institutional Perspective	Logic of appropriateness	Strong	Strong	Moderate
	Historical anchoring	Weak	Strong	Strong
	Clear framework focus	Strong	Strong	Weak
	Awareness among users	Strong	Strong	Mixed
Environmental Perspective	Adaptation to environment	Weak	Strong	Moderate
	Adaptation to performance culture	Strong	Strong	Strong
	Flexibility	Strong	Weak	Weak
	Problem seeking	Strong	Mixed	Weak
Network Perspective	Professional standards	Strong	Strong	Strong
	Trust and close relations	Mixed	Strong	Strong
	Negotiation	Strong	Weak	Weak

The most appropriate model framework should be identified using the theoretical model in table 5.4. Finally, appropriate elements should be chosen from existing frameworks in accordance to the profile. These elements must then be adapted to the actual situation and historic and/or administrative-cultural situation. This design strategy would be a support strategy for a 'model framework' design strategy.

Further development is needed before this design strategy is ready for implementation. The characteristic 'archetypes' of frameworks has to be developed further, based on analysis of more existing frameworks. The determinants for choice of framework type have to be studied in more detail. Also, the theories have to be assessed again to identify which can be combined and which can not. To make table 5.4 a practical tool, all unnecessary aspects of theory have to be removed. This will simplify the use and reduce the amount of resources necessary for development. A template for which profile corresponds to each archetype framework has to be developed. The tool may also be expanded with indications for which framework elements are appropriate for transfer to the new context.

The purpose of such methodical development is to improve the basis for choice of appropriate model frameworks in the future and to help the development of appropriate governance frameworks in areas of the world where these are not yet established. This will reduce the use of public resources for development of such administrative systems and improve the probability of successful implementation of existing knowledge and imported framework elements.

The purpose of including this unfinished design strategy here is to give as complete answer as possible to the research question set out at the start of this chapter. The completion of this development is beyond what is realistic within the limits of this dissertation. It does, however, give ideas for further research and development.

5.6 Conclusions to governance frameworks

The research question was - how can a governance framework for major investment projects be designed? To answer this we first started out be defining the concept of a governance framework and then studied three different governance frameworks in detail to understand how they work. The findings indicated that the governance framework has a value side embedded in governance principles and a system side expressed through its elements and the structure defining how they interact. The system side is the environment in which management implements systems on several levels, i.e. management systems for project, programmes and portfolios.

A governance framework is characterized by three aspects; its process of development (the history and context), its embedded governance frameworks (values) and its structure (system elements). When described according to these characteristics (for instance with the tool described in table 5.1), a framework may be systematically described and analysed. This is of course helpful in designing a governance framework. The freedom to choose solutions in the design process is big for the development process, little when it comes to the values, and big but limited for the structure and elements. For structure and elements there might be some potential for standardization.

The answer to the research question is, in short: A governance framework can be designed by using one of the following basic design strategies:

- *Model framework design:* copying main structures and elements from a preferred existing framework and adjusting and/or supplementing it to adapt to the specific context. This strategy is efficient, but may give some unintended effects it the adaptation is not done well.
- *Unique design* from 'blank sheets' guided by own experience only. This means creating a new framework based the specific needs at hand. This may create a unique and well adapted framework, but can also result in 'reinventing the wheel' and thus unnecessary use of development resources.

These supporting design strategies can be combined with either of the two above:

- Design using a system approach (based on system thinking/system engineering). The system approach may guide process and/or structure.
- Design by design criteria. This is specifically a strategy for mega-projects. These projects may have special needs beyond what existing governance frameworks are able to handle, and have resources to develop a unique framework for a one-off project. If the existing framework has the flexibility to handle the mega-project, this is not a recommended strategy, and it is not recommended for projects outside the mega-project category. Inappropriate use will create problems by stimulating a multiplicity of approaches and thus create confusion and extra work.
- Design based on a theoretical model. This approach is only suggested as an idea at this stage. It is an expansion of the 'model framework' design strategy with the potential to make this strategy more goal oriented and efficient, and maybe design frameworks with improved effect. At this stage in its development it points towards need for future research and development.

There are no simple criteria as to which of these strategies is the best. Each case has to be considered separately, based on the purpose of development, the tradition and administrative culture, the situation at the outset, and the wider context.

5.7 Validity of the governance framework research

In order to find answers to the very open research question, there was a need to investigate governance frameworks first: What are they by definition? What is their structure and content in practice? The research reported in this chapter includes using document studies and interviews, case studies, and theoretical analysis. Paper 7 reports the comparison of frameworks, and paper 8 looks specifically at the case studies. More details from these analyses are available in the report from the research project (Klakegg et al. 2009). The results of the research reported in the papers are supplemented with new analysis and discussions in this chapter.

There is a limited literature study in the definition section. It is not comprehensive and not necessarily complete. The point however was more to illustrate the variety, than to

have a complete overview. This does not represent a risk to the reliability or validity of the findings.

The studies of frameworks in Norway and UK are comprehensive in many dimensions: The amount of documentation of the frameworks made available for the research team was satisfying. These are official and original documents directly from the source. Also the interviews were comprehensive, although not too many informants were used. Interviews were semi-structured with a predefined questionnaire sent to the interviewees up front. Many hours of interviews (2-4 hours per person) were taped, notes were made and the interviewees went trough them afterwards, correcting any misunderstanding there was. After the analysis of each framework the respondents went through the text, challenging the analysis and looking for faulty facts. The informants were key people in developing and implementing the frameworks with first hand knowledge of the frameworks. Also the researchers had good knowledge of the frameworks both from a theoretical and practical perspective. The comprehensive information gathered form good sources and the rigid process of assuring the quality of the analysis indicates a high degree of reliability and fairly good validity as far as the frameworks go.

The case studies where not quite as solid. The access to cases in Norway is good, due to the central position of the Concept research programme which gave the researchers access to suitable projects with interesting stories and available data about all relevant issues. In UK the situation was different. We had to use the cases offered to us. They were interesting projects and could potentially be valuable in analysing the kind of issues focussed in the research project, but they both represented difficulties. One of the two UK cases was a PFI were much of the documentation we sought was unavailable. The other one was a defence project, so complex and even though developed over long time, still not developed far enough to answer the things we were looking for. Therefore we reduced the ambitions in case studies along the way. For the purpose in this dissertation these weaknesses in the case studies has little impact on the reliability and validity. They add some nuances to the knowledge of practical implementation of the frameworks, but the contents and structure of the frameworks was documented elsewhere.

On this, rather solid basis of documented knowledge of three governance frameworks, the rest is up to the logic of this author. Of course the number of frameworks are small and can not be regarded as proof that this is the three ‘archetypes’ of governance frameworks, or represent all possible combinations of values, elements or structure. Obviously this field needs more work and access to more examples. The interesting perspective on these three governance frameworks is that despite the similarity in purpose and objectives, being developed in two countries with fairly similar political and social situations, both rich western countries – these examples are quite different. They seem to indicate a variety in approaches that tells a lot about the answer to the research question in this chapter.

In summary the reliability of these results are considered good. The information is good and well documented. The formal validity however is limited due to the low number of frameworks analysed. Still, we argue that the results are useful and credible.

6 The most important challenges in public projects

This chapter specifically addresses the third research question: *What are the most important problems that occur in the front-end of major public investment projects, which may lead to lack of relevance and sustainability?* This chapter discusses the most important challenges in the front-end of major public investment projects. The purpose is to identify the most important problems, so that the next chapter can look at how the existing frameworks can be improved in an effective way. The most important reasons for lack of ***relevance*** are; *user needs are unknown, misunderstood or ignored*, and *objectives of the project are unknown or misunderstood*. The most important reasons for lack of ***sustainability*** are; *lack of commitment to the project from key stakeholders, conflict over objectives and/or strategies concerning the project, economic and financial benefits are low compared to investment and operational costs*, and *business or other conditions change between concept stage and final delivery*.

6.1 Existing governance frameworks – the starting point

Two assumptions form the fundament for this chapter:

- There is an existing governance framework.
- The existing framework has to be developed and improved.

The first assumption is expected to be true for all Western developed countries and all major corporations based on Western economic thinking. Examples are given in chapter 5, paper 7 and in published literature (Haanes et al. 2004; Harpham and Kippenberger 2005; Klakegg et al. 2005; Klakegg 2007; Xue 2008; SCT 2008; Agrapidis 2009). As shown in paper 7 and chapter 5, they come in all shapes and sizes, adapted to their environment and with different functions and characteristics, although with more or less the same purpose. They are found under different names; quality systems, institutional regimes, regulatory frameworks, etc., but in this research they are all given the label ‘governance frameworks’.

The second assumption is logically true. Any administrative arrangement has to be adapted to the development emerging as time goes by. Some would argue development has never been faster than today, pointing out that the need for such

improvement has never been greater than it is now. In addition, most people would accept the notion that no system or arrangement is perfect and thus should be improved.

All governance frameworks are documented for the purpose of explaining them as part of implementation. Existing governance frameworks may be described as shown in chapter 5, or in any other format. As far as quality systems go, there are other standards for definition and documentation (examples are the ISO standards: ISO 9001 Quality management systems and ISO 14001 Environmental management systems). For frameworks on a strategic level (project owner, financing party) the format is normally more individually defined in each case. Documents explaining the frameworks are helpful, but as the research behind paper 7 shows, deeper insight may be needed, and will be best achieved by performing in-depth interviews with key people involved in the development and implementation of the framework in question. Such individuals have detailed insight into the questions raised and the judgements made which actually concluded in the current situation.

In summary each country, administrative sector or corporation may have one or more governance frameworks. Each of them have slightly different but, as indicated by Klakegg et al. (2009) practically similar purposes. The maturity and form of the frameworks (current status) and hence the starting points are clearly different. This means the individual mapping of the starting point (status assessment) is important and will make up an individual starting point for each governance framework.

Indications of whether, or to what degree, an applied governance framework is positive for the execution of a particular project are relatively easy to obtain. Documenting the performance of projects at a superficial level is relatively easy. Comparing the assumptions and intended results at the time when the project was accepted for execution (the final go ahead and financing decision) with the actual results produced at the end of execution will give a good indication of this dimension of quality. Here we refer to this as the ‘short learning cycle’, illustrated in figure 6.1. It does not take a lot of extra effort, given that projects are normally required to report their results anyway. Another readily accessible way to gather indications of the quality of the governance framework for execution of projects is to interview people involved in the use of the framework (for example, assessors, reviewers, project managers, and project sponsors). Similar information may be gathered by well-prepared surveys involving the same groups of respondents.

The true measure of the quality of the governance framework for public investment projects is the outcome it provides for society. The purpose of the governance framework may be summed up in most cases as some form of ‘value for money’, ‘purposefulness’ or ‘sustainability’ of the projects executed within the governance framework. This is the more challenging part of evaluating a governance framework. Here we refer to this as the ‘long learning cycle’. This will require documentation of the outcome of each project compared to the intentions at the outset of the project, when the fundamental design of the project was decided (choice of concept). There are many reasons why this is a more difficult task: the time span is long, conditions will change, the causality chains are more complex, and isolating the effect of the project from other effects (attribution) is difficult.

Figure 6.1 illustrates the learning cycles and the development of a governance framework. Mapping the starting point (current status of the governance framework) will in many cases rest on the 'short learning cycle' or less formal indications. This is simply because of the time it takes to gather a reliable documented basis in the form of proof of results over the 'long learning cycle'. This mapping of the starting point is important in any goal-oriented improvement process. Examples of mapping three governance frameworks are documented in paper 7 and in even greater detail in the underlying report (Klakegg et al. 2009). The mapping documented in this basis is covering as much as possible, also the long learning cycle, but the short cycle is basically the only one documented also in these well developed examples. There is certainly room for interesting further research in these fields.

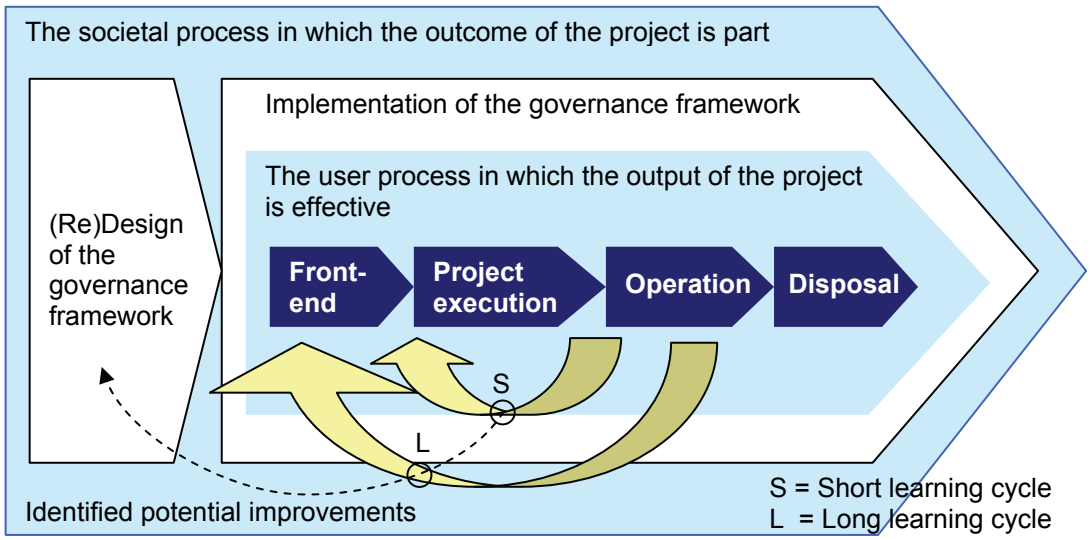

Figure 6.1 Development and implementation of governance framework based on short and long learning cycles. The short and long learning cycles are used by the Concept research programme as an illustration of a narrow perspective (short cycle) and a wide perspective (long cycle).

Chapter 5 describe and discuss the initial design process and redesign process of governance frameworks. The questions arising at the time of having a well-established starting point for improvement of the framework is: Given the existing governance framework is not perfect, where should effort be made to improve it? The intuitive answer to this question may be to improve where the existing governance framework is weakest. Such a strategy may consist of developing and implementing elements missing in the framework or improve elements with well-known weaknesses. This solution may well prove to be wrong.

To be able to improve the governance framework effectively means improving the elements with the best effect on the end objective, namely the ones that are most important for fulfilling the purpose of the governance framework. Improvement here will give the most value for the invested effort in the improvement process. The next question arising is: Where, then, do we find the most important issues, the most important areas for improvement? This is the topic of the next section.

6.2 Where to look for indications of importance

The most important areas of improvement must be the areas that have the strongest negative effect on the achievement of end objectives, the ones that reduces the value of the public investment project the most. At first sight this might seem to be a strictly individual question which should be answered separately in each case. This would be the case if the improvement of each individual project was under discussion. However, when it comes to improving the governance framework within which portfolios, programmes and projects are initiated, planned and executed, it is no longer true, at least not the whole truth.

Governance frameworks are not primarily about improving individual projects, but about improving the owner's ability to assure the consistent delivery of successful investments. Besner and Hobbs (2006, p. 14) point out that the strategic role of the front-end phase of projects is: 'choosing the best project' and 'finding the best solution to the project mission'. Here, we develop this further and state that investments will be successful by choosing the relevant projects, designing them well, executing them efficiently, and delivering results with sustainable effect. If they do not document such potential, then success for the project owner and financing party is to stop them.

Improvement of a governance framework includes several tasks that can be resource demanding. Typically, development resources and resources to implement changes are limited. Therefore the effort has to be directed towards the area which gives the most effect. This has to do with more than systems, as shown in chapter 5, although systems may be the most obvious and noticeable element. Changing too many elements at one time will make the evaluation of the effect achieved by the change difficult. Only when changing fundamental principles which necessarily have widespread consequences within the framework should this be acceptable. Such changes should not take place many times. If there is a need for such fundamental changes, this will probably be an indication that there is a need for designing a new framework.

The research in this dissertation includes the aforementioned issue as one of its main considerations. The matter in question is different from, yet similar to, the classic research questions of what factors determine failure and success in projects. It is similar in the sense that we need to identify the decisive factors. However, it is different in that the main question here is focussed on importance, not on whether the factor frequently occur or not. Paper 10 sums up the result of this work and presents one version of the possible improvement strategies. This chapter and the next will include more details and some additional aspects of the methodological choices, as paper 10 is limited in scope and had to be limited in length, leaving some aspects only partially covered.'

Paper 10 shows there has been a vast amount of research into the success and failure of projects, but also that this research has not yet answered the question of what is most important. This line of research indicates what the most frequent reasons for success and failure are. In other words, it identifies the most common faults. In addition, the research has shown a changing focus over time indicating what the dominating focus in the project management community has been at different times.

The perspective of this literature tends to be the operational perspective: that of the executing party. As indications of where the governance frameworks should be improved, this has limited value. It may, however, have great value as input to improvement processes for management systems on a lower level.

Literature focussing on development projects has taken a wider and more strategic perspective, indicating that the most important problems will be found *not* in the project itself, but in the process leading up to the project; in the front-end. Another line of project literature discusses projects as a means to achieving strategic goals, adding some indications as to where things frequently go wrong in a wider perspective. The challenges indicated in literature, and the related references, are found in paper 10, and the accompanying working report (Klakegg 2009).

The one line of research that seems to really capture the whole strategic perspective, including governance of projects, is the literature on mega-projects. By combining the findings of authors of six main books on mega-projects, a comprehensive impression of what the most important issues in governance of projects are is gained. These contributions cover a wide range of issues including political issues, decision making, financial matters, roles, leadership, sponsorship, institutional frameworks, etc. Still, this does not help much in prioritizing because the many factors are not prioritized and they point in many different directions. The sum of these findings is presented in paper 10.

As mentioned above, what is needed is a goal-oriented approach based on prioritizing the areas which are most important in serving the purpose of the governance framework. This conclusion leads to the development of a research task to identify these most important challenges in the front-end of major public investment projects. At this point it is also useful to recall the limitation made in chapter 2 of this dissertation; this research only focus the two superior criteria relevance and sustainability.

6.3 The most important reasons for lack of relevance and sustainability

Identification of the most important problems in the front-end is done by performing a survey to highly qualified respondents. Paper10 explains the choice of method and the choice is discussed further in the next section. Here the focus is on the findings. The main results for lack of relevance and sustainability in the front-end of major public investment projects are shown in paper 10. A summary of the findings is shown in table 6.1. These are the most important challenges in the front-end of major public investment projects in a situation were a governance framework is already established. The results do not apply to situations where this is not the case.

The survey had 80 respondents, all senior experts. 76 of the respondents were from Anglo-American or Nordic countries. Only the most important problems and their two most important root causes are shown in table 6.1. In addition to identifying the most important problems and their dominant root causes in established governance frameworks, the causal connection between relevance and sustainability has to be

acknowledged; relevance is prerequisite for sustainability, but not enough to make the project's effect sustainable. These findings are discussed in more detail in paper 10.

Table 6.1 Main results of a survey of the most important reasons for lack of relevance and sustainability.

Problem	Reasons
RELEVANCE	
User needs are unknown, misunderstood or ignored	Users' needs are ignored by planners and decision makers due to political or personality reasons
	The way the users are asked/participate in the planning process gives the wrong answers/does not unveil the needs
Objectives of the project are unknown or misunderstood	The objectives of the project are not stated at all, or are expressed in a very unclear manner
	The decision makers do not understand the planners' formulation of goals and objectives
SUSTAINABILITY	
Lack of commitment to the project from key stakeholders	Not identifying that the project outcome has weak support in its owner- and financing organizations
	Neglecting that the project outcome has weak support in management or accepting weak leadership
Conflict over objectives and/or strategies concerning the project	Neglecting/not solving conflict over priorities among key stakeholders
	Neglecting powerful interacting organizations/individuals in opposition to the project
Economic and financial benefits are low, compared to investment and operational costs	Planning optimism (overestimated benefits) misleads the decision makers, deliberately or not
	Bad cost effectiveness is accepted
Business or other conditions change between concept stage and final delivery	Planning optimism (underestimated costs) misleads the decision makers, deliberately or not
	The political and administrative setting is changing regularly

These findings highlight a pattern worth studying more in detail. There are two problems judged to be clearly more important than others leading to lack of relevance, and these problems seem to have quite specific root causes. This can intuitively be interpreted to mean that these problems can be relatively easy to handle. There are four problems judged to be more important than the others leading to lack of sustainability, and these problems seem to have many potential root causes (the respondents indicated many different causes to be important). This may indicate that these problems are much more difficult to improve on. Intuitively, this seems reasonable.

The complexity in handling the problems was also tested by letting the respondents answer open questions where they were asked to suggest how to deal with the most important problems. These answers point in the same direction as mentioned above. The responses to the questions of what can be done to secure relevance were

relatively specific and clear, pointing towards, for example, improving methods for assessment of user needs and political needs, designing the participation process well, and preparing users and stakeholders for participation. The answers given to the questions of what can be done to secure sustainability were of a general kind, pointing towards, for example, securing commitment from the policy makers, government leaders, community (business community and lay persons), and investors/financiers, the continual review of expected benefits in the planning stage considering all relevant stakeholder concerns. The pattern was the same as that given in the answers relating to problems and causes.

The most important problems leading to lack of relevance point towards the communication process between project promoters, owner/financing party, users, and other stakeholders. Basically, relevance seems best secured through having a well-designed participative process for which the stakeholders are well prepared. While this sounds good, the survey does not indicate how this should be achieved. That was never the intention either. Other research has to give answers to this question.

Given the causal connection between relevance and sustainability, what would it indicate for the probability of achieving sustainability if relevance is actually obtained through the initial planning process? A study of the most important problems leading to lack of sustainability, given there is a process established leading to relevant alternatives being chosen, will give a new picture. Given relevance is achieved through a participative process, there is good reason to believe neglecting or not solving conflicts over objectives and priorities are overcome. This will improve motivation for commitment to the project and its results on the part of key stakeholders. This improves the situation considerably with regard to the two most important reasons for lack of sustainability, although not eliminating them completely.

This leaves the two next important reasons for lack of sustainability to rise to the top of the list: the economical, financial and business conditions with their most important root cause, planning optimism (either on the benefit or cost side). To illustrate the complexity in these problem areas, planning optimism is obviously also a factor in the participative processes leading towards choice of relevant alternatives and commitment to the project. If planning optimism is part of the process this will open up for wrong choices and later conflicts when the consequences are revealed. In addition, there is the obvious problem that sustainability is a more long-term issue involving changes and unknown conditions in the future. Again, this indicates that sustainability is a more difficult issue than relevance and probably more difficult than all the other criteria as well.

As mentioned earlier, this is not proof that the problems indicated in the survey are the most common, or the most important in individual projects. They are what 80 experienced individuals working in important roles within established governance frameworks believed are the most important problems to handle in general, and the most important root causes leading to these problems. It is not the answer to what is wrong in any specific governance framework either. One possible interpretation is that these are the areas which are not handled well enough in the existing governance frameworks in the countries represented in the survey response group. This makes this

material relevant as basis for developing improvement strategies for these existing frameworks.

6.4 Conclusion – the most important problems in the front-end

The research question to be answered in this chapter is: *What are the most important problems that occur in the front-end of major public investment projects, which may lead to lack of relevance and sustainability?* The most important problems identified by the survey are as follows.

Leading to lack of relevance:

Most important problem: *Users' needs are unknown, misunderstood or ignored*.
The most important underlying reason: *Users' needs are ignored by planners and decision makers due to political or personality reasons*.
Second most important problem: *The objectives of the project are unknown or misunderstood*. The most important underlying reason: *The objectives of the project are not stated at all, or are expressed in a very unclear manner*.

Leading to lack of *sustainability*

Most important problem: *Conflict over objectives and/or strategies concerning the project*. The most important underlying reason: *Neglecting/not solving conflict over priorities among key stakeholders*.
Second most important problem: *Lack of commitment to the project from key stakeholders*. The most important underlying reason: *Not identifying that the project outcome has weak support in its owner- and financing organizations*.
Third most important problem: *Economic and financial benefits are low, compared to investment and operational costs.* The most important underlying reason: *Planning optimism (overestimated benefits) misleads the decision makers, deliberately or not*.
Fourth most important problem: *Business or other conditions change between concept stage and final delivery*. The most important underlying reason: *Planning optimism (overestimated costs) misleads the decision makers, deliberately or not*.

This result is discussed further in paper 10.

6.5 Methodological approach to identifying the most important issues

The primary consideration here is ensuring relevance and sustainability. Only when this is achieved, secondary issues become important. This first and most fundamental choice in the approach selected for this dissertation was made as a part of the definition of scope as discussed in chapter 2 and more in detail in paper 6. The logical deduction that relevance and sustainability has to be superior criteria to the remaining three criteria in the OECD integrated evaluation model (OECD 2006) is a first step to narrowing the search for what is most important. By accepting this as a fundament for

further work, it eliminated three criteria and consequently all of the accompanying factors deciding success and failure. In practice, this choice also had the consequence that a lot of work was eliminated.

Additionally, it focussed the study by eliminating issues that are less important as a consequence of the chosen scope. This is not to say the remaining issues are not important. They can certainly prove problematic for projects as well, but in the perspective of this dissertation, these would be secondary. Table 6.2 give an illustration of this point. Part A. illustrates that what is most important in the eyes of key actors shift in different phases. Part B. illustrates that what is most important depends on which perspective the considerations represent.

Table 6.2 Examples of differences in focus over time (part A) and with different perspectives (part B). What is more important is not the same for all parties all of the time.

OECD Criterion	**A. Main phases**			**B. Perspectives**		
	Front-end	Execution	Operation	Executing party	User	Owner
Efficiency		✔		✔		✔
Effectiveness	✔		✔		✔	✔
Impact	✔		✔		✔	✔
Relevance	✔		✔		✔	✔
Sustainability	✔	✔	✔	✔		✔

The first idea, and also the starting point for the methodological choice in this specific study, was to look at the possibility of identifying the most important issues through documents relating to project evaluations. In Norway the access to project documentation seemed realistic through the established governance framework, the Quality Assurance Scheme. The process started with looking for indicators as to what could be the reasons for lack of success. This was done by taking the two chosen success criteria (relevance and sustainability) and slicing through all six cross-cutting issues embedded in the OECD integrated evaluation model (for more details on the OECD model – see section 1.4). Each slice was then used as basis for identifying possible indicators. Each slice typically revealed 2–4 different indicators. A total of 38 indicators were identified, 15 on relevance and 23 on sustainability.

The next step was to analyse each indicator to find the ones worth developing for the study. For each potential indicator the following assessments were made: validity, reliability, accessibility, and cost. Figure 6.2 show examples of how this was done.

Indicator		Validity	Reliability	Accessibility	Cost
CRITERIA: RELEVANCE					
1	Project stated purpose not in line with policy statements made by relevant government	Good	Fair	QA-reports vs. Internet (white-papers)	Moderate
2	Government policy has changed since project started, but project purpose not redefined accordingly	Fair	Fair	White-papers vs. Current project goals, interview.	High
3	Purpose of project is redefined (reformulated), without a clear connection to a change in policy	Fair	Moderate	White-papers vs. Current project goals, interview.	High

CRITERIA: SUSTAINABILITY					
16	Lack of commitment to the project from key stakeholders	Good	Good	QA-reports vs. White-papers (interviews)	Moderate
17	Conflict over objectives and/or strategies concerning the project	Good	Good	QA-reports vs. White-papers (interviews)	Moderate
18	Lack of conformity with prevailing policy	Good	Fair	White-papers vs. Project design, interviews	High

Figure 6.2 Examples of evaluation of indicators used in developing the survey.

Based on this structured overview, the realism in the chosen methodology was reviewed. The kind of issues studied here implies qualitative indicators with a varying degree of fuzziness and uncertainty. Accordingly, the evaluation only operates in very rough categories on an ordinal scale. In descending order: Good, Fair, Moderate, and Low. (High, Moderate, Low for cost). The assessment of these possible indicators revealed that it was possible to obtain draw valid, reliable conclusions from available documents, but that the cost involved and the limited capacity to carry out the document studies made the choice unrealistic. Hence, a different approach had to be adopted.

The core question in the research is a rather subjective one: *what is most important?* Answering this question involves an assessment beyond the objective data. In the original methodological design this would have been solely in the hands of the researcher. Having concluded that access to first-hand data was too costly, the question was then how to gain sufficient knowledge of the projects in order to understand the importance of the issues, and on the other hand how to reach a sufficiently large number of projects to have a credible result. Thus, performing some form of survey was the answer to how this could be achieved realistically.

Asking a panel of experts is rather different from the original idea, and there were several important considerations:

- This research design would not give the researcher direct access to project data. The data would be secondary and thus less specific and controllable.
- The assessment of importance would not be in the hands of the researcher, but in the hands of the respondents. This would also reduce control regarding the results.

- The realistic number of respondents with competence to answer these kinds of questions would not be large, even if there were no limits as to time and resource use, and given the most efficient of survey systems. The survey had to be directed towards a specific group of respondents.
- Asking the respondents to focus on one specific project in their answers would be considered to increase the precision of each individual's answer. Still, this survey was not intended to be about improving individual projects but the wider framework. Therefore it would be relevant to ask for experience in a wider perspective, drawing on the individual's accumulated experience. This would fit the purpose best.
- The number of respondents expected was low from the outset, and thus the expectations regarding the analysis were kept low. Statistical analysis of the material was never intended and has not been attempted. The results are considered as indications, not proof.

To make sure the respondents had the necessary competence and awareness to answer the questions, several actions were taken. The respondents were selected only from countries or corporations which were known to have an established governance framework. The selection of the respondents was carried out carefully, as will be described below. The questionnaire was carefully developed, as will be described below. Also, additional information and explanations were available to the respondents during the process of answering the questions.

The choice of respondents for the survey (sampling) was a major issue in this study. The first problem was defining which organizational roles were relevant in identifying the most important challenges in the front-end of major projects. The relevant roles were identified as decision makers (who use project and evaluation documents in reaching their decisions), the project planners (who support the decision makers in their process and produce project documents), project evaluators (who perform project assessments to support the decision making with independent judgement), senior project managers (who partly support the decision making, but mainly know the consequences of the decisions made), and finally researchers (only those directly involved in research on the relevant issue; governance of projects). Only key senior personnel in each of the roles were considered as appropriate respondents. Identifying such individuals and gaining access to them is very demanding. Further, the specific nature of the questions and the accompanying 'governance language' meant that the individuals were few in numbers. They were identified and approached by several strategies. A small proportion was identified directly from within the researcher's personal network built up through 20 years of experience of working with major public investment projects. Some were approached indirectly through contacts in other networks of individuals (through contact persons, hubs in relevant special interest groups, etc.), while other relevant individuals were approached directly through identifying their contributions at conferences or in publications, and finally through identifying their formal position as relevant.

There is an obvious challenge in a research strategy depending so much on identifying and approaching individuals based on special competences. There is no way of securing that the sample is representative of the whole population. There is no way of precisely defining the population due to the special competence requirements used; they do not correspond to any formal position or education, etc. Even if a total

population could be defined based on the roles – most of this population would not be relevant. Take, for example, project managers: to be able to answer what are the most important challenges they have to be very knowledgeable, aware of governance and the strategic perspective and have been working in many projects. Only the most experienced project managers would fit this description. The real population is thus limited.

Some of these recruitment strategies may seem close to convenient sampling, but they were balanced by other non-convenient strategies. The main consideration was identifying individuals who were competent to answer the questions and representative of the role they represented. There is nothing in the answers to suggest the recruitment strategy imposed any tendency in the responses given. There is probably a bigger influence in the fact that governance of projects has received a lot of attention in some countries, resulting in a larger number of answers from such countries. This was expected and hence from the outset the design was planned to cover mainly two geographical areas: Anglo-American countries (UK, USA, Canada, and Australia) and the Nordic countries (Norway, Sweden, Denmark, Finland, and Iceland). This resulted in a larger number of invitations to potential respondents in these countries. The number of potential respondents actually responding from other geographical areas was expected to be low, but turned out to be even lower than expected. Only 4 out of a total of 80 respondents were from other countries.

The process of developing indicators described above proved to be very helpful in defining questions for the survey. Even though the research method was changed from a document study and data analysis to a questionnaire-based survey the indicators was a good place to start. The best indicators were chosen for the topics ‘relevance’ and ‘sustainability’ based on the evaluation of validity and reliability. For each of the topics (relevance and sustainability) six major questions were formulated based on the best indicator from each of the six cross-cutting issues, giving a total of 12 indicators. These formed the basis for the primary questions in the survey. Later, in the testing phase, we concluded that we had to include one more indicator from the economic and financial aspects in order to cover the needed information on sustainability (both decision making and operation). This increased the number of indicators to 13. The questions covered a chosen set of possible challenges in the front-end of major public projects, each originally connected to one of the cross cutting issues. In the reformulation phase the problems were disconnected from their original cross-cutting issues to form wider problem areas. The respondents were asked to ‘rank’ the importance of these areas on a simple ordinal scale.

For each of the aforementioned 13 alternatives above, several possible root causes were identified based on the indicators ‘left over’ from the process mentioned above and the logic of causality. A set of sub-questions was formulated, which asked the respondents to identify which of these root causes were the most important. The respondents were only asked to elaborate on the root causes of the problems they considered to be the most important, in order not to demand too much of their time. For each list of alternative root causes, the last alternative on the list gave the respondents a chance to give open feedback in terms of causes they found likely to be the most important, but is not covered by the predefined alternatives. This ensured that the respondents would be able to express their true opinion. It would also give more feedback and ideas for further work. This was an important aspect in the

development of the questionnaire; it is highly possible the predefined alternatives would not fit with the respondent's opinion. Defining the answers obviously places a lot of responsibility on the researcher. Through a systematic development of alternatives within the framework of the OECD evaluation criteria as described above, the risk of omitting important answer alternatives was reduced. The responses showed very limited use of the 'other' option, indicating that the respondents found that the predefined alternatives covered the most important challenges.

A potential criticism of this approach to designing a questionnaire is that predefined alternatives limit the focus of the respondents and lead them to conveniently select a few possible answers already defined. Generally, this is a valid critique. The answers given are influenced by the way the questions are formed. Apart from the obvious opportunity for respondents to use the open text answer alternative if they find the alternatives does not fit, this weakness was acknowledged and accepted for this survey. The systematic development of answer categories was not aimed at pointing specifically to narrowly defined problems with a specific solution or simple cause. On the contrary, it was crafted to identify broad problem areas and connect them to one of the cross-cutting issues. The task of improving a governance framework will always include a broad set of issues and the changes made will have many consequences. There is no reason to go into details that are case specific to each project at this level. The complete questionnaire is given in the Appendix to this dissertation.

6.6 Validity of the challenges research

This research question is the most challenging in this dissertation as far as research methodology goes. The issue has been discussed and considered again and again over a long period of time, with increasing conviction that the totality of the methodological approach is practical and useful given its objective and the context for this research. This does not indicate all problems are solved:

This research only focuses the two superior criteria relevance and sustainability. This means there might be other criteria in specific frameworks or even generally that did not have focus this time. This is a conscious choice. Given the fundamental thinking that leads to the conclusion that these two criteria are superior, this weakness is acceptable. If other lines of thought should successfully challenge this thinking, this might change the basis for asking questions and thus reduce the validity of these results.

The design of the survey questionnaire was thorough and rigid, but not perfect. There is a lot of responsibility placed on the researcher in this operation, and any fault because of leading questions, unclear or confusing language etc. comes back on him. In this case the strategy to reduce the problem of leading questions was rigid testing. The choice of test-respondents might be a potential source of error. They were qualified, but some of them where not in the experienced senior group. The testing was performed several times to check on improvement from stage to stage. In the end the technical performance (internet-based survey system) functioned without any problems at all. The problems with unclear and confusing language was met with the same type of testing on several test respondents and at least two times for each part of the questionnaire (three and more times for some, more difficult themes). The analysis

of the results shows that in spite of rigorous testing and available on-line help-texts etc. the answers to two questions has limited value due to lack of precision (see chapter 8). Maybe the test respondents became too involved and knew the issues in question too well to see the problems. The problematic questions does not affect the challenges theme in this chapter, they do not disturb the reliability or validity in this research. However, the general risk that some of the respondents might have misinterpreted questions or been lead to conclusions by the way the questions are formulated, can not be ruled out. Nothing in the responses during the survey period or after indicates such effect.

Some respondents have, however, indicated that the questions asked in the survey were difficult to answer. This is of course an important concern. This may be interpreted as indication that some respondents do not know the answers, or can not identify the reasons we ask for. Their response strategy might then have been to guess or just click some alternative available. This effect can not be ruled out completely, but there are strong indications that this is not the case: The respondents were asked to give open text feedback on what to do with the most important problems they identified. To the researchers surprise a large proportion of the respondents used this opportunity. The answers clearly indicated that the respondent understood the issues and had relevant opinions on the matters.

The issue of whether the questions were understood correctly also points to the choice of target group and individual respondents. The strategy for identifying and recruiting respondents have been discussed a lot and criticized for being seemingly close to 'convenient' strategies. As argued in the previous section, the target group is small because these questions demand special knowledge from the respondents. Finding those with the right knowledge is not easy. In Norway the author knows practically all organisations and most individuals in the target group. His position and experience from working with the major public investment projects for the last 20 years makes it practically impossible to find strategies that would not seem 'convenient', unless the task was given to someone else, less qualified for the job. This strategy would weaken, not strengthen this research. On the international arena there was nothing convenient at all to the recruitment strategy. Finding unknown individuals with the right knowledge, a knowledge that is not formally categorized or defined anywhere has to be a challenge. A mix of identifying relevant positions and relevant publications supplemented with going through other people's networks and relevant organisations was the only choice. Due to the specificity of these questions, a wider, more open survey (less targeted to specific individuals) would only reach a larger number of respondents, not the right ones. This would reduce the reliability of the results, not increase them. Despite the general weaknesses of the survey as a method for gathering precise information, and the specific issues concerning finding the right respondents in this case, this author considers the methodological choice to be adequate for the purpose of this research.

The number of respondents are 80 – not enough to make strong conclusion of what the reality is, but enough to give the necessary indication to form basis for an improvement strategy. The validity is limited, but adequate for the purpose here.

7 Improvement strategies for existing governance frameworks

This chapter specifically addresses the fourth research question: *What characterizes an effective development strategy for improving governance frameworks?* The answer to this fourth question is built directly on the answers to the third research question in chapter 6 and also relates to the answer to research question 2 in chapter 5. An effective development strategy for improving governance frameworks has to start with ***relevance*** first, followed by ***sustainability*** when relevance is first secured. When both relevance and sustainability are in place, other criteria can be considered. Improvements have to address both *values* (embedded governance principles, attitudes, knowledge, and communication) and *structure* (system, process, methods, and tools) at the same time. When only addressing one side (e.g. knowledge), the improvement will be hampered by the other (e.g. the system). The two sides have to be consistent with each other. By making improvements so that the most important challenges are met first, development resources will be managed well and the effect of improvement will come sooner and will be stronger.

7.1 Improvement areas

There are several issues that arise when trying to identify the most effective way to improve an existing governance framework. First, there is the question of how to recognize the need for improvement, i.e. how to assess the existing framework. This will define the starting point of the improvement process. The structure and descriptions developed in chapter 5 may be helpful in this task. Then there is the issue of priority – what to improve first. This is a question of what is most important in terms of increasing the probability of success in the projects. Chapter 6 addressed this. Choosing an improvement strategy that gives maximum improvement compared to the starting point will be effective. Paper 10 address these issues. By accepting that a governance framework has to be continuously developed and improved, and that resource for this work is limited, prioritization will be an important part of the strategy of implementation of the governance framework. This chapter will add some general considerations, but the more practical consequences are indicated in the accompanying paper.

Often improvement processes concerning systems tends to focus the structure and other explicitly described elements. The governance framework is a system on a superior level, indicating there can be a problem also here. In this author's experience

people tend to do the easy things instead of the important things. Following up on the line of thinking from the previous chapter, we should look for the most important things in an improvement strategy. A careful study of the indicated problems and root causes gives a basis for concluding that there is need for a carefully designed improvement strategy that includes measures in several areas. Some of the indications identified are presented in table 7.1.

Table 7.1 Indications of improvement areas based on the two most important causes of problems (underlying reasons) from section 6.4.

Problem root cause	Improvement area
RELATED TO RELEVANCE	
Users' needs are ignored by planners and decision makers due to political or personality reasons	Attitudes, Knowledge, Roles, Control measures
The way the users are asked/participate in the planning process gives the wrong answers/does not unveil the needs	Communication process, Methods of assessment
The objectives of the project are not stated at all, or are expressed in a very unclear manner	Attitudes, Knowledge, Methods of objective development
Users' needs are ignored by planners and decision makers due to political or personality reasons	Attitudes, Roles, Control measures
RELATED TO SUSTAINABILITY	
Not identifying that the project outcome has weak support in its owner- and financing organizations	Attitudes, Communication process, Control measures
Neglecting that the project outcome has weak support in management or accepting weak leadership	Attitudes, Communication process
Neglecting/not solving conflict over priorities among key stakeholders	Attitudes, Communication process, Control measures
Neglecting powerful interacting organizations/individuals in opposition to the project	Attitudes, Communication process
Planning optimism (overestimated benefits) misleads the decision makers, deliberately or not	Attitudes, Knowledge, Methods for benefits assessment, Access to effect data, Roles, Control measures
Bad cost effectiveness is accepted	Attitudes, Control measures
Planning optimism (underestimated costs) misleads the decision makers, deliberately or not	Attitudes, Knowledge, Methods for cost assessment, Access to cost data, Roles, Control measures
The political and administrative setting is changing regularly	Adaptability/Flexibility, Roles

The dominating improvement areas are:

- Attitudes
- Knowledge
- Communication process
- Roles
- Methods
- Control measures

It is important to acknowledge that these improvement areas cannot be improved in the same way, and not all of them are easily improved through system development. This is why the definition of a governance framework as developed in chapter 5 has to go far beyond the management system frequently recognized as its core. Using the two dimensions developed in section 5.3, the improvement areas above are connected to:

- *Embedded governance principles* (values): attitudes, knowledge and communication.
- *Structure of the framework* (system): process, roles, methods, and control measures.

Just for the record; the improvement strategy itself is parallel to the remaining third dimension from section 5.3; *the process of development* (the story).

One specific cause of problems seems to have a different character compared to the others; regularly changing setting. This is the only root-cause that is permanent. In the geographical area covered by the survey democracy and changing conditions, fast development is a fact of life − the only one that can be relied upon, apart from death, some would argue. In this case the challenge is learn how to live with this fact. This is a strong argument for flexibility. Flexibility can be an expression of attitude and a property of systems.

A fundamental prerequisite for the governance framework to be effective and also for the improvement process to work efficiently is transparency. As far as possible transparency has to be achieved in the decision making process, the documents used as basis for decisions, in reviews and monitoring. Transparency is also an expression of attitude and a property of systems. Anyone setting out to improve a governance framework should bear this in mind.

7.2 Improvement strategy

From table 7.1 it is evident there are always connections to both the value side and the system side in each problem cause. This indicates an effective improvement strategy has to involve both of these dimensions. An ‘improvement’ which only addresses the system will not succeed because of value issues, and just addressing value issues such as attitudes and knowledge will not succeed without support through improved structure (roles, process, methods).

Logically an effective improvement strategy has to start with knowing where you are, i.e. assessing the status of the existing governance framework. This will give each improvement process a unique starting point. Then you need to choose where you

want to be, i.e. develop the development objectives. The gap between the development objective and the current status is the need for improvement. This is a well-known, basic structure of any improvement process. Following the discussion in the preceding section, what has been added here is indication of which problems and causes are most important, i.e. that should be given priority over other issues. The structure of the effective improvement strategy is illustrated as a flowchart in figure 7.1. This process is adapted to major revisions, not minor, continuous improvements.

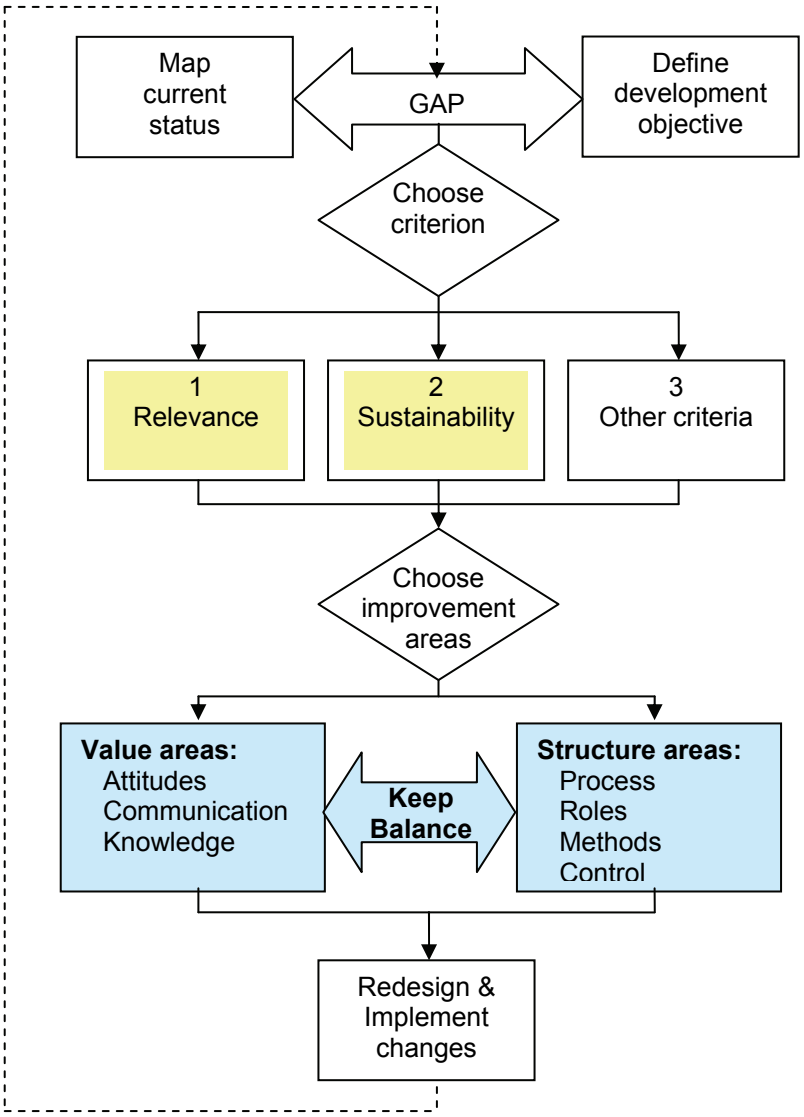

Figure 7.1 Basic structure of an effective improvement strategy for an existing governance framework. Users of this flowchart should start at the top and work their way down following the instructions in this section.

What this research indicates is that the best effect will be achieved if relevance is secured first, then sustainability, and only when these are in place the focus may turn to other criteria (efficiency, effectiveness and impact). For the improvement area given priority, both values and structure have to be considered, as well as how they interact.

In the case of relevance being the chosen improvement area, the focus should be on user needs and project objectives. In the case sustainability is the chosen improvement area, the focus should be on securing lasting effects.

One initial control has to be included before improvement effort starts: Do the existing governance framework have serious flaws leading to obvious inefficiency or unacceptable impacts? In such case these flaws should be corrected immediately. This may be equally effective as the strategy proposed above in certain situations. To use a metaphor; fixing serious flaws is an immediate repair – you don't focus on how to optimize your carburettor to reduce NO_x emissions if you cannot even get your car started. The starter has to be fixed first, in order to make the improvement attempts meaningful. This is a practical, rational task, not part of the research and thus not included in figure 7.1.

When the process has come to the bottom of the flowchart in figure 7.1 the task is implementing changes to the current governance framework. This changes the current status and gives a new starting point for improvement. Thus the dashed arrow back to the top. This is an recurring process of improvement.

The research in this chapter does not enter the domain of one specific governance framework, thereby eliminating the possibility of considering what would be the best measures on a more detailed level. Depending on the gap identified as the starting point, the need for specific improvement will appear different in each case. The following serves as an example.

> Given the typical situation representative of the experience of the respondents in the survey discussed in chapter 6 and in paper 10; in cases when sustainability is the chosen criteria, the focus should be on conflicts and commitment among key stakeholders and economic/financial and other business conditions. The reason for this is that these are the most important reasons for lack of sustainability. If, for instance, the chosen reason to act on is lack of commitment from key stakeholders, this would then be considered the most urgent problem to solve. If focusing on the causes of this problem, the issues would be identifying and improving cases where the project outcome has weak support in the owner and financing organizations and where the project outcome has weak support in management of the agency or operating organization. In the example, the chosen improvement area could be the communication process between the key stakeholders, because this seems to be the weakest point in the process of developing the public investment project according to the current situation, and it is thought to have much impact on the problem. At this stage it is important to consider more than just the communication process in terms of structure of the process (communication channels and arenas, reporting procedures, documents). It is important also to consider the value side (attitudes, communication skills, methods and tools to enhance communication ability).

More details about the options can be found in table 6.1, table 7.1 and paper 10. In a real situation the consideration has to be based on a gap analysis reflecting the realities of the situation at hand, in the actual country and sector, not on the aggregated impressions from this or any other survey.

7.3 A conclusion to improvement strategy

To make the conclusion short, here is the improvement strategy in compressed form:

1. Perform a gap-analysis based on the current status of the governance framework (map of current situation) and the development objectives of the owner (where you want to be in the future). Identify where the current situation is not acceptable.
2. Check the need for immediate repairs. Supplement missing elements and react to flaws in existing elements or values that obstruct the effect of the governance framework.
3. Choose the appropriate development criterion to focus: If the current situation involves initiating investments that are not relevant to the users or the problem to be solved; this has to be fixed first. If relevance is well taken care of and the current situation includes initiative investments that are not sustainable; this has to be fixed first. If both relevance and sustainability is OK, there will be improvement potential concerning other criteria, and the focus is now on those considered most important in the actual situation.
4. Choose the improvement areas involved in fixing the situation. Remember; the chance is you can not improve by just changing the structure, roles or methods. Such improvement will be obstructed by attitudes, communication or lack of knowledge, unless you do something to improve the important factors at this side too. If the problems are found on the value side – lack of communication etc. you will also have to consider changes in structure, documents etc. A balance has to be maintained between the structure side and the value side.
5. Redesign the governance framework (see chapter 5) and implement the new or improved governance framework. Implementation is outside the scope of this dissertation.

7.4 Validity of the improvement research

The validity of the survey identifying the most important problems in the front-end and their root causes is addressed in chapter 6. When this fundament was accepted as valid, this also represented accept of the basis for table 7.1. This table is the basis for the discussion in this chapter. Considering the low level of precision in detail needed from table 7.1 this seems to verify that there is no problem in accepting the less than optimal methodological issues concerning the survey.

What is done in this chapter is combining the information in previous chapters and adding practical experience and inductive logic to tease out a practical strategy for improvement of governance frameworks in general. The reliability is not considered strong in this chapter, although the result seems practically reasonable. The validity is limited due to the fact that it in current form is very much the work of one single individual. To strengthen the basis for the conclusions in this chapter, added literature studies and involvement of more than one researcher would be useful.

8 Fundamental definition and design of projects

This chapter specifically addresses the fifth research question from chapter 3.1: *How can a public investment project be charged with an appropriate direction and the right level of ambition?* Previous chapters have focussed on governance and governance frameworks established by the project owner to ensure that investments are potentially successful in a strategic perspective. The aim of such an approach is to develop relevant projects delivered efficiently and with sustainable effect, or cancel them when appropriate. Finally, it is time to look at projects. The interpretation of the question comprises the following two aspects: the direction expresses where to go, clarifying the results, and ambitions express the degree to which the project needs to stretch, and what level of achievement is expected. The answer to the question turns around two concepts:

- ***Project definition***: The definition of objectives based on society's and users' needs. The choice of which objectives to define on strategic, tactical and operational levels will determine the *direction* of the project.
- ***Project design***: The definition of the means to achieve the objectives depends on identifying the possible means and their anticipated effect. The most critical issue is securing consistency. The constraints that lie in combinations of availability of resources and present uncertainties determine what is realistic and thus contribute to defining the right level of *ambitions*.

8.1 Linking projects to the dissertation theme

It has been shown in chapter 4 that governance of projects includes both command and control aspects representing the project owners' need for assurance that resources are spent wisely, and the support and empowerment aspects representing the project organization's need to have a reasonable chance to succeed. Chapter 5 discussed the structure and content of governance frameworks and how they can be designed or redesigned. These governance frameworks are created to establish a best possible environment for the development of successful investments, in this dissertation's perspective preferably organized as projects. Chapter 6 indicated the most important problems in the front-end when pursuing relevance and sustainability. Chapter 7 followed up and indicated how to achieve an effective improvement strategy for governance frameworks. This chapter moves on from there and for the first time in this dissertation the focus is on the project. The consequence of changes in the governance framework will naturally be changes to the way projects are initiated, planned and executed. The last part of this study focuses on such consequences.

The link to previous chapters is weak in the sense that there is no direct causal or logical connection. When taking the step from frameworks to projects there is a wide range of issues that could have been chosen for the purpose of this study. One possible approach could have been to look at the results of the survey (reported in chapter 6) and specifically at improvements in projects to handle the most important challenges in the front-end. However, it was decided not to do that, but this may followed up at a later stage or taken up by other researchers. Instead, it was chosen to include an analysis of empirical data from a large number of cases studying how projects are defined and designed. Survey results are also included. The survey reported in chapter 6 had three parts, of which part 3 was developed to become supplementary to the empirical data in this chapter. The intention in this chapter is to give some indications as to how goals and ambitions are handled in the definition and design of projects. Governance frameworks represent an instrumental approach to securing success in investment projects. This chapter will give indications as to whether projects are able to live up to the ambitions of instrumental logic expressed through the governance framework.

8.2 The fundamental logic in projects

As indicated in figure 2.1 and expanded in figure 6.1, there is a strict logical sequence in the life of the results of a project. Although this sequential logic may be less obvious in practical life than in theory, due to parallel processes and tasks, e.g. concurrent engineering, multi-tasking, 'crashing' of progress, or the iterative nature of development, this fundamental logic is accepted as a basis for the research in this dissertation. This logic is developed further and expanded in figure 8.1 to indicate the most fundamental processes and decision points in the front-end of projects. This instantly reveals that there might be more than one fundamental logic in projects. Some of these options will be indicated and discussed in the following.

Turner (2006, p. 93) defines the three inherent steps in a project's life cycle, of which this dissertation investigate the first two (these are important in the front-end):

- definition – when the objectives are designed (here, project definition)
- design – when the means of obtaining those objectives are defined (here, project design)
- execution – when the work is done and performance monitored (project execution is outside the scope of this work).

Drawing a line between project definition (choosing or developing) objectives and project design (choosing or developing means to achieve the objectives) may be helpful in order to reduce mixing goals and means – a frequent mistake in defining project objectives. See, for example, the discussions in the accompanying paper 11. This paper looks specifically at how objectives and goals are handled in major Norwegian public investment projects. Further, in this chapter both this and other fundamental logics in project will be discussed.

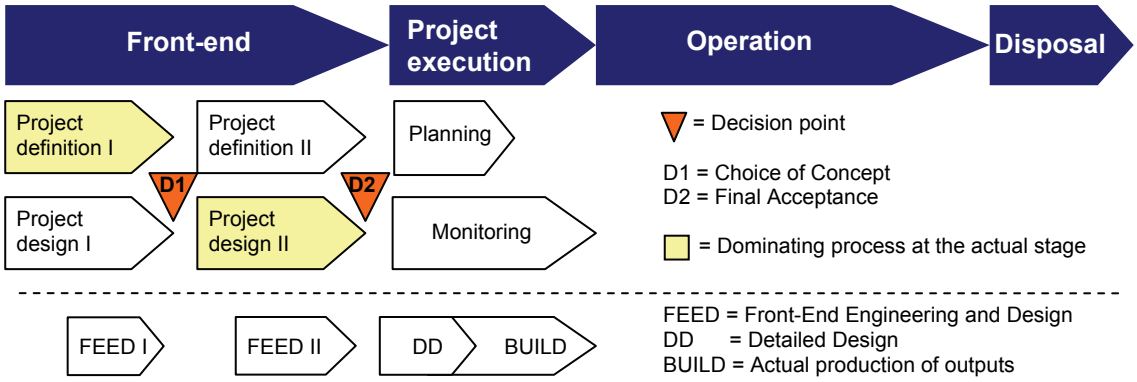

Figure 8.1 Front-end phase expanded to identify fundamental processes and decision points. The processes and decisions in the front-end have to consider consequences in all phases of the life cycle of the outputs.

One aspect of figure 8.1 is that it draws a line between the design of a project and design of the results (outputs). This line is important to avoid misunderstandings in the following discussion. This chapter only discusses the design of a project, not the design of the output. The design of a project produces a strategy for how the project shall be executed. The design of the output produces a specification of how the output shall be. As indicated, there has to be some outline design in the front-end, and this is often called FEED (Front-End Engineering and Design). The purpose of this early output design is to find the comparative values needed to establish a basis for the all important front-end decisions: which alternative to develop into a solution (the choice of concept – D1 in figure 8.1) and the decision to finance and issue a mandate to execute the project (final acceptance – D2 in Figure 8.1).

The development of the outputs starts with no details and is gradually refined into a more detailed and precise definition of what the result of the project is going to be. This is mirrored in the terms ‘conceptual design’ or ‘outline design’ used in the front-end, and ‘detailed design’ used in the execution phase. The design of the output is closely connected to the choice of means to achieve objectives. The definition of means includes trade-offs between benefits and costs connected to alternatives to find the best way to achieve goals. In fact, there is a wide overlap in practical terms. This makes it difficult to distinguish clearly between design of the project and design of the output, and in practice there may not always be a need to treat them separately. Here, the dividing line is kept strong to try to help differentiate between the concepts. Hereafter, the design of the output is not discussed in this dissertation.

Means on one level may be seen as the goal on the next level: the use of resources is a means to produce outputs, outputs are means to achieve the intended outcomes, and the outcomes are means to serve a purpose for the project owner. On every level the objective explains ‘why’, and the means explain ‘how’. Youker and Brown (2001) explain this Why-How Framework referring back to the Means-End Chain developed by March and Simon (1958). This is a fundamental logic embedded in projects. Although the Why-How Framework is not explained further here, it is potentially an important tool for the development of objectives and associated means – the project strategy.

The Project Management Institute (PMI 2004) uses the following groups of project management processes: initiation, planning, executing, controlling, and closing; thus, it indicates that these are generic parts of any phase or activity. These processes are appreciated as important concepts in project management, but in the context of this thesis a simpler approach is used. Besner and Hobbs (2006, p. 14) concluded that the use of the word 'initiation' to identify both the front-end phase and the initiation process in the above explanation is not helpful. They point out that the front-end, including initiation of the project, is very different from other phases in the project life cycle.

The issue in this chapter is project definition and project design, as defined by Turner (2006, p. 93). These processes are limited to the front-end, as indicated in figure 8.2. In the project execution, planning and monitoring are used to illustrate project management processes. In practice, the indicated processes may be sequential, parallel or iterative, depending on the situation. Hereafter in this dissertation the project management processes are not discussed.

Project definition I and Project design I lead to the choice between relevant alternatives (D1): the choice of concept. The chosen concept is developed through Project definition II and Project design II towards the final decision to finance and execute the project (D2): the final acceptance. Project definition is the process of defining the goals for the project. Project design is the process of choosing the means to obtain these goals. This is described as 'inherent steps in the project life-cycle' by Turner (2006, p. 93). The processes indicated in parallel are strictly iterative: changes in one process initiate response in the other. Over time new knowledge of the project and its context emerges and has to be included. Goals and means are consequently developed over time to become more specific and they influence each other. Therefore the development process should include careful consideration of goals as well as means iteratively.

The above considerations will continue into the execution and operational phases of a project, although changes in these phases have to be even more carefully considered as the consequences of changes may be complex and increasingly incompatible with work already done in the project. Note that the continued considerations of objectives (definition) will typically continue as a governance function. Consideration of means (design) will increasingly over time be closely connected to execution and thus a responsibility of the project management/project organization, but when the results of the project are delivered this responsibility is passed over to the operating party. The considerations must include assessments of whether the changes will give sufficiently sustainable benefits to accept the negative consequences of change. As reported in project experience reports (e.g. Norwegian Official Reports NOU 1999:11; Whist et al. 2001; National Audit Office 2002; 2003; Fraser 2004), changes in the execution phase usually create problems from the executing party's perspective. The project owner, however, may well choose to induce changes late in the process in order to increase the value of the investment in the long run. This is important because the strategic perspective is the dominant one over the executing perspective and thus changes cannot be ruled out just to protect the execution of the project. On the contrary, the project is a means, not a goal in itself, and should always be considered

secondary, both to the strategic perspective, and the operational- and users' perspective. Consequently, the whole life cycle of the outputs has to be considered.

The disposal phase is also interesting in itself, for at least two reasons. Firstly, the way an asset is disposed of will be decisive for how sustainable the current project is, and the economic result. Disposal has a net contribution to the economic outcome of the project, in some cases positive when an asset can be sold, or negative when an asset has to be scrapped or demolished. Secondly, the disposal phase is interesting because it is a result of an asset no longer being viable or fit for purpose, indicating there is a need for a new project. The disposal phase of the current asset will to a great extent overlap with the front-end of the next potential project. Although the execution-, operation- and disposal phases include interesting challenges for research and methodology, I will return to the front-end and the fundamental processes there in the following.

In figure 8.2 a fundamental logic of projects is developed with a focus on how projects develop from an identified need to a sustainable effect. In order to define a relevant project, the project has to be based on the real needs of society and the users. As shown in chapter 6, being relevant is a requirement for a project's outcome to be sustainable. Consequently, this is where project development has to start. The next fundamental step is to interpret these needs into objectives and formulate them as goals to give direction to the further development and to express the project owners' level of ambitions. This project definition is decisive for the development process.

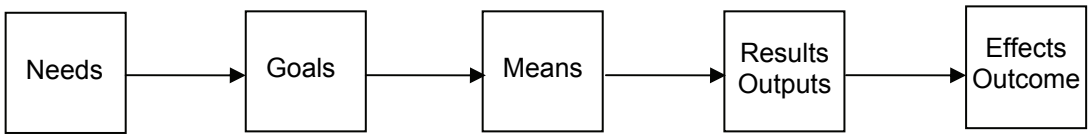

Figure 8.2 The fundamental logic of projects and other goal-oriented initiatives.

When an understanding of the goals is established, the next step is to choose appropriate means to obtain the goals. In this respect, the questions of efficiency in transformation of resources into results and the effects of the use of these results will be most important. This is called project design in the front-end. When the development of means reaches the execution phase it becomes part of the detailed design processes. The execution (actual realization of the means chosen) produces a result – an output. In public investment projects this result is often a physical object, an electronic system or change in an organization. When the project has delivered a result (output), the use of the result determines what the effects are (outcome). This is explained in terms of three perspectives in paper 11: society's perspective (strategic), users' perspective (tactical) and executing party's perspective (operational). The executing party's perspective focuses on the production of outputs. In the short-term perspective, focus is on the users' acceptance and embrace of the delivered outputs. In the long term, the focus is on the societal effects of this use – the outcome for society as a whole.

In paper 6 another fundamental logic is presented: the Logical Framework Approach. According to this logic, the three perspectives are used to test assumptions and

uncertainties on each level. The framework and its use have been described earlier and will not be repeated here.

As a last contribution to describing the fundamental logic of a project, figure 8.3 shows the main trade-offs in project design. These are usually addressed in a feasibility study. It may be argued that this might be an inherent step of its own in the project life cycle (Turner 2006, p. 93), but in this context it is seen as the key issue of the interactions between project definition and project design. The main considerations and trade-offs are as follows:

- Outcomes versus Outputs: Which outputs create the best starting point for creating the intended outcomes. Iterations: if the outputs are not likely to create the intended outcomes, they have to be reconsidered.
- Goals versus Means ('Why's versus 'How's): Which of the means best meet the goals established for the project. Iterations: if optimal means are not available, the goals may have to be redefined.
- Benefits versus Costs: Which alternative means is preferable, given its combination of costs and benefits. Iterations: the consideration of one benefit at one cost versus another benefit at different cost is part of a complex of evaluation criteria, indicating a need to reconsider until the best combination is found.

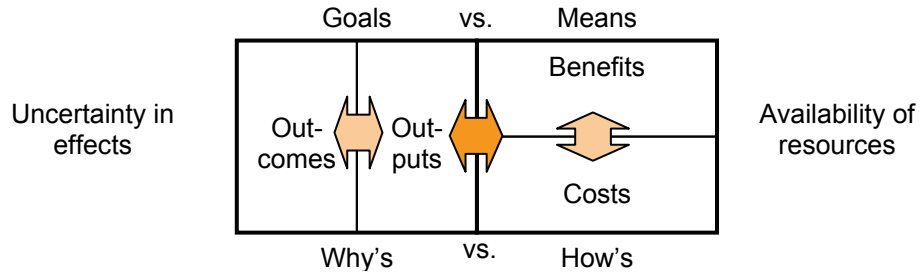

Figure 8.3 Fundamental trade-offs in feasibility studies. The interactions in project definition and project design include elements of trading off between different considerations. Key trade-offs are indicated by double arrows.

All of the considerations and trade-offs listed above have to take into consideration the uncertainty attached to all assumptions, whether on the benefit or cost side. Also, all considerations have to consider available resources and other restrictions. Limitations and restrictions are often the practical reason for having to reconsider. These trade-offs form the core process of feasibility studies.

In the beginning of the development process the trade-offs mainly focus on developing and choosing the right objectives (project definition), later these trade-offs are more focussed on developing the business case and ensuring the trade-offs are balanced, leading up to the choice of concept. Through the project design process the focus is on proving the value of the investment, leading up to the final acceptance. The outcomes versus outputs trade-off dominates in the project definition process, and

the goals versus means and the benefits versus costs trade-offs dominate the project design process.

It is important to remember that a given investment is always a part of a bigger picture; the project is a means to obtain objectives. In this introduction I have tried to clarify some of the concepts which will be discussed in the following sections. When these causal chains of logic and processes are branded as 'fundamental' in this chapter, it expresses the notion that these processes are always present in the early development of a project, and that the logical steps explained above can be identified and are necessary in every project development. As will be described in later sections in this chapter and in Paper 11, this logic represents a structure that has to be mirrored in the definition and design of a specific project. It should be addressed in project documents and assessments.

The description of a 'fundamental logic' illustrated by boxes and arrows (fig. 8.3) automatically gives a strong hint of rationalism and instrumentalism. I have accepted this as a starting point. Projects are a rational tool designed for a purpose. However, this description should not lead the reader to think the context is less important. Any of these processes are parts of an open system with reciprocal influences between the wider environment and the processes within the project (Engwall 2003; Söderlund 2004; Cicmil et al. 2006; Pellegrinelli et al. 2006). There is also a strong influence arising from limitations to the rationality (Simon 1957).

So far, I have maintained a positivist position in this discussion. Taking an alternative position, viewing the processes discussed above from a constructivist perspective (cf. the contributions in Hodgson and Cicmil 2006, *Making Projects Critical*), these 'fundamental logics' would be highly questionable. It would bring in other issues and lead to other conclusions, as is demonstrated by Thomas (2006). She looks at similar expressions of prescriptive logic in project management (statement of work, work breakdown structures, time planning techniques, etc.) and points out that practice includes contradictions that limit communication on issues not prescribed by these structures (p. 192), and that the logic represents self-propagating structures that may reinforce itself to the degree that it becomes a threat to the success it was intended to support – over-rationalization and documentation of 'one right way' (p. 194). Linehan and Kavanagh's (2006) approach is another example showing an alternative perspective. They propose two ontologies: the 'being' ontology, which describes the world as objects, things, states, events, and which describes the world using nouns (p. 52); and the 'becoming' ontology which emphasizes process, activities, construction of entities, and describes the world using verbs (p. 54). One point of the 'becoming' ontology is that is constantly question categories and divisions that are routinely seen as fixed (p. 55).

The examples mentioned above represent exciting new ways of discussing project reality. They are supplements which certainly may help improve the probability of success for all parties involved in projects, including within the logic described above. If we were to look at the fundamental logic according to the 'becoming' ontology, where the development represents a process of negotiation and use of power and persuasion where goals emerge and the means to reach them are developed in conflict or harmony, the focus would be on the communication process instead of on structures and roles, etc. At this point, I will leave this alternative ontology, well

aware that it exists and contributes to the understanding, even with a starting point in the 'being' ontology.

Although the model itself (the symbolism in the figures) seems to suggest precise causality, this is not how reality works, as pointed out by many authors (e.g. Engwall 2002; Eskerod et al. 2004). However, it is important to keep in mind the need for ability to predict. Without acceptance of any causality, all means to plan would be lost (Næss 2004a).

8.3 Theoretical aspects of project definition and design

8.3.1 Defining a project

Meaning of the terms project definition and project design in literature

The decision making literature includes relevant contributions to understanding how projects are identified and defined (Keeney 1996; McDaniels and Gregory 2004), and the economic consequences of imperfections in this process (Hendry 2002). A literature search (Compendex (database), search words, project definition, project design) gives a result that indicates the historic development of the project definition approach. In the early 1990s the issue of project definition received much attention and some contributions were added later. Some contributions looked at project definition processes in specific sectors: in construction (Beal 1990; Kähkönen 1999), software projects (Bimson and Burris 1989; Lobsitz 1996; Metcalf and Lynch 2003), and in general (Ramsay-Connell 1991; Giard 1992; Bates 1994; Neal 1995; Fangel 2000). There is a tendency in these contributions to discuss a wider concept of project definition, often similar to 'project planning'. This probably stems back to the 'Downey Report' (Downey 1969), which defined a project definition study phase that subsequently was made mandatory in some sectors, such as the defence sector (Williams 1994a). The Downey Report includes a division into a Project Definition I (DP1) and II (DP2) similar to the one shown in figure 8.2. However, it has a wider scope, including both defining the project and its output. Most contributions have a similar scope in Finland (Kähkönen 1999), Australia (CIDA 1994), the UK (Williams 1994b), and the USA (Gibson, Kacczmarowski and Lore 1995). Some literature is more limited in scope and focuses on design as only the development of the product or project result (Cooper et al. 2003).

The most comprehensive research on project definition reached its peak at the Construction Industry Institute (CII) around the year 2000 (Hamilton and Gibson 1996; Chung-Suk and Gibson 2001; Gibson and Gebken 2003), introducing the Project Definition Rating Index (PDRI), a comprehensive tool for assessing maturity in project design.

The PDRI methodology is based on assessing a large number of elements divided into three different sections in the project score sheet: I) the basis of project decision; II) the basis of design; III) the execution approach. Section I comprises business strategy, owner philosophies and user requirements. Section II comprises site information, building programming, building/project design parameters and equipment. Section III

comprises procurement strategy, deliverables, project control, and project execution plan. The description of the PDRI reveals that there is more than one possible use of the word 'design'. In this dissertation the 'design' means establishing the overall structure of the project. In category II of the PDRI the meaning of 'design' is development of details (engineering, producing working descriptions, blueprints). This use of the word in the construction 'project design' is confirmed by searching for 'project design' in literature. These search results all refer to engineering. 'Project design management' is used similarly for the management of design teams (Girard and Robin 2006; Hamilton 2007). It is important not to confuse these concepts. The PDRI is relevant here because it is an example of a tool for assessment or review of the project design, in accordance with the purpose of this chapter. However, it is well documented by the authors from the CII and will not be discussed further here.

Big or small efforts in the front-end of projects are believed to be consistent with good or bad project design. The Downey Report (Downey 1969, p. 69) suggested that up to 15% of the total development cost should be invested in the project definition, depending on technical novelty and complexity of the project. This has since been used as a rule of thumb for indicating good practice in front-end planning.

Stahl-Le Cardinal and Marle (2006, p. 232) indicate that the amount of effort in the front-end of projects is important: '*building a correct project structure is achievable and gives more guarantee for success. On the contrary, a bad structure is a guarantee for failure: failing to plan is planning to fail.*' They refer to a Standish Group survey indicating that:

- 80% of project success and failure may be linked to planning, such as bad scope definition, bad stakeholder analysis, bad activity decomposition, and bad resource assignment.
- 21% of the successes in projects result from the definition of objects.
- 32% of the failures in projects are caused by definition of objects, decomposed into complete (or not), realistic (or not) and stable (or not) specifications.

Obviously, the amount of resources/hours spent in the front-end does not directly indicate the quality of the definition and design activities or the end result/documents produced by these activities. However, the amount of effort is likely to indicate how much consideration is involved and how well the basis is worked through. Even though it cannot indicate the quality in single cases, putting in much resource in the front-end is likely to make sense as a general rule of thumb.

Some contributions also indicate the consequences of the effort in the front-end in measurable terms: Hamilton and Gibson (1996) indicate the following, based on benchmarking a large number of projects:

- 20% cost savings with a high level of pre-project planning effort
- 39% schedule savings with a high level of pre-project planning effort.

Cho and Gibson (2001) indicate the following based on comparing projects with a high PDRI score (high level of maturity) with projects with a low PDRI score (low level of maturity):

- 19% average cost savings compared to the expected for design and construction
- 13% schedule reduction compared to the expected for design and construction
- Fewer project changes
- Increased predictability of operational performance.

As this search result indicates, the discussions about project definition and project design reached a peak in the early 1990s, peaked again around 2000, and have been a recurring issue since then. The importance of the issue is well documented in the contributions referred to above. The meaning of the words have developed over time, from encompassing project planning as a whole in the early days, to the present day, when the meaning of words may have been settled by Turner when he specified definition, design and execution as the three inherent stages in a project life cycle (Turner, 2006, p. 93). This research builds further on these contributions and recent work by other authors.

Objectives – defining the project goals

The objectives are at the core of the project definition process. Objectives, expressed through a purpose on the highest level, should be broken down into goals, formulated to serve as a tool for project development and execution, and even specific targets with measurable characteristics expressed through indicators. As indicated in figure 8.4 (based on Klakegg 2004, p. 16), goals (and the corresponding measurements) have purposes in at least two important meanings: horizontally, as part of the needs–effect causal relationship as previously indicated, and vertically, as part of the learning process.

The new contribution from figure 8.4 in this setting is the vertical learning dimension. Learning is often under-communicated, and sometimes taken for granted. From experience there is no evidence that the learning is taken well care of, not even when it is explicitly mentioned in governance frameworks and reporting intended to support learning is explicitly demanded. This message could be placed into any of the chapters in this dissertation, but it is most appropriate here, focussing on goals. Learning is a prerequisite for improvement. In the context of this chapter it is a prerequisite for getting closer to answering the research question: how to charge a project with the right direction and level of ambition.

Norms are ‘limits’ or ‘standard’ values useful as the starting point of any project definition. Some norms indicate what is typically considered acceptable needs or values of effect. They come from aggregated experience over time, collected in measurements and assessments. Norms express either standard values (typical values) or limit values (minimum and/or maximum values). Norms may also express rules or values in terms of how things should be done, i.e. patterns of conformity. Norms can be used to establish an expression of needs or to help express objectives. The actual needs in each case have to be assessed even if there are established standards or norms for the purpose of general planning.

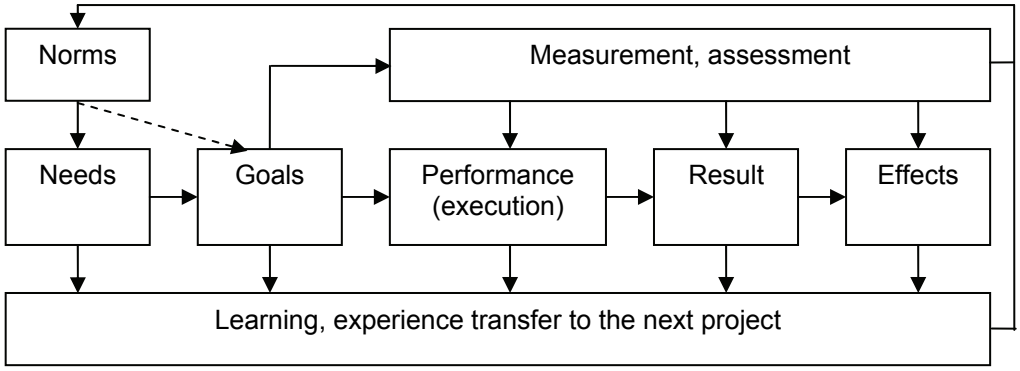

Figure 8.4 Goals as part of two dimensions, the horizontal (left to right) dimension being the Needs–Goals–Means–Effect causal logic and the vertical (top to bottom) learning process (adapted from Klakegg 2004, p. 16).

Project definition includes the use of norms and the result of systematic needs assessments to define which goals are appropriate for the initiative in question. This is obviously a process that is dependent on having very good knowledge of the needs and priorities of the stakeholders (Youker and Brown 2001; Næss 2004b; Stahl-Le Cardinal and Marle 2006). The best way to achieve this is through participation (particularly by decision makers but also users and other stakeholders) in order to make sure the needs and priorities are well understood, and in order to align objectives among the participating groups, as indicated in paper 10 and other literature (Drucker 1954; Næss 2004b; Sager 2006).

The overall purpose of goals is to ensure that a project can be successful. Goals have many functions (based on Stenberg 1987; Kolltveit and Reve 1998; Westhagen 2002):

- Create common understanding of what the purpose is
- Create motivation
- Clarifying what the project tasks should result in (defining the deliverables)
- To make planning and execution possible.

Obviously, these functions overlap and coexist. The first two are very closely linked to the individuals taking part in project development: they need to understand the purpose and find motivation to participate in the efforts to reach the goals. The latter two are more directed towards explaining the results, for the planners and executers to be able to understand and do their job. These functions point towards the content of the project.

Objectives and goals are logically closely connected to society's and users' needs. There are basically two different ways of identifying such needs: by having planning experts who monitor and analyse the needs and continuously identify and express them, or by asking the users and other stakeholders themselves in a participation process. The first solution is the traditional choice in public planning. It may be the most efficient and is often necessary for practical reasons (access to data and tools, the need for quick results). The process depends on expert knowledge and also rational, systematic methods and tools. This solution has received attention in research (Sager 1991; Næss 2004b; Olander 2007). The second solution seems intuitively sensible, despite being more challenging to use, and is also indicated as an improvement

possibility in paper 10. Involving the stakeholders makes the process more complicated and uses resources, but on the other hand it also has advantages, such as improved communication, and realism in assumptions and alignment of objectives. There has been a lot of research in this field too (Keeney 1988; Bierle 2002; Sager 2006). Bierle (2002) looked into the question of whether the involvement of stakeholders would give reduced quality in the decisions due to less weight on the rational methods and objective facts. He reported a study of 239 cases and concluded that the increased access to information and ideas, even technical and scientific resources and analysis in intensive stakeholder processes, results in higher quality in decisions than using traditional approaches (status quo). In this dissertation, this is considered an indication that public investment projects should include both types of processes.

The main concern for project definition is to understand how effects are connected to the needs on both a strategic level (society) and a tactical level (user level). What effects will give the users and society maximum benefit? Only when this connection is adequately understood is it possible to identify the relevant objectives. In order to define the right level of ambition there is also a need to understand the limitations as to what is possible to achieve.

Another perspective on objectives and goals is that an important function is to make it possible to evaluate whether a project has been a success or a failure. This will, however, point towards ex-post evaluations, which are not included in the scope of this dissertation.

8.3.2 Designing a project

Design as tasks executed to attain goals

Whereas definition was the focus of the previous section, in this section the focus turns towards project design – how the means to achieving the goals are chosen and defined in accordance with the definition given by Turner (2006, p. 93). Also, 'project design' may have ambiguous meaning, since 'design' traditionally is used for the development of specifications for a product (the deliverable of a project) (Cooper et al. 2003, p. 368). In this dissertation it means defining the means to reach the project goals. This issue is also addressed in papers 6 and 11, specifically in the form of the best practice standard, the Logical Framework Approach (LFA-method). The LFA-method is described in other sources (Samset 2003; Örtengren 2004) and will not be presented here. Figures 8.1 and 8.2 are relevant and will be referred to in the description here too.

Figure 8.1 indicates a strict logical structure connecting needs to objectives, and further to means and effects. Obtaining this logical connection is the basic issue in project design. Again, as noted above, it is necessary to acknowledge the limitations to the possibility to create strict causal chains such as this one, but as long as it is accepted that it is purposeful to look at projects as a rational tool for implementing decisions and look at the implementation of governance and management from an instrumental perspective, the need to make these structures as logical and consistent as possible it is also accepted. In section 8.2 the fundamental assumption was that

objectives have to be linked to society's and users' needs. In this section, a similar assumption is that means have to be linked to effects. The argument for this is simply that the purpose of the means is their intended effect. When choosing the means to obtain the objectives, the question is really to find the means with the best possible effect – the ones that are consistent with the needs behind the chosen objectives.

Project design as project strategy

As pointed out by several authors (Youker and Brown 2001; Samset 2003; Stahl-Le Cardinal and Marle 2006), there are many ways to go wrong in defining a project. This is also supported by a long tradition of research into project success and failure, as indicated in paper 10. Some of the causes of success and failure are more fundamental than others. In this chapter, two of the causes are addressed: the definition of objectives and the design of a fundamental structure (principal means) to achieve the objectives. They make up what some authors refer to as the project strategy (Youker and Brown 2001; Samset 2003). Other authors show that project strategy has remained an ambiguous term and introduce a different project strategy concept altogether (Artto et al. 2008). Accordingly, other terms are used here too. The main elements of project design as identified by three authors are shown in table 8.1. All of the contributions have been processed and restructured to make comparison easier.

Samset (2003, p. 114) discussed the 'project strategy' and how it should be evaluated. Like Youker and Brown (2001), he built on experiences from international development projects and extracted experience relevant in a more general setting. Youker and Brown (2001) focussed on the development of a hierarchy of objectives as part of a project design. Stahl-Le Cardinal and Marle (2006) used the term 'project structure definition' and discussed experiences from industry projects. Although the starting point and intention of these three contributions are different, they all have interesting aspects.

Stahl-Le Cardinal and Marle (2006) described how to design a project structure and focus on introducing three important inputs into the process: initial situation (where we are), objectives (where we want to go), and environment (what is around us). This is, of course, an important starting point. I have added the division between the objectives and means category to show explicitly that not only the project definition stage, but also the project design stage is covered. The aforementioned authors discuss from an operational perspective. Their scope is to describe the whole development process needed to define and design a project and the fundamental logic. The two other contributions referred to in table 8.1 suggest the Logical Framework Approach (LFA) for this purpose. The LFA covers all elements indicated under the headings of initial situation, environment, objectives, and means. Consequently, all three contributions in reality cover this aspect of the discussion. They point to the importance of flexibility and robustness in alternatives and the resource assignment process.

Youker and Brown (2001) described a process limited to the definition of projects. Their contribution is largely consistent with that of Stahl-Le Cardinal and Marle, adding more focus on the hierarchy (structure) of objectives from a strategic perspective. Whereas Stahl-Le Cardinal and Marle indicated that a defined project has

to be decomposed (i.e. is given by the owner), Youker and Brown pointed to the need for developing common understanding and commitment to objectives, and identifying strategic alternatives. Objectives and strategic alternatives are interlinked and this has implications also for the project definition process, as indicated in table 8.4. The two processes are interdependent and cannot be disconnected from each other.

Table 8.1 Project design as described in three different contributions. Crudely reorganized and processed by the author for comparison and discussion.

Stahl-Le Cardinal and Marle (2006)	Youker and Brown (2001)	Samset (2003)
Initial situation		
Corporate strategy		
Standards		
Resources, constraints and assumptions	Assumptions	Realism in view of available resources and time frame
Environment		
External influences		
Objectives		
Needs	Common understanding of what the project attempts to achieve	Direction and level of ambition
	Hierarchies of objectives (Why-How framework)	
Requirement definitions		Confounding and conflicting objectives
	Commitment to objectives	
Performance indicators	Results measures	
Means		
Homogeneous decomposition of project (Work Breakdown Structure, Product Breakdown Structure)		Attribution of anticipated effect
Alternatives, flexibility/robustness	Strategic alternatives	Effect of changes in strategy during implementation
Resource assignment process		
	General control	**General control**
	Check for flawed logic	Consistency in logic

Samset (2003) described a process to review the project definition and design (he used the term 'project strategy') of the project. This is obviously a different purpose to the two other contributions and a direct comparison thus has many limitations. Organizing the elements of this contribution in the same table as the others makes it possible to look for parallels and try to identify what the important elements in the project design process are. Whereas the first two contributions described what to do (and to some extent how to do it), Samset described what to look for in these considerations. Samset's contribution makes it even more obvious: the project definition stage and the project design stage are interlinked. As indicated by Youker

and Brown and also Samset, checking for consistency in logic throughout the project definition and design is crucial.

Together, the three contributions referred to in table 8.1 form a rich source of knowledge about designing projects, as indicated by the choice of words in the table. For more detailed explanations of the words and concepts appearing in the table see the original sources.

Learning is obviously an important dimension in any project process, not least here. The link that makes the issue of learning arise here is that Stahl-Le Cardinal and Marle (2006) point out that objectives are decomposed into goals and targets suitable for measurement. The results of these measurements are equally important for learning as they are for control and management, especially when discussing the more fundamental issues in a project (ref. figure 8.4 and Klakegg 2004, pp. 111, 129). Measurements are fundamental for establishing and maintaining norms. Learning from previously defined goals and chosen means is the basis for later project definition and project design. The measurement of results is important in order to assess failure and success in project execution (referred to as the short learning cycle in figure 6.1). The measurement of effects in the long run is the ultimate test of a project design (the long learning cycle in Figure 6.1). This topic is examined by Andersen et al. (2008) and will not be discussed further here.

8.4 Empirical indications related to project definition and design

8.4.1 Indications in Norwegian public investment projects

Indications of the importance of project definition may be found in many forms and in different contexts. One indication is found in the very structure of the expanded Norwegian governance framework established by the Ministry of Finance in 2005. The Quality Assurance Scheme is explained briefly in section 1.4, chapter 5 and in papers 4 and 7. Quality Assurance 1 (QA1) concerns the choice of concept and is thus at the core of the issue discussed in this chapter (see also figure 8.1). Such quality assurance has the following structure, expressed through the list of documents subject to QA1 (and thus the control activities involved):

- Needs analysis
- Overall objectives and strategy document
- Overall requirements specification
- Alternative analysis.

The above list sums up the logic presented in table 8.1 in a simple way. The first step is to analyse society's and users' needs. This identifies the purpose of a project and what is to be achieved. The next step is to analyse the assumptions and requirements, taking into consideration the initial state, available resources and constraints. This is followed by the definition and formulation of objectives, goals and targets, describing what to achieve. Such documentation shows how the fundamental logic of the project

is puzzled together. Then there is the analysis of strategic alternatives, including assessments of benefits and costs, concluding whether the alternatives are worth implementing or not, and giving advice on which alternative to choose. It is too early to draw conclusions as to whether the introduction of this simple but principal structure in Norwegian major public investment projects has actually made a difference, as only a few projects have been subject to QA1. However, the very existence of QA1 is an indication of the perceived importance of these matters. Analysing the effect of QA1 will be an important future research task.

In Norway many projects have been subject to Quality Assurance 2 (QA2) – an assessment conducted before they are approved in Parliament (more details in section 1.4). Although (at the time of writing) not many of these projects are finished, and hence it is not known how well they have performed, they were well documented at the time of the final decision to approve and finance them. This documentation includes all necessary data to analyse the project definition (objectives) and design (fundamental structure). Available documentation from 51 major public investment projects has been analysed and the results are documented in paper 11. In the analysis, the LFA-method is used as a best practice standard. A summary on an aggregated level is given in table 8.2 and table 8.3. In the following I will look more closely into these results.

Table 8.2 Accumulated results of analysing the definition of a sample of major Norwegian public investment projects. N = 51.

Category	Well-defined projects	Defined with technical faults	Defined with strategic faults
No. of projects	16	12	23
Share of total	31%	24%	45%
Type of problem	—	Missing one level of objectives	Objectives mirror the political process, not the logic of the project
Potential consequence	Fit for realistic planning	Needs redefinition before further planning	Needs redefinition May not be fit for realistic planning. Some may even better be stopped.

The result concerning project definition is hardly impressive. At QA2 stage, which is just before Parliament finally approves a project and its budget, only about one-third are well defined according to the LFA best practice standard (see paper 11 for an explanation). These have a consistent logic from the strategic level down to operational, well-specified goals. Even in this good category almost none of the projects accommodate all the requirements in the LFA good practice standard, but they are all in all well defined. Approximately one quarter have (only) technical faults in their design. Such projects should be redefined before they are approved for execution, but may still have a purposeful logic. These project definitions include minor problems that are relatively easy to correct. Worse is that almost half (45%) of the projects have strategic faults in their definition, meaning they have too many parallel tactical goals and their logic is not consistent. Some of them have only political statements of good intentions instead of goals. This category of project should be substantially redefined, in which case they would probably have to go

through significant changes before approval. In some cases it may prove difficult to define a purposeful logic, and these projects should then be stopped.

Table 8.3 Accumulated results of analysing the design of a sample of major Norwegian public investment projects. N = 51.

Category	Well-defined projects	Defined with technical faults	Defined with strategic faults
No. of projects	16	12	23
	Number of projects in the category with the following problems:		
Unrealistic goals	5	1	8
Vital resources missing	3	7	14
Major uncertainty not included in analysis	13	10	23
Potential consequence	May be fit for realistic planning and being managed successfully	Needs redefinition and redesign	Needs redefinition and redesign. May not be fit for execution. Some may even better be stopped.

The results in table 8.3 require some explanation. The projects in the 'well defined' category have a sound logic, but some of them have unrealistic strategic goals. The goals on tactical and operational levels are realistic. Most resources are in place. The uncertainty analysis is not mandated to include all uncertainties (only uncertainties on operational level are required). This explains why a large share of the projects, even in this category, has shortcomings here. Only few of these projects have resource problems – 3 projects have too low budgets, but on the other hand 2 other projects in this category have too high budgets. From an owner perspective this means 5 projects have shortcomings in this respect. The projects that do have all important uncertainties included have either been through an extended QA2 or the QA consultant has included all uncertainties (including the effect and benefit side) without an extended mandate.

The projects in the 'tactical faults' category tend not to have strategic goals defined. These are the goals that tend to be unrealistic. This explains why there are hardly any projects with unrealistic goals in this category. A significant share of these projects has not secured vital resources (budget, time, and people) at the time of analysis. A few of the projects had been through an extended uncertainty analysis, as explained for the 'well defined' category – approximately the same share of the projects in the category. The shortcomings in this category are relatively many, but not severe. With some rework on the definition stage and a new analysis, these projects would probably be fit for further planning.

The projects in the 'strategic faults' category also have mostly realistic goals, although not a consistent logic as explained before. Many of these projects have too many tactical goals, many of them not connected with the project in a cause-effect chain. These goals may be realistic, if other measures than the investment project is

also realized. The unrealistic goals are mostly found on the strategic level. A significant share of these projects has not secured vital resources – even more than the previous category. Interestingly, none of these projects have been through an extended uncertainty analysis – they all miss out on important uncertainties in the owner perspective. With the limited mandate of the QA2 analysis, this is not a critique of the QA2 analysis as such – the QA consultants have done what they were asked to do. These projects, however, have many shortcomings that may be indications of future problems. Based on these observations this author would conclude that the projects are not ready to proceed. They should probably be significantly redefined and redesigned before approval. The sum of indications suggests that these projects are not mature enough at this stage. Unfortunately, the material does not include information to test the duration of the front-end phase in these projects or a formal test of maturity (e.g. PDRI test, see section 8.3). One may be tempted to speculate whether some of these projects have been rushed through the decision making process.

To date, there are no requirements to redefine and redesign the projects. The current project assessments in QA2 do not include checking the logical structure. There seems to be a need for an earlier intervention where the fundamental logic is tested. This is exactly the core of the QA1 which was introduced in 2005. QA1 is an assessment before the formal planning of a project is allowed to start by approval in the Cabinet. Unfortunately, there is not yet data available to confirm improvements in these results after introducing QA1.

A few additional observations may be made (see paper 11 for more details):

- Many of the objectives defined are verifiable, but few are measurable.
- Many objectives are overly ambitious, especially on the strategic level, while a few objectives have too low ambitions.
- In more than half of the projects resource problems are identified.
- Many important uncertainties are not included in the QA2 analysis due to a limited mandate, but even within the mandate uncertainties are not included in one-third of the projects.

The analysed major Norwegian investment projects perform poorly in terms of project definition and project design when compared to the chosen best practice standard. In this analysis the Logical Framework Approach (LFA) is used as a reference. The LFA is not used to define or design the projects in Norway, and the project community questions some of its requirements. Even after modifying the requirements down to what can be considered a generally accepted normal standard for Norwegian projects, the fundamental design and especially the project definition fail.

More details and additional findings are presented in paper 11. There is obviously a need for improvement in this area. Even though some aspects of the best practice criteria may be subject to discussion, the current level of performance in project definition and project design is not as high as might be expected, as seen from the analysed sample discussed in this section.

In sum, these findings may add up to an impression that is a little more pessimistic than it needs to be. Many of the faults registered are minor and can be corrected relatively easily as awareness increases. There is also reason to hope the projects that

pass QA1 will have a better logical structure when they reach QA2. This will be an interesting research task in the future.

8.4.2 A survey among international experts

What are the most important functions of goals, and who are the most important stakeholders in defining them? These questions, and others, were approached in part 3 of the survey reported in paper 10. See paper 10 and chapter 6 for explanations relating to the respondents, the methodology, etc. The original questions are shown in the Appendix to this dissertation. The questions are also designed to test the experts' understanding of the nature of objectives by looking for consistency between the answers.

Table 8.4(A) shows the results of the question concerning important functions of objectives. Table 8.4(B) shows the results of the question on important stakeholders in the definition of objectives. The respondents were asked to indicate the degree of importance of predefined alternatives (1 = least important, 4 = most important). In table 8.4 EV is the expected value or a 'weighted score' calculated by multiplying the number of votes by its weight (the scale) and dividing by the number of respondents. This gives a more nuanced impression of the answers than the mode (mode is shown shaded in the table). SD is the standard deviation, showing how widely dispersed the values are from the expected value. Some observations drawn from the findings presented in table 8.4 are commented upon in the following:

There are many functions and many stakeholders which are important in defining objectives. This seems to confirm the importance of a participating process. There is also a large degree of consistency in the answers concerning the task leaders/task force. This is not where the objectives are most important, as confirmed by both the mean and EV in table 8.4. Hence, this category is not discussed further.

At the other end of the scale, the most important functions are consistently connected to the most important stakeholders, *owners* and *decision makers*. Although the answers to the two separate questions A and B rank owners and decision makers in opposite order as number 1 and 2 respectively, these two are the most important ones in both sets of answers. The standard deviation indicates a typical dispersion of answers over the alternatives. The respondents' pointed out the most important functions of objectives as follows:

- to explain the decision makers' intended effect from the initiative
- to define the ambitions of the owners.

In the medium range of importance are end users, project promoters, and management of the agency/corporation as well as project management. The responses clearly indicate that all of these stakeholders are important, but not as important as the decision makers and owners. The functions connected to each of these stakeholders are also in the medium range, giving a consistent answer to the questions.

Table 8.4 Results of a survey on the understanding of objectives in public projects (N = 78 respondents). EV is the expected value and SD is standard deviation. Part A shows the experts answers as to why objectives are important. Part B shows the answers to the question about who is important in defining the objectives. Cells containing the dominant answer are shaded. Average EV is 2,67 in part A and 2,69 in part B.

A	**What are the most important functions of the objectives?**	1	2	3	4	EV	SD
	Defining the ambitions of the owners	5	14	33	26	3.03	0.89
	Explaining the decision makers' intended effect from the initiative	1	17	32	28	3.12	0.77
	Clarify the needs of the users	5	16	33	24	2.97	0.61
	Contribute to secure financing for a good purpose	12	29	24	13	2.49	0.77
	Communicate the priorities of the corporation/agency	6	20	40	12	2.74	0.65
	Describing clearly the direction of the project given by project management	10	21	28	19	2.72	0.95
	Give orders to workers/task force	47	16	12	3	1.63	0.77

B	**Which are the most important stakeholders in defining objectives?**	1	2	3	4	EV	SD
	The owner (government officials)	4	11	33	30	3.14	0.71
	The decision makers (politicians)	5	18	22	33	3.06	0.91
	The end users (users of the result)	14	23	25	16	2.55	1.02
	Project promoters/Project vendors	6	27	32	13	2.67	0.71
	Management (corporate/agency)	4	21	40	13	2.79	0.60
	Project management	11	25	27	15	2.59	0.91
	Task leaders	29	22	24	3	2.01	0.83

Some minor but interesting features seem worth commenting on:

- The end users as stakeholders have a lower score, whereas the function to clarify the needs of the users has a higher score than average. This is consistent with the reality; the users' needs are very important for the objectives but the users themselves are seldom directly involved. The dispersion of answers is very low on the function, indicating that most respondents agree on this, whereas there is high dispersion when expressing the importance of users as stakeholders.
- A similar picture emerges when looking at project management. The function to describe clearly the direction of the project given by project management has a higher score than average, whereas project management as stakeholder has a lower score than average. This is consistent with the situation in many

front-end processes; project management is not even established at this point in time, but the awareness of the function of giving direction is high.
- The function to contribute to secure financing for a good purpose is less important than average. This may be an expression of unwillingness towards the subjective 'selling' of projects by project promoters. The promoters themselves are still considered an important group of stakeholders, approximately on average. Their importance is probably due to their ability to influence, not their formal role or position of power. This corresponds to practice, where the use of influential powers to convince decision makers is often combined with arguments of a subjective nature, promoting one good cause over many others but without a substantial fundament.

The respondents gave consistent answers and their responses reflect a situation that is recognized as consistent with reality, and support indications found in literature (Miller and Lessard 2000; Flyvbjerg et al. 2003; Altshuler and Luberoff 2003).

What are the actual considerations used to define the objectives of major public investment projects? This issue was also raised in the survey, and the results are shown in table 8.5. The respondents were asked what considerations usually form the basis for defining objectives. Later they were asked to express how important a list of pre-defined considerations would be for comparison in an ideal world, on a scale from 1 = least important to 4 = most important. The list of predefined considerations included 10 different criteria, including the 5 criteria included in the OECD Integrated evaluation model (OECD 2006). The percentage column shows how large the proportion of respondents who indicated that this consideration is actually used as basis for defining objectives. When asked which considerations are usually involved there was also an opportunity for respondents to use the open alternative giving other criteria. A total 6 of 76 respondents used this opportunity. The open text contributions are shown at the bottom of table 8.5.

The most surprising observation in table 8.5 from this author's perspective is that none of the respondents mentioned the users' needs in the 'other' category. The answer mentioning 'beneficiaries' is possibly meant to cover beneficiaries' needs. In relation to this observation; Chung-Suk and Gibson (2001, p. 119) show that 'building use' is given the highest weight among the PDRI elements, indicating this is what they have found to be the most important element in the project design for a building project (i.e. use of the building corresponds to users' needs). A possible explanation is that (some) respondents may have had connected needs to the relevance criteria where needs are mentioned as part of the explanation.

The 'other' category includes some reformulations of criteria already on the list, but also two new contributions: strategic fit and politicians' image. These contributions are interesting and point to the strategic and political importance of major public investment projects. They may be associated with the politicians' needs.

Table 8.5 Results of a survey on considerations when defining goals in public projects (N = 76 respondents). Comparison between what is usually considered and what should ideally be considered. EV is the expected value. Cells containing the dominant answer are shaded.

Considerations/assessments when defining objectives	Usually	Ideally				
		1	2	3	4	EV
Causality – logical consistency	32%	2	21	36	16	2.84
Resources – vital assumptions	64%	1	14	33	27	3.11
Realism – being achievable	62%	2	5	29	39	3.36
Uncertainty – opportunities and risks	55%	0	13	27	35	3.25
Efficiency – utilization of resources	50%	3	20	37	15	2.82
Effectiveness – goal achievement	54%	1	9	41	24	3.13
Impacts – positive and negative long-term effects	66%	0	8	36	31	3.26
Relevance – usefulness, in keeping with needs and priorities	51%	0	6	28	41	3.42
Sustainability – viability, support and resources to continue	43%	0	9	41	25	3.17
Level of ambitions – probability for success	28%	3	17	36	19	2.91

Other considerations actually used: Strategic fit, Use of available funds, Environmental and social cross-impacts, Politicians' image, Beneficiaries, Ability to achieve political objectives.

The most usual considerations (above 60%) are impacts, resources and realism. This seems to describe a practical approach to defining objectives. 'Impacts' is a broad category of considerations, potentially including all effects of a project. This will be possible for most respondents to relate to, but indicates an unclear strategy of choice or priority. There is no indication of direction in this criterion alone. The other two considerations (resources and realism) are practical and make sense; available resources are vital in order to be able to achieve the objectives, and realism is also a necessary consideration. However, as shown in paper 11, these two are parts of the same criterion. Access to resources is one of the components in the realism criterion. All in all, the most common answers in the survey indicate a less systematic but quite pragmatic approach to defining objectives. The general impression is that the process has the characteristics of 'making sense of the project' more than systematic formal analysis.

The next category of answers, the medium range (between 40% and 60%), includes uncertainty, efficiency, effectiveness, relevance, and sustainability. These criteria are basically the same as the OECD criteria. Uncertainty is added and is actually the consideration with highest score in this category. These criteria are obviously important and usual criteria, although not dominating in real life according to this survey. They represent a more formal and systematic analysis of the projects in question. Sustainability comes out as the least considered criterion in this category. This may indicate the short-term nature of political decisions when it comes to

decisions about major public investment projects. Long-term considerations, such as sustainability, seem to be given less priority than short-term considerations, such as impact and resources.

The two least considered aspects when defining goals are causality (consistency in the fundamental logic) and the level of ambitions (probability for success). This may partly serve as an explanation for the findings indicated in paper 11, where the design of projects is shown to persistently perform badly on these two criteria. I will return to project design in the next section.

One purpose of the questions in the survey was to check whether the reality as described by the respondents is consistent with the respondents' opinion on how it ideally should be. By comparing the left-hand side with the right-hand side of table 8.5, some characteristic features become apparent. The four most important considerations in an ideal world (according to the respondents) are realism, uncertainty, impacts, and relevance. Resources, effectiveness and sustainability are held to be more or less equally important. Causality, efficiency and level of ambitions are considered less important. The indications of priority in these answers are weak. There is not a lot of difference, meaning that the considerations are all indicated as being approximately equal in importance. This suggests that the respondents had difficulties in giving clear priorities. All considerations are important; there are no irrelevant or unimportant considerations on the predefined list, so in this respect the respondents are correct. However, as mentioned above, some of these considerations are interconnected. Having all 10 (or more) considerations is not necessary in practical situations and would make it unnecessarily difficult to see the big picture.

The message indicated by these results may be that the respondents (representing different kinds of expertise in this field) may be less aware than expected, and that there is a strong need for a more systematic approach to defining objectives. This more systematic approach may start with more integrated evaluation criteria for alternatives, as suggested by the OECD and as argued in paper 6. These observations provide arguments for seeking answers to what the most important challenges in the front-end are (as attempted in chapter 6 and paper 10). Further, the results imply that checking the fundamental logic (represented by causality and levels of ambition) is among the least important considerations when defining goals. In paper 11 it is argued strongly that checking the fundamental logic is an important consideration, although not one of the evaluation criteria for choice of alternatives but rather as a criterion of quality in the processes and documents in the front-end of major projects. One should always expect consistency and logic to be qualities of all alternatives. Aspects of checking the consistency in projects will be discussed in section 8.4.3.

The survey also included some general statements about objectives. The respondents were asked to indicate to what degree they agreed or disagreed with the statements given. The purpose was to check whether there was broad agreement about certain aspects of objectives in projects. The results are shown in table 8.6.

Table 8.6 International senior experts' views on objectives 1. General statements. Mode values marked. (−2 = fully disagree, +2 = fully agree; A: N = 78, B: N = 76).

A	General statements on objectives	−2	−1	+1	+2
	The formulation (choice of words, precision, clarity, etc.) of objectives is important	0	3	19	55
	Being able to verify goal achievement is always necessary for the project's success	0	6	30	41
	Performance measurement is very important in public investment projects	0	5	39	33
	Ambitious objectives contribute to convince the decision makers	9	30	25	13
	It is important to communicate the intention behind the objectives to task force members	0	6	36	35
	Ambitious operative targets make people stretch their performance	5	24	41	7
	Measuring the effect of public investment projects is impossible	39	28	10	0

B	Statements on objectives – how things actually are	−2	−1	+1	+2
	Goal achievement is never verified	9	18	42	7
	The defined objectives are well communicated internally in the project organization	4	36	32	4
	The defined objectives are well communicated externally (to stakeholders outside the project)	8	47	18	3
	The objectives are always based on a structured process including stakeholders	13	34	25	4
	Budgets are often deliberately set too low	7	24	31	14
	There is always feedback to the project team members on goal achievement	15	36	23	2

The respondents agreed on many points. The answers in table 8.6 are clear on most of the questions. The respondents agreed on the following points:

- Communicating the intention behind objectives is important
- How objectives are formulated is important
- Ambitious targets make people stretch their performance
- It is important to verify goal achievement
- Performance measurement is important in public investment projects
- Measuring the effect of public investment projects is possible.

In part A there is one interesting answers, though. On the question about whether ambitious objectives contribute to convince decision makers the respondents were divided. One half of the respondents agreed, while the others did not. None of the groups are dominated by strong opinions. A check of individual answers revealed that there was no preference among the respondents representing decision makers, either. Respondents in this group were also divided and gave diverse responses on all degrees of agree/disagree relating to this issue. The explanation for this finding may be that the respondents were genuinely uncertain, including even the decision makers themselves. The issue of level of ambitions in goals was followed up with a separate question, shown in table 8.8.

The answers to part B in table 8.6 add up to a general warning about the state of affairs. The answers indicate that budgets are deliberately set too low, that goal achievement often is not verified and that project team members do not receive feedback on goal achievement. The answers also indicate, albeit vaguely, that the process to define objectives does not always include stakeholders, and objectives are not well communicated internally or externally. The respondents agreed on the external communication but differed widely on internal communication, thereby suggesting that practices vary.

The results presented in part A of table 8.6 represent the respondents' subjective opinions about general issues related to objectives. They express support for general ideas about goals, usually found in theory and practical guidelines on how to define and formulate goals. The results indicate that the respondents were familiar with the basis of the subject that is under discussion in this chapter. The results presented in part B are also subjective and represent interesting signals about current practice. It would be interesting to test some of the statements with empirical data, but the analysis referred to in section 8.4.1 is not designed to check whether the statements are correct or not. This would require a different approach.

Table 8.7 International senior experts' views on objectives 2. Control statements for comparison with findings from empirical data. Mode values marked. (−2 = fully disagree, +2 = fully agree. A: N = 76, B: N = 75).

A	Statements on objectives – how things actually are	−2	−1	+1	+2
	Planning assumptions are often accepted as a basis for decisions without acknowledging the uncertainty attached	3	6	27	**40**
	Important relevant uncertainties are deliberately excluded from uncertainty and risk analysis in the early phases of project development	13	17	**27**	19
	Strategic goals are normally deliberately set to represent unrealistically high ambitions	12	**34**	26	3
	There are usually too many goals defined in the project	1	22	**33**	21
	Goal formulations are often flawed (unclear, contradictory, confused with means, etc.)	0	11	**47**	18
	Conflicting goals are not a common problem	**33**	30	12	1

B	Statements on objectives – how things should be	−2	−1	1	2
	Objectives should always address users' needs	2	7	30	**36**
	It is vital to be able to verify that each and every objective is achieved	2	13	**44**	16
	Goals should be specified in a way that makes measuring the degree of goal achievement possible	0	7	**34**	**34**
	All objectives should be realistically achieved within the time perspective of the project	5	19	**30**	21
	Communicating the objectives internally within the project organization is more important than communicating them externally	12	**28**	25	10
	The objectives should be revisited/reformulated during the planning and execution phases	3	13	26	**32**
	After the project is approved, the objectives should never be changed	**30**	21	19	4

Part A of table 8.7 lists questions designed to be tested against the analysis of empirical data described in the previous section and reported in paper 11. The respondents agreed that planning assumptions are often accepted without acknowledging the uncertainty. The data analysed in section 8.4.1 confirm this. The reason for this in the data is the mandate given to those responsible for the uncertainty analysis. The respondents even indicated that some uncertainties are deliberately excluded in the early phases. Whether the exclusion is deliberate or not is impossible to test with the current research approach and data available. The mandate to perform uncertainty analysis in QA2 is obviously formed by purpose. There is no support in this material to suggest that the reason for some uncertainties not to be identified in the analysis is to deliberately exclude uncertainty or obtain intended answers. On the contrary, when there is a specific reason for analysing a wider perspective the mandate is made wider. If the reality is as indicated by the responding senior experts, this should not be accepted. To test the statement in a more general setting would certainly be interesting because the signals given by the respondents are strong.

Further, in part A it is evident that the respondents indicated that strategic goals are not deliberately defined to be too ambitious. This is also confirmed by the data. There are examples of too high ambitions (22% of the projects), but this is not the normal procedure. The respondents indicate there are usually too many goals defined in the projects. This is confirmed by the data. The experts indicated there are often confounded[6] goal formulations (unclear, contradictory, confused with means, etc.). This is confirmed by the data – approximately 30% of the formulated goals was confounded.

The respondents clearly did not agree with the statement that conflicting goals are not a problem. This may indicate conflicting goals are frequent. The data tell a different story, showing only 5 cases (pairs) of conflicting goals in the whole sample of 541 goals. When considering this statement the respondents may have been thinking about the trade-off between goals. There are always difficult trade-offs between objectives when resources are limited. The statement was designed to gain insight into direct conflict (objectives which cannot be obtained simultaneously) but was not formulated precisely enough to make this clear.

The statements in part B address how things ideally should be. Most of the answers given by respondents confirm conventional knowledge about goals. They agreed that objectives should address users' needs, and that verification of goal achievement is important. Further, they confirmed that goals should be made measurable. They agreed that all objectives should be realistically achieved within the time perspective of the project. The latter statement (i.e. all objectives should be realistically achieved within the time perspective of the project) was not well formulated because it does not distinguish between the outputs (within time perspective of the project) and outcomes (within the life cycle of the result). The participants did not give a clear response as to whether communication of the objectives is more important internally than externally. This statement was not very well formulated, since internal communication and external communication have different purposes and thus it is not appropriate to compare them. The last two statements were not originally placed together in the survey. They include a control for consistency: one states that the goals should be

[6] The word 'flawed' was used in the survey questionnaire.

revisited/reformulated during planning and execution phases, while the other states the opposite, that goals should not be changed after project approval. The respondents consistently indicated that the objectives have to be changed, assuming there is a good reason, and this is normally induced by external or internal changes or emerging new information.

One specific question asked in the survey was directed at testing what the senior experts thought about how ambitious the objectives of a public investment project should be. The results are shown in table 8.8.

Table 8.8 Adequate level of ambitions in public investment projects (N = 77).

How ambitious should the objectives in public projects be?	Number of answers
High (to make the project organization stretch for higher performance)	22
Moderate (according to normal performance level)	52
Low (to ensure the probability for success is high)	3

Clearly, it is recommended that objectives should be moderately ambitious, meaning in accordance with normal performance, not unrealistic and not too easy. This is in accordance with theories on the relation between pressure and performance (Eskerod 2006, pp. 10–10). In Klakegg (2004, p. 102) this is also discussed, and there are indications in American literature (Dinsmore 1999, p. 187; Youker and Brown 2001) that some researchers tend to recommend realistic or moderate goals, whereas in Scandinavian literature (Christensen and Kreiner 1991; Lundin 2003, Andersen 2008. p. 259) challenging goals are recommended. This difference may have a cultural background, given that American business is very competitive and American project managers are very ambitious and enterprising. They might need to be held back a little, whereas Nordic project managers may need more of a push to optimize results. Dividing the respondents into an Anglo-American group and a Nordic group certainly suggests this possibility might be worth looking into: 40% of the Nordic respondents answered ‘high’ whereas only 10% of the Anglo-American respondents did the same. The number of respondents is not high enough to make this a strong conclusion and the survey was not designed to investigate this specific question any deeper.

The respondents were also able to elaborate freely when writing their responses to the question concerning the level of ambition in public projects. Their responses indicate that the issue is complex, where the resources, complexity of the project, complexity of the problem, policies, and also the function of the objectives themselves have roles to play. Of course, completely unrealistic goals are meaningless. How ambitious objectives are perceived may be influenced by how strong the will is to obtain them (Sager 1991), and there are serious questions about to what degree it is acceptable to let ends justify means when there are ethical issues involved.

The questions asked in the survey on objectives were not intended to prove anything. The number of respondents is too low to give a basis for strong conclusions and general knowledge applicable to all projects. Part 3 of the survey was designed to test whether the reality in projects, as seen by a sample of senior experts in different project-related roles, is consistent with theory and guidelines indicated to be purposeful in the research carried out as part of my thesis (papers 6 and 11). The

experts revealed through their answers that they did understand the basic concepts of objectives and that they know the practical processes well. Their answers also indicate there is a need for more clarity in these matters. There is a need for systematic approaches, improved guidelines and more consistent criteria for evaluation.

8.4.3 Consistency in observations

A few concerns follow from the findings in previous sections:

- First, the use of definitions and words is not consistent in theory or practice; this is indicated in section 8.1. Figure 8.1 shows definition and design as two parallel, iterative processes, but in the text it is pointed out that Turner (2006) uses the word 'stages' in connection with definition and design; stages implicitly signals consecutive phases. The iterative nature is found to be strong in the theory section 8.3 and empirical section 8.4.1. Several sources are used and differences in concepts are commented on. Similarly, the answers to three imprecise statements in the survey in section 8.4.2 illustrate that unclear formulations due to ambiguous wording is a relevant problem.
- Second, the consistency in all of the findings may not be representative of what actually happens in the real world. The theoretical contributions, the survey respondents and the researchers who perform the analysis are 'experts' in this field. They have spent time and effort on understanding how objectives are defined and formulated and how projects are designed to achieve success. Most of the people actually formulating objectives and managing projects in the real world have not. Their focus may be on other issues, e.g. technical and economic. The data analysis, however, indicates the true state of affairs since the projects are direct expressions of the level of current practice in Norway in recent years.
- The data from Norwegian major investment projects were collected from a period in time when such projects received special attention (see papers 7 to 9). Following the introduction of the Quality Assurance Scheme in 2000 everything concerning the front-end of the projects has been given more attention than previously considered 'normal'. The formulation of objectives is one of the issues which has been focussed and widely discussed in this period. This may have given some unintended effects. There seems to have been an improvement in the quality of individual goal formulations in this period (indicated by Klakegg 2004, p. 83, but not discussed in the present research). On the other hand, the number of defined objectives seems to have been increasing. An average project in recent years (2004–2007) seems to have more goals defined than an average project in the earlier period (2000–2003) of the dataset. The number of projects in 2004–2007 is too small to give a valid confirmation. The data may have been influenced by a trend, initiated by the QA scheme. This can only be controlled for by analysing other samples or other time periods.

To summarize, the responses given by experts and the data show good consistency. The answers given by senior experts in the survey largely confirm the findings in the data analysis. No great surprises were found. Conventional knowledge of objectives is confirmed. This is interpreted to be an adequate platform for answering the research question.

8.5 Charging the project with appropriate direction and level of ambition – conclusions

In this section I return to the research question: *How can a public investment project be charged*[7] *with an appropriate direction and the right level of ambition?* Previous sections in this chapter have provided a rich basis on which to answer this question. Finding the appropriate direction and level of ambition has to do with identifying the appropriate objectives, decomposed into goals on different levels. This is what has been called project definition. Finding the appropriate level of ambition has to do with finding the means which answer to the objectives and are realistic within the limitations in resources and the actual situation. For the purpose of a clear discussion it is helpful to make a clear distinction. As seen in section 8.2, project definition is closely connected to project design in an interactive process. Therefore, the two have to be considered as a whole in order to answer the question.

The following listed points summarize the answer to the research question.

Project definition:

- Project definition starts with society's and users' needs. These are the basis on which the purpose of a project and the fundamental arguments for initiating the project are identified.
- The initial situation has to be well understood, including high-level development objectives (policies, corporate strategy), available resources, constraints, and requirements.
- The wider situation has to be well understood, including external influences and long-term development trends.
- The best way to approach the aforementioned basics of project definition is to combine a continuous systematic effort in monitoring these issues and a participative process whereby stakeholders take an active part. The Why-How framework is an example of a systematic tool for developing the logical causal chain. *The choice of which objectives to define on strategic, tactical and operational levels defines the* ***direction*** *of a project.*

Project design:

- Project design depends on identifying the possible means and their anticipated effect.
- The most critical issue is securing consistency in the project design. This calls for an analytical framework structuring the logical elements to help ensure the quality of analysis combined with evaluation criteria to help the choice of concept. An example of such a framework is the Logical Framework Approach, while an example of such evaluation criteria is the OECD's

[7] The word 'charge' may seem strange, but it is meant to give an association with 'charging a battery' or 'loading a gun'. A project has to be charged, otherwise it will not be able to perform, and the charging has to be done well, otherwise it has the potential to destroy the whole project. After charging, the real action can begin. Thus, by charging a project is meant that it is made able to perform well.

integrated evaluation model. These system elements have to be anchored in the governance framework of the project owner.
- The robustness of the design also has to be considered; it has to be flexible enough to support the necessary changes following internal and external changes through the project execution.
- The process of designing projects includes systematic trade-offs between measures based on their individual cost and anticipated effect against the defined objectives and available resources, given priorities and external uncertainties. *The restraints that lie in combinations of availability of resources and present uncertainties determine what is realistic and thus contribute to defining the right* ***level of ambitions****.*

These conclusions do not answer the research question in full detail, but it is a start. The potential value of this contribution lies first and foremost in the structure it brings to the discussion. If members of the project management community stop mixing everything together and start communicating precisely on these matters, there is a chance that future data analyses like the one reported here will give better results.

The findings in this chapter indicate this is an area where there is a wide gap between what is actually established knowledge about what it takes to deliver good practice and what is actually done in practical life. Much state-of-the-art knowledge seems to be hidden. Research results and guidelines exist, but they seem not to be used, or maybe misunderstood. A suggestion for further research would be to find out why this is the case.

8.6 Validity of the project definition and design research

One fundamental issue in this chapter is the choice of definitions. Accepting Turner's (2006, p. 93) division of the project life cycle into three 'inherent steps' would not be practical for this research, if they were to be understood as consecutive phases. Instead, the concepts of 'project definition' and 'project design' are developed as parallel, iterative processes. Do we need such concepts? The answer is, not necessarily, but it does help structure the discussions and sort out some issues that are commonly mixed up and entangled in complicated discussions. This choice of definitions (concepts) or the words to describe them are not a matter of reliability or validity as such, but by doing this it became easier to sort things out – making reliability and validity more obtainable. If this choice had not been accepted, it would have skewed the basis for the discussions in this chapter, possibly resulting in a different discussion and potentially a different answer to the research question.

The research in this chapter based on three elements: literature (theory), data analysis (facts), and a survey (subjective opinion of experts). Together these elements make up the basis for analysis and discussions. The potential in this material is not necessarily utilized to its maximum. Further, there may be additional themes hidden in this material.

The literature study in this chapter is given lower priority than the other two elements. The reason has to do with available time and resources. A lot of resources were invested in the survey and data analysis, leaving less opportunity for a comprehensive

literature study. There is undoubtedly relevant literature which has not been represented in this chapter. However, the limited literature included seems to confirm the impression that the issues involved in the current research question tend to be mixed up rather than clarified. This leads to the conclusion that the literature study is less important than the other two approaches in this chapter. The literature study is considered sufficient for this purpose.

The data analysis has a strong basis, with more than 50% of the total population in the sample. Some types of projects are under-represented, but the sample still indicates good reliability for this population. The problem is that this population is limited to major Norwegian public investment projects having been through QA2 up to 2007. In this chapter the research question is discussed within a context of all major public investment projects, and thus the real population is much bigger. The discussion is not limited to Norway and this brings in serious questions about the validity. This is one reason why it was important to bring in the view of international experts based on empirical experience from many countries (the survey).

The validity of the survey itself is discussed in section 6.6. The concerns mentioned there about limitations to relevance and sustainability are not relevant in this chapter. The potential problems in understanding the formulation of questions (use of specific words) is expected to be less important here too. The subject 'use of objectives' is expected to be far more incorporated than 'governance of projects' by most of the respondents. On the other hand, the questions that proved to be less well-formulated came up in this part of the survey. Clearly, the responsibility for this belongs to the researcher. Still, this taken into consideration, the reliability of the survey is considered appropriate for this research.

The question of validity of the survey in this context again brings up the problem of limited number of respondents. It was very limited: 80 international experts, of which 75–78 answered the questions referred to in this chapter. The issues and questions here are less specific, and are relevant and well known to a wider population than the governance questions in parts 1 and 2 of the survey. Actually, this part of the survey (part 3, see Appendix to the dissertation) could have been used separately to reach a wider group of respondents. This would have strengthened the validity. For resource reasons this was not possible at this stage. However, it could be done later to achieve stronger conclusions.

In general, the survey and data analysis resulted in consistent responses, except for three unfortunate statements/questions that were badly formulated. These three questions are excluded here. When not including the answers to unclear questions, there is no apparent difference between the results of the survey and the analysis of empirical data in this chapter.

The international senior experts' responses confirm the impression given by the data analysis. This indicates that the findings of the analysis of Norwegian major public projects may be transferred to other countries and also to the private sector. Of course, careful consideration is required when drawing generalizations from such conclusions.

The survey and the data analysis do not individually provide strong evidence for the current state in project definition and project design. Taking into account the consistency with theoretical contributions as indicated in section 8.3.1 and especially 8.3.2, the overall conclusion is that these findings are consistent with reality and theory. They are confirmed by triangulation between three different methodologies and different sources of information. Thus, the overall credibility of the findings is acceptable.

9 Conclusions and further research

This chapter sums up the findings of previous chapters and indicates further areas of research which have become apparent as a result of this work. The first three chapters of the dissertation form a general introduction, describing the scope and limitations of the work, and also the methodology. These chapters are not concluding chapters and thus not included here. Chapters 4 to 8 are research chapters, each presenting the research work and the accompanying papers. Chapter 4 discusses governance and this is reported in section 9.1. Chapters 5, 6 and 7 discuss governance functions and governance frameworks. These are important aspects of the context in which projects are planned and executed. The conclusions are reported in section 9.2. Chapter 8 concerns projects as such and are reported in section 9.3.

The research area of this dissertation is wide; consequently several limitations had to be introduced to make the research task feasible. The most prominent limitations are:

- only the administrative subsystem of the state is subject to study
- only major public investment projects are included
- only the front-end of projects is discussed
- only the two most important evaluation criteria, relevance and sustainability, are focussed upon (this limitation is not valid for chapters 4, 5 and 8).

Table 3.2 in chapter 3 shows a brief overview of assumptions, research questions, methodology, and results on one page. Here, the essence of the conclusions will be presented in a different form and suggestions for future research added.

9.1 Governance of projects

The approach

Studies related to projects almost always start with the perspective of the corporation. Previous definitions of project governance all explicitly connect to corporate governance. The definition of corporate governance indicates that this is a perspective limited to the corporation. Studies of governance on the contrary often start with the perspective of society – describing aspects of the political and administrative systems. They look at what influences the decision making and tasks of public organizations. This dissertation focuses public investment projects. Therefore, the author has chosen to start with a basis in general governance literature and the perspective of society, thus not limiting the perspective to that of the corporation. This gives a better starting

point for answering to the challenges in public projects and hopefully makes it easier for key individuals in public sector to follow the logic and terms used in the governance part of the study.

The topic

The underlying assumption in this research is that projects cannot be judged only on their own terms. They have to be seen in a wider perspective, namely the owner's perspective. In the case of public projects the owner is the state or other public entity acting on behalf of the users and society as a whole. Research has shown that projects often fail to meet specific goals for cost, time and quality, and also fail to satisfy the expectations of the users and decision makers with regard to delivering benefits. This is a problem for society, representing a waste of public money and other valuable resources.

A further assumption is that a government, as responsible entity, will establish certain principles and structures to ensure that taxpayers' money is well spent. This is an important part of governance by the conscious owner. Awareness of the importance of governance has been rising sharply over the last couple of decades. Governance has many different faces, frequently divided into two categories: the traditional hierarchical (multi-level) governance and the currently more appreciated network-based relational (multi-actor) governance. Network governance is recognized as market-based in the US and more partnership-based in Europe. Governance is fundamentally about how decisions are made and carried out and includes both formal and informal arrangements. The definition of governance of projects developed here is:

> *Governance of projects concerns those areas of governance (public- or corporate) that are specifically related to project activities. It consists of formal and informal arrangements by which decisions about projects are made and carried out. Good governance of projects ensures relevant, sustainable projects and alternatives will be chosen, delivered efficiently and cancelled when appropriate.*

Governance of projects is closely linked to ownership. Ownership gives control and responsibilities. Control rights include the right to use, possess and dispose of a resource or an asset. Profit responsibility includes both the cost and benefits related to the use of the resource or asset. Balancing these two aspects is crucial in governance of projects. In the case of the public sector/state, ownership is frequently organized as the responsibility of many different organizations, a much more complex situation than implied in most literature on the role of the project owner or sponsor. This in turn implies there are two levels of governance functions to be addressed: the superior level (policy making/strategy development) and the project-related level (support for decision making, support for planning and execution of projects, and support for operations and asset management). In each of these categories there are many governance functions, as presented in chapter 4.

The conclusion

The research question addressed in this part of the dissertation is: *What are the most important functions (from an owner perspective) that ought to be carried out by governance frameworks that govern the front-end of major public investment projects?* An analysis of the governance functions relevant to the front-end of projects has led to the conclusion that the following governance functions are most important in a general case:

- Defining a clear decision making process
- Controlling the quality of the documents used as the basis for decisions.

Which of the governance functions identified in chapter 4 is the most important clearly has to be considered on the basis of the actual situation in each case. These governance functions should work through the most effective combinations of hierarchical and relational arrangements.

BOX 1 Suggestions for further research
Area: **Governance of projects**
• The interface and mutual influence between governance (as functions) and management (as functions) is not fully understood and defined. Several contributions are made based on either hierarchical or relational governance, highlighting specific aspects. The potential of the current complex governance explained in chapter 4 is not yet exploited. There is potential for improvement in our understanding of institutional roles and their interactions (owners, boards, management, and stakeholders). The level of engagement by governance bodies is one possible area of interest. • The multi-role situation (one party having several roles) and the multi-party situation (several parties sharing the same role, i.e. more than one owner) have not yet been investigated thoroughly, yet they may include additional aspects of the governance of projects. • The governance roles on an individual level (individuals acting as e.g. project sponsor, gatekeeper) need to be better understood. This will require further research. • Identifying the optimal mixes of policy instruments (regulations, economic means and information) for the governance of projects will require larger studies based on information on an aggregated level. • What are the purposes, procedures and tools relating to the governance functions identified in chapter 4? How are they implemented today in different settings (countries, sectors)? Answering these questions indicates the need for more detailed studies, case studies involving a range of different contexts exploiting the reality of governance in practical life.

The author considers this part of the research to be fairly successful, although less practical than originally hoped for. In order to have purposeful discussions on the subject, the process of developing and understanding theoretical concepts is necessary. This has been fruitful. The aim of coming closer to a practical and useful answer as to what is most important was probably slightly unrealistic, given that it will always be dependant on the situation. As shown by the suggestions for further research presented in box 1, this author does not consider this line of research as completed once and for all.

9.2 Governance frameworks for public projects

The approach

Studies related to projects have often referred to governance frameworks (using different terms and meanings) as shown in the introduction to chapter 5. They often limit the study in this respect to conclude that the existing governance frameworks are important and that current frameworks are not optimal. Making these frameworks the main object of study is new, compared to the project literature. Where project literature tends to explain why projects do not succeed by pointing at changes in the context and shortcomings in the governance framework, the work here aims at designing governance frameworks that may guide the projects in a better way. Others have pointed out that the decision making processes, the political processes and the trade-offs between stakeholders create problems for projects. These issues are supported by the results of the survey in chapter 6, but there are also clear indications that something can be done to reduce the negative effect of the shortcomings in these processes. This study cast light on this potential by clarifying the contents and structure of governance frameworks and point out that practices that are institutionalized in the context of projects also have important impact on the projects. Future studies need to take into account, not only the initial project conditions but also the institutional characteristics.

The topic

In order to implement the regulations and other means to ensure public projects are successful, some sort of system for clarifying values (norms, principles, rules) and structure (procedures, methods, tools) has to be established. Today, many large corporations and most governments in the economically developed world have established some sort of institutional system. Different authors apply different names for this phenomenon – in this dissertation the term ‘governance framework’ is used. The definition of governance framework developed here is as follows:

> *Governance framework for projects: a set of principles and an organized structure established as authoritative within an institution, comprising processes and rules established to ensure projects meet their purpose.*

This is clearly an example of an instrumental-structural initiative based on an economic-rational perspective. The structure, principles and processes have to be developed and implemented acknowledging the limits to rationality and that other

perspectives (e.g. cultural perspectives) are necessary to fully understand the implications.

For the purpose of analysis and comparison of governance frameworks, a set of general characteristics have been defined: the development process (the history, starting point and status), the embedded governance principles (the values), and the framework elements (the structure). The development process is unique in each case. Governance principles are found to be partly implicit rules and norms for how things are – how to do business – often identified as an expression of the economic and administrative thinking in a country or region. The structure, comprising elements and their interactions, defines the 'system' aspect of the governance framework. Structure elements of governance frameworks can partly be standardized. These findings are relevant when transferring experience between different countries, sectors and organizations.

In this research three governance frameworks have been analysed. The findings may be summarized as follows. The Norwegian Quality Assurance Scheme has the characteristics of a purely front-end approach, a simple control measure in a powerful position. The UK MoD Acquisition Operating Framework has the characteristics of an internal quality assurance system in which governance and management system are integrated. It covers the whole project life cycle and has a powerful position within the organization. The UK OGC Gateway process has the characteristics of a complex system where the boundaries between governance and management system are not all that clear. It covers the whole life cycle. The position relative to the decision making process is rather unclear, but its position has become much more powerful through changes in 2008.

From these analyses three 'archetypes' of governance frameworks are suggested: 1) *The lean framework* – simple, flexible, control based, limited in scope, only high-level guidelines, and few operational tools attached; 2) *The integrated framework/'quality system'* – medium complexity, strong on control and operational tools, and limited to one sector or to a set of similar projects; and 3) *The complex framework* – holistic, open, including a variety of alternative guidelines, methods and tools to fit emerging situations and different settings.

As part of the research, four projects were analysed as case studies. The projects did not show any specific influence of the governance frameworks resulting from intervention in the projects. Still, each project in its own way illustrated the value of implementing a governance framework and more specifically the need for early interventions and/or reviews. The more general value achieved by performing assessments as part of the governance framework is providing reassurance for the project owner and legitimization for the project organization. For the governance frameworks there was a strong indication that there has to be flexibility built into their elements and the practising of them.

Having a governance framework is important to ensure public investment projects are relevant and sustainable, and many governments and corporations already have a governance framework in place. Of course, these frameworks are not created out of nothing; they are deliberately designed and implemented. This indicates a need for

design strategies. They will never be perfect, indicating there is always a need for improvement strategies. Both of these issues are addressed in the dissertation.

The conclusions

The research question in chapter 5 is: *How can a governance framework for major investment projects be designed?* The analysis suggests that design strategies are useful when developing a new governance framework, or when redesigning and improving an existing one. The two basic design strategies are:

- *Unique design:* starting with 'blank sheets' and designing a framework to fit a specific situation guided by own experience only.
- *Model framework design:* copying main structures, etc., from one preferred existing framework and adjusting and/or supplementing to adapt to the specific context.

In addition, there are several support strategies, all of which can be combined with the basic design strategies listed above:

- System approach: design using a process and/or structure based on system thinking or system engineering.
- Design by 'design criteria'.
- Design based on a 'theoretical model'.

For the purpose of improving existing governance frameworks efficiently it is necessary to know what the most important challenges in the front end of major public investment projects are. This should be used to prioritize which parts of the governance framework to improve first.

The research question in chapter 6 is: *What are the most important problems that occur in the front-end of major public investment projects, which may lead to lack of relevance and sustainability?* Analysis of the results of a survey involving 80 international experts has resulted in the following conclusions:

The most important reasons for lack of relevance are:

- User needs are unknown, misunderstood or ignored
- Objectives of the project are unknown or misunderstood.

The most important reasons for lack of sustainability are:

- Lack of commitment to the project from key stakeholders
- Conflict over objectives and/or strategies concerning the project
- Economic and financial benefits are low compared to investment and operational costs
- Business or other conditions change between concept stage and final delivery.

The research question in chapter 7 is: *What characterizes an effective development strategy for improving governance frameworks?* The results of the survey imply that relevance is fundamental for achieving sustainability.

An effective development strategy for improving governance frameworks thus has to start with relevance first, followed by sustainability when relevance is first secured. When both relevance and sustainability are in place, other criteria can be considered. As indicated in the corresponding analysis, improvements have to address both

- *values* (embedded governance principles, attitudes, knowledge, and communication) and
- *structure* (system, process, methods, and tools) at the same time.

When only addressing one side (e.g. knowledge), the improvement will be hampered by the other (e.g. the system). The two sides have to be consistent with each other. By making improvements so that the most important challenges are met first, development resources will be managed well and the effect of improvement will come sooner and be stronger.

As indicated by the research ideas in box 2, governance frameworks is a new research area which still needs a wide range of approaches before it is fully understood. Several studies may have to be combined in order to identify cross-influences and detailed consequences.

The author considers this part of the research as the core of the area covered in this dissertation. It is also the part considered to be the most successful in this study. Contributions include both new theoretical concepts and practical applications. The level of detail is limited in practical terms, leaving many questions unanswered. However, getting it right on important principal choices may more than make up for lack of detailed guidelines. This is especially true for the design and improvement of governance frameworks. The conclusions may seem hardly more than 'common sense', but the confirmation that intuitive solutions can be proper is also a good thing. The fundament for considering what are the most important issues – the ones that should to be given first priority to make a development process effective – is considered adequate to believe in the results.

BOX 2 Suggestions for further research

Area: **Governance frameworks**

- A study of different governance frameworks would be useful to understand better the differences in contexts and their consequences between different sectors, countries and regions of the world.
- The present case studies indicate there is a need for more detailed case studies in order to identify the more specific influences and interactions between the governance framework and projects planned and executed within it. Specific research questions might focus on how quality assurance (assessments and reviews) should cover different contexts. Further, there is a need to study what early warning signals reviewers should look for, given the complexity of projects and their context.
- The transfer of experience of governance frameworks from one context to another situation is challenging due to very complex considerations. Some elements are more suitable for transfer and even standardization than others. More research is needed to fully understand the transfer process and the embedded considerations. Research into which elements are suitable for standardization and the potential value of such a development would be welcome.
- Design by design criteria has been suggested by Miller and Hobbs (2005), but implementation of this strategy has not yet been observed. This issue might form the subject of future research on mega-projects.
- The method 'design by theoretical model', as described in section 5.5.2 is currently at the idea stage. Several elements of the theoretical model in this suggested method have yet to be developed: simplification of theory base, templates (profiles) for choice of model framework type, and development of 'framework archetypes'. Then the method would need to be tested in real life.
- The research on the most important challenges in the front-end of projects may be expanded into new contexts (e.g. other regions or countries) to secure a more nuanced picture. Adding more respondents would certainly strengthen the possibility to draw stronger conclusions and maybe more detailed analysis.

9.3 Major public investment projects

The approach

In the study of actual projects I follow the tradition of research related to projects. A research question is defined, the need for data to support an analysis is identified, gathered, systemized and discussed in relations to theory and practice. Two things still make it stand out from the crowd: the focus on the fundamental logic – the necessary

structure – and the quality of the dataset. On the first point; all project literature focus on structures, but still often creates confusion by not defining the concepts clearly or by defining 'ideal' structures that do not correspond with reality (one example is defining phases and steps as consecutive without acknowledging explicitly that several phases or steps include the same kind of processes and activities). The point made here which makes this study different, is the strong emphasize on the core logic embedded in goals and objectives where project literature often focus the formulation of the goals (and therefore only scratches the surface of the problem). The other strength is the quality of the dataset. This was possible due to access to primary data about goal formulations from more than half of the total number of major public investment projects in Norway in the time period covered. This gives a realistic picture of the real situation in these projects at the time.

The topic

This final part of the dissertation is the only part where the focus is on projects as an entity in their own right. Previous chapters have discussed the owners' and financing parties' considerations in the front-end of major public projects. Chapter 8 basically investigates the fundamental logic of such projects, how they ideally should be defined, and to what extent empirical evidence indicates that the reality reflects this ideal. It is argued that there are several fundamental logics in the structure of projects. The most important logic, and the one subject to investigation here, is the following causal chain:

Needs → Goals → Means → Outputs (results) → Outcomes (effects)

In the front-end, two processes dominate: the project definition process where objectives are defined based on a process of identifying needs and formulating goals; and the project design process where means are defined and chosen based on a process of assessing anticipated effects and their alignment with the defined objectives. It is argued that these processes are parallel and iterative, not consecutive as described in many papers and books. In the discussion, the following are identified as the main trade-offs in this process, usually linked to the 'feasibility study':

- Outcomes versus Outputs: what results are optimal and represent the best platform for achieving the intended outcome
- Goals versus Means: which means best meet the defined goals
- Benefits versus Costs: which alternative is preferable, given combinations of benefit delivered and cost attached to each alternative.

The outcomes versus outputs trade-off dominates in the project definition process and the latter two dominate the project design process. In practice, the indicated processes may be sequential, parallel or iterative, depending on the situation. The discussion in chapter 8 only deals with the project definition and project design processes in the front-end, not the design of the project outputs or project management in the execution phase. These limitations have been useful to keep concepts separate and have contributed to clarification.

The results of the accompanying survey confirm conventional knowledge regarding the use of objectives in projects. The respondents held the owner and the decision

makers to be the most important stakeholders in defining roles and also held defining the ambitions of owners and explaining intended effect as the two most important functions of goals in projects. The survey's findings confirm there is a gap between what is actually considered when defining goals and what should ideally be considered. The most usual considerations are impacts, resources and realism. What ideally should be considered is indicated to be realism, uncertainty, impacts, and relevance, followed by resources, effectiveness and sustainability. The respondents tended to hold many considerations as important and were unable to prioritize, indicating the complexity of this problem but also suggesting that the respondents (representing different kinds of expertise in this field) may have been less aware, or at least less precise, than expected, and that there is a clear need for a more systematic approach to the definition of objectives.

Most interesting from the perspective of this dissertation is that the respondents did not explicitly connect objectives to needs, which is held to be absolutely fundamental in this work. Further, they held that checking the fundamental logic (represented by causality and levels of ambition) is among the least frequent considerations when defining goals. This author argues that checking the fundamental logic is an important consideration in the front-end. It is not one of the evaluation criteria for choice of alternatives, but rather a criterion of quality in the processes and documents in the front-end of major projects (a consistency check). Decision makers should require, and be able to expect, a consistent and logic fundamental structure in all alternatives.

Many theoretical and empirical indications were found to underpin the importance of the fundamental logic in projects. The most prominent example in this work is documented in paper 11 and includes an analysis of data from a sample of 51 major public projects in Norway. In the analysis, the LFA-method is used as a best practice standard. According to the LFA any project should meet the following requirements:

1. All operational objectives should be fully achievable;
2. Resources should be sufficient to support the fulfilment of operational objectives;
3. There should be one tactical objective to determine the level of achievement, which should be realistically achievable once the operational objectives have been defined;
4. The strategic objective should be realistically achievable within a wider time perspective provided that the tactical objective has been achieved; and
5. All major uncertainty factors should be identified and considered in the design of the strategy, and there should be no fatal risk factors in the project.

The studied sample of projects performed badly when compared to the chosen best practice standard. Even after modifying the requirements down to what can be considered a generally accepted standard for Norwegian projects, the fundamental design and especially the project definition failed. This clearly suggests this matter needs more attention than it has received to date. Typical problems included:

- Missing strategic or tactical objectives (20% of projects)
- Too many parallel tactical objectives (40% of projects)
- Many objectives on strategic level were not verifiable (47% of strategic objectives)

- Many objectives on strategic level were overly ambitious (27% of strategic objectives)
- Often project goals were confounded, they represented means, descriptions or requirements but were presented as goals in project documents (30% of the originally formulated goals was removed as confounded)
- Many projects indicated resource problems (41% of projects)
- Most projects had not included all uncertainties in their analysis at the time when decision was made to accept and finance the project (90% of projects).

The failure to include all uncertainties was largely due to the limited mandate of the uncertainty analysis performed at the relevant stage of development. Only in a few cases was the QA-consultant asked to include all aspects. In total, only 6 of the 51 projects included all uncertainties. None of the single projects met all of the five best practice criteria defined by the LFA. All projects except one failed to meet two or more criteria, and 7 projects did not meet any of the five criteria. Only approximately 30% of the projects had a sound, logical structure. The introduction of QA1 in 2005 is expected to improve the situation for future projects, because QA1 includes a control for logical structure in projects.

Even though the study sample only covered major Norwegian public investment projects (excluding the oil and gas sector), there is reason to believe the results are representative of a wide range of projects and are relevant to the private sector, other developed countries, and even international development projects. The responses given in the survey by a group of international experts confirm conventional knowledge about objectives and seem to support the impression resulting from the data analysis. This indicates that the consistent and logical structure that should be expected from projects is often not achieved. Without awareness among the stakeholders, or making the documents subject to scrutiny, this may not be recognized before it is too late to avoid negative consequences.

The conclusion

Chapter 8 looks at the following research question: *How can a public investment project be charged with an appropriate direction and the right level of ambition?* The following offers an answer to the research question.

Project definition: The definition of objectives should start with society's and users' needs. This is the basis on which the purpose of a project and the fundamental arguments for initiating the project are identified. Other input is the initial situation, including high-level development objectives (policies, corporate strategy), available resources, constraints and requirements, and the wider situation, including external influences and long-term development trends. The best way to approach these basics of project definition is to combine a continuous systematic effort in monitoring these issues with a participative process where stakeholders take an active part. The Why-How framework is an example of a systematic tool for developing a logical causal chain. The choice of which objectives to define on strategic, tactical and operational levels will define the *direction* of the project.

Project design: The definition of the means to achieve the objectives depends on identifying the possible means and their anticipated effect. The most critical issue is

securing consistency. This calls for an analytical framework for structuring the logical elements to help ensure the quality of analysis combined with evaluation criteria to help the choice of concept. An example of such a framework is the Logical Framework Approach. An example of a set of evaluation criteria is the OECD's Integrated evaluation model. These system elements have to be anchored in the governance framework of the project owner. The process of designing the projects includes systematic trade-offs between measures based on their individual cost and anticipated effect against the defined objectives and available resources, given priorities and external uncertainties. The robustness of the design also has to be considered; it has to be flexible enough to support the necessary changes following internal and external changes through the execution. The constraints that lie in combinations of availability of resources and present uncertainties determine what is realistic and thus contribute to defining the right level of *ambitions*.

This part of the study is a result of choices more than a logic consequence of the previous chapters. The choice made at the outset could have been different – which of course would have given a different result. The author considers this part somewhat successful, but also frustrating because there are so many additional aspects, such as supplementary analysis, etc., that could have been done, given more time and capacity. Coming closer to practical guidelines would probably have been more satisfactory at this point, given the candidate's preferences to be close to the projects. As is evident from box 3, there is plenty of scope left for future research.

BOX 3 Suggestions for further research

Area: **Definition and design of projects**

- There are indications in this research that the current definitions and fundamental logic concerning projects (specifically the front-end) should be reconsidered and reworked to form a more consistent whole, or at least be communicated better. Even experienced international experts struggle to prioritize between stakeholders, roles of the objectives and which considerations are more important when defining goals.
- The data analysis from paper 11 should be performed again with different data samples to increase the knowledge about the front-end in projects. This could identify differences or provide confirmation that the situation is similar in other types of projects, project sizes, sectors, geographical areas, or economic regions.
- The data analysis should be updated at a later stage when the results of the projects are known, and it may also be useful to follow up the situation over time to see whether there are changes, especially in case there are initiatives to improve the situation (such as the current introduction of QA1 in Norway). Such initiatives are expected to improve project performance, but this has to be confirmed.
- The Logical Framework Approach (LFA) is used here as a best practice standard. It requires having only one tactical objective. As shown, this is not generally accepted as a guideline in Norway. Investigating the importance of this specific requirement and the consequences of deviations from this criterion could be an interesting study, potentially adding new knowledge and new arguments to the more general issue of motivating the adoption of new guidelines.
- Studying the research question in chapter 8 from a completely different ontological position might lead to a completely different answer – not necessarily a better or more correct answer, but a different one, adding to the understanding of the issue at hand.
- There are many ways to perform project assessments. Governance frameworks and review guidelines suggest different approaches. Are independent reviews, whether internal or external, currently performed in a way that makes them effective in testing the fundamental logic structure of projects? If they are not, what does it take to make them effective for this purpose?

9.4 Theory, practice and methodology revisited

The research behind this dissertation started with the intention of studying a relatively new (for us) field with the purpose of understanding and learning for the sake of improving the governance of projects in Norway. The starting point was practical, not theoretical. The purpose of the research was never to prove anything. It may be difficult to identify the specific contribution of a limited scope of work within a very complex area. The specific areas where this dissertation contributes new insight are:

- Governance of projects – the interplay between governance functions and management functions and how governance frameworks regulate and stimulate this interplay.
- The theoretical and practical challenges in the development and implementation of governance frameworks in different contexts[8].
- The current reality in major public investment projects in Norway in terms of the lack of fundamental logic and consistency.
- Added new knowledge to improve governance by potentially help create relevant projects with sustainable effect.

In this section I will take a brief look at theory, practice and methodology in light of the experience gathered through this research:

Theory

Throughout the whole work, I used different theories as input to do the analyses and to support the discussions. The most obvious example is found in table 5.4. I did not start with one specific theory as basis. Hopefully this research contributes to theory by suggesting improved definitions and clarifications of concepts. Examples are the proposed definitions of governance of projects, governance frameworks, premises for transferring governance frameworks from one context to another, and theory based design of governance frameworks. Contribution have been made in order to improve the theoretical understanding of governance related to projects, the governance functions and the structure and contents of governance frameworks, design strategies for governance frameworks, as well as the fundamental logic of projects with the division between project definition and project design.

All in all a few areas of theory have been shed light on, but the over all terrain of theory in this field remains the same.

Practice

Examples of contributions made are commented on in the following:

[8] This part of the research resulted from a fruitful collaboration between the Norwegian University of Science and Technology and University of Southampton in a separate research project financed by Project Management Institute (PMI) and the Concept research programme. The report was published in 2009 by PMI (Klakegg et al. 2009).

First of all, the understanding of governance and its main functions is hopefully improved. By exploring not only the contribution from different theories of governance, but also the practical interface towards management functions, contributes to clarify roles and responsibilities. By taking in the consequence of the governance aspects in this dissertation, it should now be easier to obtain the right perspective in documentation and discussions about major investment projects. Similarly, the arguments clarifying the superior criteria relevance and sustainability could help planners identify the most important aspects of the decisions and help them communicate these to decision makers. This should be useful in respect to the many decisions made every year concerning major public investment projects, and a vast amount of public money invested in these projects.

The most comprehensive contribution is probably on governance frameworks. I hope that this research has contributed to:

- better understanding of what these frameworks are,
- a language to describe these frameworks (exemplified by their history, contents and structure),
- methods of designing purposeful governance frameworks, and
- improved basis for successfully transforming a governance framework from one context to another.

More work is needed in order to translate this new knowledge into specific guidelines and instructions for practitioners, but a new and improved basis is now established.

For projects, this research has clarified the fundamental logic from society' and users' needs through the goals and means to the outputs and outcomes. It has also contributed to an improved understanding of the division between project definition and project design, and the importance of keeping this separated from the product development (product design). The knowledge of how the current major public investment projects perform in terms of defining objectives and means to achieve these objectives should be particularly useful. It is now possible to design initiatives targeting the real flaws of the project goals; their definition and fundamental logic – not only the formulation and choice of words as has often been the case in the past.

Methodology

Choosing the right research methodology is clearly important but also often difficult. Even after making efforts in understanding and choosing carefully among a wide array of different approaches, the doubts and second thoughts have followed me all the way to the end. In hindsight, the choices I made still stand as the best choices available, given the situation at the outset. It is still an open question whether these choices have given the optimal result. Judging on basis of the achieved results reported here, the choices made in this research seem adequate, well adapted to the purpose and the available data and information.

The study of governance and other fundamental concepts in this work was based on screening a wide array of theories and literature, rather than choosing a specific theory as starting point. This still seems to be the right choice – maybe the only realistic approach available for that purpose. The general mapping is now done and for future

work the next step will be choosing specific theories and approaches fit for the chosen purposes defined for the research.

In the study of governance frameworks, the most important experience related to methodology is the limited access to nuanced, in-debt information about suitable case-projects. Governance frameworks in the public sector are by definition public and they are generally easily available. Information about the projects, however, is normally not as easy to access.

Looking back, I would still have preferred to base the study of the most important challenges in the front-end on documented sources and not (only) on a survey (as discussed in chapter 6 and paper 10). But given the time and resource limits, this was the only available option. The results seem to confirm that it was the correct choice, even though a wider base of respondents would have given stronger conclusions and opened up for more detailed analysis.

For the discussion about definition and design of projects in chapter 8, the most important problem seems to be the access to relevant data from certain categories of projects, for example defence projects. This raises the question whether the conclusions may be valid for this project category. However, this was a result of limited resources and time, more than a methodological problem. Further effort may well make the necessary data available at a later stage. In Norway, the experience of an open attitude towards sharing information for research purposes is strongly felt.

On the whole, the research work has certainly been a learning process. To new researchers working in this field, I would say that all the work identifying the appropriate research method for the defined purpose needs to be performed thoroughly. There is no easy way to good research, but the experience from this work may hopefully help.

9.5 Generalization of findings

This research started out with a basis that included the Norwegian quality assurance scheme as a key issue. Half of the cases used to illustrate the influence of governance frameworks are Norwegian, and all the projects in the study of fundamental design of projects are from Norway. The country-specific findings are mainly connected to:

- Description and discussion of the Norwegian state as a project owner (paper 5)
- Description and discussions of qualities of the Norwegian (and UK) governance frameworks (papers 4, 7, 8 and 9).
- Current performance in the front-end of major public investment projects in Norway (paper 11)

This obviously seems to give the research a distinct Norwegian flavour. Does this mean the findings are limited to a Norwegian setting?

The author finds that the answer is no, for the following reasons:

- The general discussion of governance in chapter 4 is not limited to any specific country, although dominated by Western economic thinking and tradition.
- The study of governance frameworks in chapter 5 also include frameworks from the UK and explicitly discuss transfer of the findings to other settings in terms of national culture, regional business and government thinking and management style. The discussion concludes that such considerations are important and that transfer of experience is possible and potentially efficient when done with adequate care.
- The survey reported in chapter 6 included respondents from a wide array of countries, although limited to developed, rich, Western countries. Generalization of the findings from the survey is discussed in section 7 of paper 10. This discussion concludes with a call for careful consideration when trying to transfer the findings to other parts of the world, but that the findings are definitively not limited to Norway.
- The discussion of improvement strategies in chapter 7 is built directly on the findings in chapters 5 and 6. No limitations are added, and thus the result of this chapter will have the same geographic validity as the preceding chapters.
- The analysis of data from Norwegian projects in chapter 8 is obviously a documentation of current performance in Norway and cannot be transferred to other countries as such. However, the discussion includes relating the issues in this chapter to international literature and empirical findings from other countries. The definition and design issues are documented in a wide range of scientific contributions from different settings. The survey reported in chapter 6 with international respondents included control questions that show a remarkable resemblance with findings in the Norwegian material.

The focus of this thesis is major public investment projects and governance frameworks installed by public entities. This clearly puts the focus of the research within public sector. Does that mean the findings are limited to public sector?

The author finds the answer is no, with the following arguments:

- The general discussion of governance and governance functions in chapter 4 also explicitly includes private sector in terms of corporate governance. There are no aspects of the discussion about terms and definitions that limit this to public sector but the flavour of the chosen words may be distinctively public sector to some readers.
- The study of governance frameworks in chapter 5 is held on a general level that is open for both public and private sector. The proposed definitions refer to organisations and institutions without labelling them as public or private. Although no private sector examples are given in this dissertation, we know that many private sector corporations and non-governmental organisations have established similar governance frameworks.
- The respondents to the survey in chapter 6 represent both public and private sector well.
- No additional limitations are introduced in chapter 7. Therefore, this chapter has the same validity for all sectors as the preceding chapters.
- The dataset in the analysis in chapter 8 is obviously limited to public sector. Still the findings are recognized as valid for other sectors as well. The literature and survey confirms this. One could conclude that there is no big

difference between the sectors when it comes to the challenge of defining fundamental logic and formulate goals for projects. This is more down to individual abilities and the complexity of communication and political processes than a question of sector specific context.

All in all the findings in this research seems good for generalizing across both geography and sectors, although more limited and with more careful considerations in the first respect than in the latter.

9.6 Final remarks

The research reported in this dissertation has focused the following areas:

- The complex nature of governance
- The fundamental governance functions of the front-end of projects
- The characteristics of governance frameworks and deeper understanding of their content and function
- Design and improvement of governance frameworks.
- The most important problems that occur in the front-end of major public investment projects, leading to lack of relevance and sustainability
- The fundamental logic of projects
- Project definition and project design.

This dissertation includes five research questions and each of them is answered in chapters 4–8. The reliability and validity of the findings in each chapter have been evaluated by the author and found adequate. Due to limitations of time and also the author's capacity and competence the findings tend to indicate main structures without details. This is acceptable as a start, but it also creates an urge to continue searching for more detailed understanding.

A challenge in this research is the wide span of topics from the deep theoretical issues to the complex and dynamic practicalities in 'real life'. There is never time to pursue the issues in debt in both directions. This is also a dilemma in this researcher's own background as a practitioner and researcher. The result is that this researcher, after having to limit the effort according to the time and resources available, permanently feels 'stuck in the middle'.

The overall impression of the conclusions indicates there is a wide gap between what is actually established knowledge about what it takes to deliver good practice and what is actually done in practice. Much of the state-of-the-art knowledge does not seem to be used by practitioners. My ultimate suggestion for further research would be to find out why this is the case.

Why do people continue to make the same mistakes despite knowledge of good practice being available? Why do people keep on making the same mistakes even when specific instructions are given on how to perform a task? Why is it so difficult to motivate people to check fundamental qualities such as consistency and logic in the documents they take part in producing?

Making major public investment projects more relevant and sustainable depends on the ability to develop a good basis for decisions. Most of the problems discussed in this dissertation can be identified with self-control, and certainly through peer review. As long as current practice shows that these problems are not handled well, this indicates internal controls and reviews are not enough. The best we can do is to make sure that the plans are consistently documented, and that they are logical and realistic. To stimulate to further improvement we need to make use of independent, and perhaps external reviews.

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Governance of Major Public Investment Projects

In Pursuit of Relevance and Sustainability

Papers and Appendix

Ole Jonny Klakegg

PhD Dissertation
Norwegian University of Science and Technology
Faculty of Engineering Science and Technology
Department of Civil and Transport Engineering

October 2009

List of papers

Paper 1

Governance: Recent developments of a 'messy' concept

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Unpublished essay
April 2008, updated March 2009

Abstract

In general terms, governance deals with the processes and systems by which an organization or society operates. Co-ordination of social systems seems to have two forms: the old form, with the state steering through goals and priorities, and the new form, with outcomes from formal and/or informal public–private interaction. This duality is developed into a clear distinction between 'multi-level' governance (highlighting the various tiers of government: local, regional, national, or supranational) and 'multi-actor' governance (reflecting the relational involvement of both public and private actors). The fundamental notion that governance is the process of developing common goods for society, or making such development possible in a wide sense, is still valid. Hence, governance is viewed as the modern form of the concept 'to govern'. It is a response to changes in the context for government, rather than a result of a different concept being invented.

In the public sector, recent government reforms mirror this development. New Public Management (NPM) was introduced to increase efficiency by giving manager's freedom to act within their area of responsibility and to measure their efforts by results. This freedom, based on a contract to deliver results, has to be balanced by control efforts. The post-NPM reforms with more emphasis on collectivity and collaboration, focuses on public ethos and standards to find good solutions. In private sector, corporate governance includes two different forms: shareholder-value systems (USA, UK, Canada, etc.) and communitarian systems (Central and Northern Europe, Japan, etc.). Corporate governance is about ownership and defines what rights and responsibilities follow with ownership. It is about the corporation's responsibility to the owners, and in a wider sense to society and the people influenced by its activities. Recent contributions suggest more emphasis on stakeholders to strengthen strategic value creation. Governance is not two separate spheres – one public and one private. Governance is a means of alignment in society. The new embedded-rational model, as an alternative to the traditional liberal or welfare models, explains this.

Keywords: *Governance, Government, Public Administration, Corporate Governance*

1 Introduction

To find the exact meaning of the word governance is not straightforward. Authors such as Stoker (1998), Rhodes (2000), Lægreid (2006), and Christensen (2007) describe governance as a concept which is unclear, ambiguous and disputed. Peters and Pierre (1998) describe governance as 'messy'. Different authors define governance differently, and use it in a wide variety of ways – both descriptive and explanatory.

Christensen (2007, p. 7) states:

> *Governance has become a rather fashionable term that is used to describe almost any aspect of the work of the political-administrative apparatus, so its content is pretty ambiguous. In most cases government would be a better and more precise term. Some authors say that government is decision-making, control and planning systems inside the political-administrative apparatus, while governance extends this system to non-public actors, like the 'joined-up' system created by Tony Blair in the UK (Pollitt 2003).*

This indicates a plurality in meanings, which has to be debated. Pierre (2000, p. 3) sums up such a debate thus:

> *Governance literature is slightly confusing in its conceptualization of governance. Governance has a dual meaning; on the one hand it refers to the empirical manifestations of state adaptation to its external environment as it emerges in the late 20th century. On the other hand governance also denotes a conceptual or theoretical representation of coordination of social systems and, for the most part, the role of the state in this process.*

For the Concept Research Programme, working on governance of major investment projects on behalf of the state, the fundamental understanding of the term governance is important. In this paper the author choose to return to the origin of the concept and start by trying to understand why there are so many disputes over words and an unclear governance concept. Looking at how the term is used in different sciences and problem areas further increase the complexity and broad understanding. The intention is to find out where the concept of governance stands today. The purpose is to build a platform on which a deeper understanding of governance of projects can be developed.

2 Origin of the governance concept

The word **Governance** is associated with words such as 'government', 'governing' and 'control'. A **government** is a governing body. The word itself comes from the Greek word *κυβερνάω* (*kybernao*), meaning 'to steer, to drive, to guide, to act as a pilot' (Wikipedia, 2008). Plato used it with regards to how to design a system of rule. (Kjaer 2004). **Governing** means using one's position or ability to influence or direct development. For example, the governing party is the political party in power in a country. **Control** is a matter of being able to decide over, define limitations for, delegate authority to, or withdraw from someone. Starting with this very general impression of the word itself and associated concepts, this paper will give a more

complete, yet brief, introduction to the concept of governance both as it has been used earlier and is used today.

Let us start with the concept of 'government'. A government is described as 'the organization, that is the governing authority of a political unit' (WorldNet Search 2008). This description points towards words such as 'authority' and 'administration'. **Authority** is the power or right to give orders or make decisions (WorldNet Search 2008). **Administration** refers to the persons (or committees or departments, etc.) who make up a body for the purpose of administering something. Administering is the act of governing or exercising authority (WorldNet Search 2008). Typically, 'the government' refers to the executive function of the state. In many countries (particularly those with parliamentary systems), the government refers to the executive branch of government. In political science and constitutional law, the executive is the branch of government responsible for the day-to-day management of the state. In many countries, this is referred to simply as the Government, but this usage can be confusing in an international context (Wikipedia 2008). Constitutional law defines the political structure of society (LoveToKnow 2008).

Hellman and Shankerman (2000) point out that the relationship between the political authority and the public raises the fundamental issue of whether the government acts as the agent of its citizens or as the instrument of some ruling elite that has 'captured' the state. We will look this further in the following, starting with the elite angle.

The executive branch contains the head of government, who is the head of this branch. The word 'administration' is used to identify the leader and period in power in politics, for example 'the Bush Administration' in the US. The word government is used in a similar way: 'the Blair Government' in the UK or 'Regjeringen Bondevik II' in Norway. This indicates that government can be more than just the organization. It may also be described as '*the ruling power in a political society*', (LoveToKnow 2008). **Regime** is the word used by Feinstein and Feinstein (1983) in their studies of urban politics, referred in Altshuler and Luberoff (2003, pp. 62–72): '*The Feinsteins define a regime as "the circle of powerful elected officials and top administrators" who are formally responsible for determining local policy and who are "susceptible to electoral forces"*'. This indicates some important aspects of government as of today: governments cannot decide everything on their own and not without answering to society. Other definitions of regime do not limit the participants to public officials, but they may also come from other powerful positions. Stone (1989), referred by Stoker (1998), defines a regime as '*an informal yet relatively stable group with access to institutional resources that enable it to have a sustained role in making governing decisions*'.

The word 'power' comes into the equation in the Feinsteins' definition. **Power** is the possession of controlling influence (WorldNet Search 2008). It also denotes an entity or organization possessing or exercising power or influence or authority (see the description of authority above). Another related concept is power dependence. **Power dependence** implies the following: (a) organizations committed to collective action are dependent on other organizations; (b) in order to achieve goals, organizations have to exchange resources and negotiate common purposes; (c) the outcome of exchange is determined not only by the resources of the participants but also by the rules of the game and the context of the exchange (Stoker 1998, p. 22)

The concept of government has received a lot of philosophical attention for many centuries, but it is not necessary to go further into philosophy here. Nor is it necessary to go deeply into the political theory derived from this philosophy, describing different types of government (dictatorship, oligarchy, theocracy, monarchy, democracy, etc., where anarchy denotes the lack of government), the history thereof, or the separation of powers (legislators make laws, judiciaries interpret them, and governments enforce them). At this point, we will return to the fundamental question of whether a government acts on behalf of the citizens:

The **parliamentary system** is based on this belief and the doctrine of separation of powers mentioned above. In this system the Parliament is the legislative assembly (WorldNet Search 2008), the executive powers rest with a body of cabinet ministers chosen from and responsible to the legislature or parliament. The Head of Government is the chief officer of the executive branch of a government, often presiding over a cabinet. In a parliamentary system, the head of government is often titled Prime Minister, Premier, etc. In presidential republics or monarchies, the head of government may be the same person as the head of state, who is often a president (of the republic) or a monarch (Wikipedia 2008). Although these are important aspects of politics and government, they are accepted as a part of the given context for this work and thus not described further.

The roots of the concept of government go back to the forming of organized communities in ancient history. The necessity for government derives from the fact that people need to live in communities, yet personal autonomy must be constrained in such communities (Adler 1996, pp. 80–81). This indicates the purpose of government: to organize society and to make desired development possible. According to Christensen et al. (2007, p. 11), '*The public sector is justified by its primary mandate: to serve the people*'.

The public administration, and hence government, can thus be associated with the terms 'politics' and 'policy'. **Politics** can be defined as follows:

> [An] endeavour that consists of putting a problem area on the public agenda, having it accepted as a binding public responsibility and organizing a permanent problem-solving routine. This implies that processes and structures are crucial components of public policy. By processes we mean activities and behaviour that play out over time. These can be decision making, opinion-forming, implementation or learning processes. By structures we mean the frameworks within which processes unfold. The structures set limits as to who can participate. They also limit what are deemed acceptable, reasonable, appropriate or valid perceptions of a situation, a problem or suggested solutions. (Christensen et al. 2007, p.15).

According to Jenkins (1978), **policy** is: '*a set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where those decisions should, in principle, be within the power of those actors to achieve*'. The complexity of the matter is indicated by Birkland (2000), who claims there is a lack of consensus on the definition of policy. He outlines a few definitions of policy as follows (Birkland 2000, 21: Table 1.3, referring to authors in parenthesis:

- *The term public policy always refers to the actions of government and the intentions that determine those actions*'. (Clarke E. Cochran et al.)
- '*Public policy is the outcome of the struggle in government over who gets what*'
- Public policy is '*Whatever governments choose to do or not to do*'. (Thomas Dye)
- *'Public policy consists of political decisions for implementing programs to achieve societal goals*'. (Charles L. Cochran and Eloise F. Malone)
- '*Stated most simply, public policy is the sum of government activities, whether acting directly or through agents, as it has an influence on the life of citizens*'. (B. Guy Peters)

The definitions of policy range from pointing to the intentions behind the actions, the actions as such, and the outcome of these actions. This indicates the complexity of issues met when studying governance and how ambiguous even scientific literature in this field may be. It is within this setting of politics and community that governance is found and has to be understood

Organizations in the public sector have a wide **spectrum of tasks**. For instance, distinctions can be made between advising on policy issues, regulation, administration, control, and supervision, and the production of services (Christensen et al. 2007, p. 16). Kooiman and Van Vliet (1993, p. 66) classify the tasks of government in governance in the following way: '*(de)composition and co-ordination; collaboration and steering; integration and regulation*'. The first task involves identifying and linking stakeholders. The second task is concerned with influencing and steering in order to achieve desired outcomes. According to Stoker (1998, p. 24), the third task is about 'system management'.

Stoker (1998, p. 17) states: '*government is characterized by its ability to make decisions and its capacity to enforce them. In particular government is understood to refer to the formal and institutional processes which operate at the level of the nation state to maintain public order and facilitate collective action*'. This citation more or less sums up what a government is about.

Turning back to the fundamental question of government either serving the citizens or ruling on behalf of an elite, the answer turns out to be a paradox. The answer is that both are possible, as shown above. This is described by Grossman (2000) as follows:

> [C]haracterizing the state as the agent of its citizens involves a paradox. If the state is to enforce collective choice over resource allocation and income distribution, the citizenry must subject itself to the state's power to tax and to spend. Hence, the state can use the sovereign powers to exploit its citizens so that it may become an instrument of a ruling elite that appropriates the net revenues of the state.'

French (2004) uses this paradox to underpin his economic models which indicate that improvements in public governance facilitate development towards quality improvements and increasing variety of production – successful transitions of economic systems – when connected to successful political transitions.

Based on this brief overview of some aspects of government, the remainder of this essay will deal with the meaning of governance in different settings and the historic development of the concept up to the present day.

3 Recent development of the Governance concept

First some definitions and descriptions of what governance is (or can be):

- *'Governance may be defined as regimes of laws, administrative rules, judicial rulings, and practices that constrain, prescribe, and enable government activity, where such activity is broadly defined as the production and delivery of publicly supported goods and services.'* (Lynn, Heinrich and Hill 1999, p. 3).
- *'Governance is rules, processes and behaviour that effect the way in which powers are exercised.' (*Commission of the European Communities 2001)
- *'[Corporate governance] usually mean[s] the way in which the crucial components of the firm are organized to reach the common goal and the way they are co-ordinated to promote or adapt to change. This has basically to do with the definition and allocation of the decision-making power within the firm'* (Dallago 2002 – referred in Thiry 2006, p. 1).

These definitions indicate a wide meaning of governance both in the public and corporate setting. The words used to describe the meaning of these definitions are very different, but still there are some common features; rules, structure, enabling activity/change and reaching goals.

Lynn, Heinrich and Hill (1999) studies governance in the public sector and points out that 'values and interests of citizens, legislative enactments and oversight, executive and organizational structures and roles, and judicial review are linked through a dynamic interactive and continuous socio-political process' (p. 6). Further 'governance is an end in itself, a translation of competing interests and values into operational guidance for policies and programs and into political property rights that preserve the stability of a legislative deal.' (p. 11). Governance is both the objective and means to achieve – 'something'. We are certainly looking into a fascinating issue here, but this needs to become clearer. We continue to dig into it.

The rise to prominence of the term 'governance' stems from the difficulties of hierarchical coordination, either by firms or by the state (Miller and Floricel, 2000, p. 135). This statement points to a possible reason for the change in focus seen in recent decades.
Putnam (1993) says governance is connected to the concern about social capital and the social underpinnings necessary for effective economic and political performance. Kaufmann and Vicente (2005) relate governance to the traditions and institutions by which authority is exercised for the common good. Grünfeldt and Jakobsen (2006) suggest the terms 'Good governance' and 'Governance' can be used with the same meaning.
According to Hirst (2000, p. 13),

> *The use of the concept 'governance' is a relatively recent fashion. It attained wide currency in the past decade and largely at the expense of the concept of 'government'. Indeed, governance is generally perceived to be an alternative to government, to control by the state. The use of the concept is almost exclusively*

confined to the technocratic and elite discourse. It has yet to enter the popular vocabulary of politics.

Hirst continues by pointing out that it has been non-governmental organizations and economists which have taken up the concept and which can be viewed as alternative elites to the established ones.

In general terms, governance deals with the processes and systems by which an organization or society operates. The new term may indicate a new concept, or a rewriting of an old one (government), thereby indicating its contents or focus has changed. There is a need to dig deeper in order to understand which of these it is. Stoker (1998) gives an introduction to the key trends and developments in governance. He points out that governance is date and place specific (p. 26) and that the world of public administration is changing. The following table sums up his propositions and dilemmas (based on p. 18-19):

Table 1 Gerry Stoker's Five propositions and corresponding dilemmas (1998) – the key trends and developments in governance.

No	Proposition	Corresponding dilemma/critical issue
1	Governance refers to a set of institutions and actors that are drawn from but also beyond government.	There is a divorce between the complex reality of decision making associated with governance and the normative codes used to explain and justify government.
2	Governance identifies the blurring of boundaries and responsibilities for tackling social and economic issues.	The blurring of boundaries can lead to blame avoidance and scapegoating.
3	Governance identifies the power dependence involved in relationships between institutions involved in collective action.	Power dependence exacerbates the problem of unintended consequences for government.
4	Governance is about autonomous self-governing networks of actors.	The emergence of self-governing networks raises difficulties over accountability.
5	Governance recognizes the capacity to get things done which does not rest on the power of government to command or use its authority. It sees government as able to use new tools and techniques to steer and guide.	Even when governments operate in a flexible way to steer collective action governance failure may occur.

Rhodes (2000, p. 55) formulates an interesting perspective on the term governance: '*The word governance can be used as a blanket term to signify a change in the meaning of government (Jørgensen, 1993; March and Olsen, 1989) often focussing on the extent and form of public interventions and the use of markets and quasi-markets to deliver public services*'. As shown in section 2 the term government has many meanings, focussing on the organization and actions of the state for the purpose of the public good. The term governance seems to have entered the stage during the last couple of decades as a response to changes in the environment in which a government

(as an organization) operates and adapts (its actions). Christensen (2007) seems to indicate the same development (see the citation in the introduction in this Paper).

Peters (2000) uses the term 'self-governance' pointing to the increasing tendency to let (public) entities define their own governance arrangements. He further describes how co-ordination of social systems seems to have two forms:

- The old form: state steering through goals and priorities.
- The new form: outcome of formal or informal public–private interaction.

Tatenhove, Mak and Liefferink (2006, p. 9) looks at the development of practices within the European Union and points out the division between:

- Formal practices: constitutions and organisational structures, rule directed (front stage)
- Informal practices: new institutionalist and governance approaches, rule-altering (back stage).

Like Peters, they respond to emerging practices of an informal kind, labelling the strategic motivation as 'co-operative' or 'conflictual'. EU refers to these interplay-processes as 'governing', whereas the authors use the word 'governance' (p. 16).

Börzel, Guttenbrunner and Seper (2005) point out that governance structures emerge from the actors involved and their relationships – an enactment process. They also distinguish between two types of governance processes; hierarchical and non-hierarchical. Hierarchical imply one party imposing their will on the others, and non-hierarchical including both parties in a negotiation process. They lend an ear to Pierre and Peters (2000) when they distinguish between:

- Governance as structure
- Governance as process.

Driessen (2005) has developed this duality into a clear distinction between 'multi-level' governance (highlighting the various tiers of government: local, regional, national, or supranational) and 'multi-actor' governance (reflecting the involvement of both public and private actors). In this context, both are relevant and will therefore be investigated further. The two directions in the governance literature are described separately in the following.

4 Multi-level governance

Multi-level governance stems from the 'classic' meaning of government as an authority or administration described in the introduction above. As people moved together and formed larger communities the need for more layers of government appeared. Today, this perspective spans from very wide mandates on a high level, such as the United Nations (UN), the World Bank (WB), Organization for Economic Co-operation and Development (OECD), European Union (EU), and World Trade Organization (WTO), down to national, regional and local authorities such as municipalities, boroughs and townships.

The basic function of governance in the multi-level perspective is hierarchical coordination. It is associated with the descriptions in section 3 as the old form of state steering (Peters 2000), the formal practice in governing (Tatenhove, Mak and Liefferink 2006), and governance as a structure (Börzel, Guttenbrunner and Seper 2005). Classical means of governance are **regulations** (proscriptions/injunctions or prescriptions/orders), **economic means** (sanctions or incentives) and **information** (advice or warnings) (Bemelmans-Videc et al., 1998). This system of classification of the tools of governance may be very useful, and at the same time it gives some indication of how governance can be identified in a practical setting by the use of these means.

In the European Community the term 'multi-level governance' has been used since 1993 when it was introduced by Marks (1993). In this contribution the focus was on regional development. OECD has later continued this in their work to develop and manage regional development policies (OECD 2009).

In 1992, the World Bank defined governance as follows: '*Governance is the manner in which power is exercised in the management of a country's economic and social resources for development*' (Kaufmann and Kraay, 2007). In 2007, the World Bank reformulated its definition as '*the manner in which public officials and institutions acquire and exercise the authority to shape public policy and provide public goods and services*'.

Kaufmann and Kraay (2007, p. 4), of the World Bank, refers to previous work (Kaufmann, Kraay, and Zoido-Lobaton (1999, p. 1) which extended this definition to include the following: '*the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them*'.

These World Bank definitions, despite being rephrased during the previous decade, have held a relatively stable meaning, and Kaufmann and Kraay (2007, p. 6) observe that, '*While the many existing definitions of governance cover a broad range of issues, one should not conclude that there is a total lack of definitional consensus in this area. Most definitions of governance agree on the importance of a capable state operating under the rule of law*'.

Further, the World Bank definitions are very general in their approach. The World Bank represents one of the new elites mentioned by Hirst (see section 3). The last of the observations by Kaufmann and Kraay cited above indicates that the part of governance which most definitions agree upon is the part which defines what 'good governance' is.

One area where this is important, and also one of the most influential areas for the use of governance is economic development (Hirst, 2000). International development agencies and the World Bank may be used as examples, using their position to impose good governance as an effective way of modernizing governments in developing countries. They use their position by attaching various compliance conditions to their loans. Good governance is perceived as what these institutions define, and of course

this develops and changes over time. A former Senior Vice President of the World Bank (WB), Joseph E. Stiglitz (1998), gave an excellent example when he described the new paradigm for WB and its engagement in international development. Another area is sustainable development. Berger (2003) points out a strong relationship between the concept of governance and sustainable development (p. 224) and places the relationship at political-administrative units and thus within multi-layer governance (p. 226).

Hirst (2000, p. 14) states '*Good governance ... means creating an effective political framework conducive to private economic action – stable regimes, the rule of law, efficient state administration, adapted to the roles that government can actually perform, and a strong civil society independent of the state. Democracy is valuable in this context if it provides legitimacy for good governance.*'. This points to the interpretation of governance as an instrument to create a society like the one that elites in power want. Hirst also suggests the same contents of 'good governance' as indicated by Kaufmann and Kraay (above). This seemingly high level of conformity on what good governance appears to be should not be taken for granted as worldwide. Rather, it seems to stem from the economic area highly influenced by Western thinking.

Miller and Floricel (2000) point out the following: '*The institutionalist approach aims to identify the various governance modes that enable coordination of major actors in society (North 1990). Each society develops its own architecture, and optimal solutions are hard to identify (Coriat 1998; Hollingsworth and Boyer 1997)*'.

The instrumental logic in this approach to governance is that the ones in power decide the policy and choose the means to achieve the goals they have set. Subordinates are anticipated to comply with the choices made at the top. In a sufficiently strong position, this form of governance can be implemented top-down. Hardly anyone is in such a strong position anymore (if they ever where), either internationally or nationally. Based on Rhodes (1996), Stoker (1998, p. 22) sums up the situation as follows: '*In a governance relationship no one organization can easily command, although one organization may dominate a particular process of exchange. National-level government or another institution may seek to impose control, but there is a persistent tension between the wish for authoritative action and dependence on the compliance and action of others*'.

However, this may be interpreted as an indication of one major reason why multi-level governance will never (again) be the only form of governance, and why hierarchical coordination faces difficulties both in a public setting such as described here, and in a business setting, as will be discussed later. The coordination with the private sector, non-governmental organizations, etc., will be addressed in the next section.

5 Multi-actor governance

Multi-actor governance is associated with the descriptions in section 3 as the new form of state steering (Peters 2000), the informal practice in governing (Tatenhove, Mak and Liefferink 2006), and governance as a process (Börzel, Guttenbrunner and Seper 2005).

Governance implies the use of civic institutions and networks to create the policies and the programmes which citizens want (Peters and Pierre 1998; Putnam 1993). Government cannot do this alone. Citizens have to be involved in policy making, either through individual participation or voluntary associations, religious institutions, etc. (Berger and Neuhaus 1977; Sager 2006). As the world is changing at a faster rate and non-governmental organizations become more and more important, the public context is becoming more and more complex. Thus, to cope with this development, governments have to change.

Kooiman and Van Vliet (1993, p. 64) also challenge the notion that the government can impose governance alone, when they write: '*The governance concept points to the creation of a structure or an order which cannot be externally imposed but is the result of the interaction of a multiplicity of governing and each other influencing actors*'.
Kooiman (1993) concludes that governing from the governance perspective is always an interactive process because no single actor, public or private, has the knowledge and resource capacity to tackle problems unilaterally. Feldman and Khademian (2003) goes down the same road proposing to think about governance structures as relationships created through the interactions of people in different and reciprocal roles that are relatively dynamic (p. 541). Public manager are not only enacting mandates they are given but also influencing policy through their multiple and reciprocal relations and influence on structures (p. 551).

Rhodes (1996) described governance thus: '*governance signifies "a change in the meaning of government, referring to a new process of governing; or a changed condition of ordered rule; or the new method by which society is governed"*'. He elaborated on these changes one year later, by adding '*a non-hierarchical form of steering, where state and non-state actors participate in the formulation and implementation of public policy*' (Rhodes 1997). This explicitly contradicts the traditional notion of governance as hierarchical coordination – it is non-hierarchical.

Uusikylä and Valovirta (2007) studies performance measurement and conclude that current unsatisfactory performance in the OECD countries has to do with too narrow management models (perspectives). They suggest the answer is to escalate from performance management to performance governance, given the critique against rational means-ends managerial models. They refer to Kenis and Schneider (1991) and give the following reasons, found at a societal macro level, for the current changes (2007, p. 408):

- The rise of organized interests, increased power of collective actors and increased interdependence
- Functional specialisation and strengthened policy spheres
- Increased number of political actors and competing interests that has led to government overload
- Strong state intervention together with scarce resources (governance under pressure)
- Decentralisation and fragmentation of government authority
- Blurring boundaries between public and private sector
- Increased complexity and coordination and controlling problems following from that.

Uusikylä and Valovirta (2007) develop a performance governance model with three fields of performance; 1) enabling performance factors such as learning, process development and resources, 2) single organization's performance targets i.e. measurable outputs, 3) multi-organizational sphere. They consider societal needs as dispersed, alternative and often conflict-laden and contradictory. Performance is no longer a managerial phenomenon but is closely related to democratic control and accountability (p. 409). This illustrates the wide consequences of the changing societal conditions and is an example of the new understanding of the world. It also explains the growth of policy networks.

Abbott and Snidal (2001) discuss the use of standards as a mechanism of international governance and shows how these can play different roles under different circumstances. They look at different government arrangements, varying combinations of private and public governance and varying levels of governance (national, regional and global) in light of the scope of the problem and the capacity of institutions. They define international governance as '*the formal and informal bundles of rules, roles and relationships that define and regulate the social practices of state and non-state actors in international affairs*'. What links this definition to multi-actor governance is the emphasis on relationships. The diversity of governance arrangements naturally stems from the diversity of problems that states, firms and other actors attempt to resolve. Among other things, Abbott and Snidal point out that no 'pure' governance form can handle all problems effectively, and no single governance blend (combination of private and public arrangements) is always best. This may be used to raise the question of governance at international levels.

Matten and Moon (2008) point out several interesting aspects of this new relational governance: national business systems are different and influence the way government and corporations act. The power of the state is different, being weaker in the USA and stronger in Europe. Unlike the USA, in European countries other stakeholders than shareholders are important actors. Traditions of labour unions in Europe have resulted in sectoral and national negotiations rather than negotiations on corporate level. Finally, Matten and Moon point out that the economic relations are dominantly market-based in the USA and based on alliances in Europe. Flyvbjerg, Bruzelius and Rothengatter (2003), investigating several international mega-projects, have made similar observations: governance is relative – the same formula will not work everywhere. Another illustration of this conclusion is the evaluation of the Channel Tunnel between the UK and France (Anguera 2006), where the differences between the two countries are apparent. These geographical (contextual) differences are evident in all forms of governance – multi-layer or multi-actor – but the increased influence of relations in the multi-actor perspective makes this more complex. The tendency to choose specific governance mechanisms to accommodate specific situations will increase. This is the case within organisations, countries and even cross boundaries as the Channel Tunnel is an example of.

Governance, from a management perspective, is the complex process of steering multiple firms, agencies, and organizations that are both operationally autonomous and structurally coupled in projects through various forms of reciprocal interdependencies (Jessop 1997). Here, Jessop points to some basic reasons for governance being complex and implicitly why governance had to move on from the top-down coordination to the interactive relations based modus. These observations

tell us that governance cannot be implemented top-down only. The governing party has to take into consideration the fact that other parties have strong, powerful positions and will have significant influence on priorities and how policies can be implemented. The new perspective may see this situation as built on networks of actors and negotiation between actors.

Several of the citations above describe relations as important and imply that influence happens through governance measures made by governments and the response to these measures from other powerful actors in an interactive process. This may also come about the other way around, with government responding to actions and initiatives from companies, organizations or individuals. Shah (2006) builds on a similar understanding of governance, developing a comparative institutional framework for responsive, responsible and accountable local governance. The title alone ('A comparative institutional framework for responsive, responsible, and accountable local governance') gives indications regarding multi-layer governance (local), multi-actor governance (comparative, responsive) and good governance (responsive, responsible and accountable). Shah's work includes overviews of conceptual and institutional literature on local governance and a brief history of the development of governance in a number of countries and regions. His conclusion is that: '*The new vision of local governance … argues for a leadership role by local governments in a multicentered, multiorder, or multilevel system. This view is critical to creating and sustaining citizen-centered governance, in which citizens are the ultimate sovereigns and various levels of governments are there to serve as agents in the supply of public governance.*' (Shah 2006, p. 36).

6 Recent reforms in public governance

As we have seen above, **Public Administration** (PA) has changed significantly over the last few decades. Some authors refer to the 'old public administration' in order to distinguish between the starting point and the later developments. In the Western democracies, public administration was previously based on a set of norms and values. This allowed for trade-offs and prioritizing between different and often competing values and goals (Christensen and Lægreid 2001; Olsen, 1997). Olsen (1988) described this model as 'the institutional state'. According to this model, a state is a moral community built on traditions reflected in value systems and institutions that provide rules for correct and good behaviour. Public administrations have the role of bearers and defenders of values and are not merely neutral instruments for the political leadership (Christensen et al. 2007, p. 52). This is a multifunctional and complex civil service model which has been strongly challenged in recent years (Box 1999; Christensen 2007, p. 28).

Even though an updated PA concept was introduced, **New Public Management** (NPM) took over the arena (Klausen 2005). NPM has introduced many of the same ways of thinking and designing systems in the public sector as traditionally used in the private sector in Europe (Pollitt and Bouckaert 2000) and Scandinavia (Bush et al. 2005). NPM is the post-modern version of governance in public sector, inspired by economic and rational thinking. The development has often been associated with the governments of President Ronald Reagan in the USA and Prime Minister Margaret Thatcher in the UK during the 1980s.

Christensen (2007, p. 28) describes the New Public Management reforms as follows: '*Most NPM reform efforts have had similar goals: to improve the effectiveness and efficiency of the public sector, enhance the responsiveness of public agencies to their clients and customers, reduce public expenditure and improve managerial accountability (Wright 1994)*'. This is certainly a very broad set of goals, making NPM a broad reform of government. Of course, the practical implementation of the reform and the focus in each country varies, but in general it seems evident that public governance is coming closer to corporate (private sector) governance. Pollitt (2003) has studied this phenomenon in the public reforms in New Zealand, illustrating the tensions created by this development.

The public sector is increasingly organized through independent public entities, strategic leadership and contracts. The means used is strong vertical and horizontal specialization of administrative systems, competitive tendering, customer choice, etc. In addition, NPM prescribes cultural changes aimed at making government apparatuses more user-friendly and market-oriented (Christensen and Lægreid 2001). A major principle of NPM is that the ministry should be a secretariat for the political leadership (Christensen and Lægreid 1998). This means that a ministry should take care of planning, coordinative and strategic tasks, in addition to having the capacity to serve the political leadership on an ad hoc basis when needed, while single cases should be handled by agencies. This is an old doctrine, which became established in 1955 because of capacity problems in the political leadership, but it was revived with the NPM reforms (Christensen 2003).

There is a lot of critical literature pointing out that NPM (and also corporate governance) does not fully take into consideration the specific context of public sector. Christensen and Lægreid (2001) and others are referred by Klausen (2005). Some authors regard it as somewhat naïve. Christensen (2006, p. 32) shows that NPM reforms failed to deliver increased efficiency, 'both in a micro and particularly macro way', and may have been followed by a tendency of decrease in quality of public services.

A basic idea of NPM was to separate politics (decision making) from administration 'leaving managers to manage' (Cohn 1997; Box 1999, p. 21). The intention was increasing their freedom to act within their area of responsibility and to measure their effort by results. This freedom, based on a contract to deliver results, has to be balanced by control efforts. This contradictory tendency has grown more visible over time and is the core of the next wave of development in Public Governance: **the post-NPM reforms**.

Because of NPM failing to deliver efficiency, the increased fragmentation and what has been described as 'the fear factor' (terrorism, tsunami, pandemics, etc.), there is a growing tendency to (and obvious arguments for) reinstate a more central political and administrative control (Christensen 2007, p. 32). Different terms are used to describe this tendency: 'joined-up government' in the UK and 'whole-of-government' in Australia. The Scandinavian countries (and the rest of Europe), still lagging behind the Anglo-American NPM pioneers, follow more or less the same patterns.

Compared to the NPM reforms, the post-NPM reforms are generally more about cultural than structural features (Christensen 2007, p. 37). Now the mantra is to think

about the collectivity and to find ways to collaborate with other public entities to find good solutions (Bardach 1998), and focussing on public ethos and standards is now more important than before (Brunsson and Jacobsson 2002).

Christensen and Lægreid (2008) have studied the central civil service in Norway. Based on data from 1976 to 2006, they show that the administrative culture has been quite resistant to the reform ideas of NPM. The rule-based approach still remains important and role considerations are stable, although tasks and external contacts have changed. Demographics relating to, for example, gender and education have also changed. Structures have changed, with fewer top leaders and more mid-level positions. Another structural change is that more civil servants are working on planning and coordination tasks and fewer on single cases. The main picture, however, is increased complexity; new reform tools have been added to existing measures. '*What we see is reforms with a supplementary function rather than a process in which post-NPM reforms have replaced NPM reforms. New measures have been added without a substantial reduction in the old ones*' (Christensen and Lægreid 2008, pp. 27–28).

Public managers have four different roles to play, according to Zapico-Goñi (2008). These are the administrator, the producer, the inventor and the integrator. Traditionally public managers have been focussing a lot on being administrator and producer. The context today with uncertainty, interdependence, diversity and instability leads to an unexpected, discontinuous and radical change where they have to focus their other two roles; inventor and integrator (p. 425).

It is easy to see parallels to the development in governance as described earlier: from the 'old' public administration with hierarchical co-ordination (multi-layer governance) to the recent relationship focussed management (multi-actor governance) in the description of these reforms. From the once balanced position in the institutional state, development in society imposed an imbalance where hierarchical co-ordination does not work as it used to. The answer to this has been more competition, specialization, the use of contracts, etc., in the NPM reforms. The development may have gone a bit too far or failed to acknowledge the duality of empowerment through freedom and the need for control, giving rise to the post-NPM reforms in the pursuit of a new balance[9]. The post-NPM reforms give ambiguous signals, though; NPM does seem to strengthen both multi-layer governance and multi-actor governance by increasing (vertical and horizontal) specialization. All in all, it still has the distinct flavour of the transition shown in governance, as mirrored by the development in governance literature.

7 Governance in the private sector: corporate governance

The concept of governance is the essence of management on a superior level. In the private sector this indicates relations to the position of the board of directors or owner of a company or corporation. One of the most extensive bodies of governance literature focuses on corporate governance.

[9] This was the case even before the current financial crisis and recession period. Current answers to the crisis points very much in the same direction; towards stronger public management.

One definition of corporate governance is '*a system [that] shapes who makes investment decisions in corporations, what types of investments they make, and how returns from investments are distributed*' (O'Sullivan 2000, referred to in Detomasi 2006, p. 227 and O'Sullivan 2003, p. 24).

Corporate governance systems are composed of the following:

- Internal governance processes (structure, composition and authority of the company's board of directors, the relationship between board and management, and the internal financial and auditing controls to monitor performance).
- The quality of the independent auditing functions present in the national economy (normally fulfilled by an accredited accounting profession based on rigorous standards).
- The nature and quality of the corporate law and regulatory mechanisms existing within a national economy that are designed to shape corporate activity.

(Monks and Minow 2004, cited in Detomasi 2006)

Detomasi (2006) emphasizes that despite these common elements, corporate governance systems differ dramatically between nations with regards to purpose, structure and function. Corporate governance systems reflect social, political and economic purposes. They reflect the connection between corporation and society in each country.

Jacoby (2005) gives a historical overview of the relations between corporate governance and society, based on a similar understanding of the corporate governance system on a national level. He describes corporate governance thus: '*it comprises the laws and practices by which managers are held accountable to those who have a legitimate stake in the corporation*'.

Detomasi (2006), Jacoby (2005), O'Sullivan (2002; 2003), and Abbott and Snidal (2001) all discuss differences between countries and the governance systems found in different countries. There seems to be two important categories of corporate governance systems:

- Shareholder-value systems (USA, UK, Canada, etc.)
- Communitarian systems (Central and Northern Europe, Japan, etc.)

The main difference concerns who is regarded as legitimate stakeholders. The shareholder-value system only regards shareholders as legitimate stakeholders. An example is the corporate governance in the USA:

> [The] Policy Governance model, [is] a new, rational paradigm for directors; put simply, the Policy Governance Model as applied in business answers one question: *How can a group of peers, on behalf of shareholders, see to it that a business achieves what it should (normally in terms of shareholder value) and avoids unacceptable situations and actions?* The model does not prescribe a certain structure, but a set of principles. These principles are universally applicable and sufficiently integrated to be called a 'model' or, indeed, a *theory* of governance. (Carver 2001)

Communitarian systems also hold non-shareholder constituencies, such as employees, banks and the community in general, as legitimate stakeholders, in some countries by law (Germany, Norway, etc.) while in other countries there is no legal requirement to do so (Japan), according to Jacoby (2005, p. 70).

Today the shareholder-value system seems to be dominating international governance trends, influencing countries such as France and Japan to phase out their systems of cross-shareholding to make way for international and institutional investors. O'Sullivan (2003) makes comparisons and points out weaknesses in theories used to explain the development. She also documents systems changing significantly over time. Academics discuss whether the development seen will end in convergence with a common model or remain different.

Clarke (2004) looks at different systems: an 'outsider' system of market-based corporate governance predominant in the US and the UK, and characterized by dispersed ownership and primacy of shareholder value, is the current dominant force. However, in Europe a 'relationship-based system … has prevailed, reflecting the rich cultural diversity of the continent, and different corporate history and values' (Clarke 2004). In addition, there are family-based systems as in Asia Pacific.

Jacoby (2005) gives an interesting overview of the development (especially the US corporate governance system from the 1930s to the present). On of Jacoby's main points concerns the changing nature of governance systems: '*Corporate governance is politically constructed and historically mutable*' (2005, p. 71). He points out several interesting developments, here mentioned more or less chronologically up to today:

- The separation of ownership and control
- Welfare capitalism, New Deal
- Corporate Social Responsibility
- Institutional investors, speculating (raiding and stripping)
- Lean and mean companies, options, development of shareholder-value model.

Jacoby (2005, p. 79) quotes the Russel Sage study: '*the share-holder value model is fundamentally about the distribution of resources and risk*'. This statement points out a strong link to the subject of public investment projects. It is also about the distribution of resources and risk. The wide spectre of considerations necessary in decisions about public investment projects appears to parallel the communitarian model more closely. When designing public investment projects, planners and decision makers undoubtedly have to consider the welfare of all relevant stakeholders (users, neighbours, interest groups, etc.) and the people or society in general. The distribution of welfare and resources is the fundamental reason why we have a public sector.

Corporate governance has been described as a 'system' (see above) – but that is not precise enough. The following OECD definition includes the structure (system), but puts it into a wider context where relations are the central issue. The following definition is useful because it allows for both shareholder-value and communitarian models. It also points to structures supporting the setting and achievement of goals.

Corporate governance is defined by the OECD (2004) as follows: *'Corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined.'*

From the descriptions, definitions and discussions above, it is clear that corporate governance is about ownership – what rights and responsibilities follow with ownership. It is about the corporation's responsibility to the owners, and in a wider sense to society and the people influenced by its activities. Furthermore, let us follow Thiry (2006) and look at how corporate governance and projects is connected. He describes the connection like this:

Referring to Jensen (2001) and Clarke (2004) Thiry identifies two main directions in current organisational literature, and one recently emerging (p. 1):

- It is the business of business to make money, and therefore to pursue shareholders' interests.
- Companies exist to serve the interest of multiple stakeholders.
- Value creation through innovation and intangible assets (emerging, referring Lazonick 2000; O'Sullivan 2000; Dallago 2000; Blair 2005).

Thiry argues that businesses currently focus the shareholder model will likely favour a stakeholder approach in the future and that they should aim for value creation. The reasons are the shareholder model's short-sightedness and disregard for the consequences of a changing [economic] environment. Both the corporate view and the project view identify stakeholders as actors significant for successful realisation of objectives. Recently authors have criticized both the shareholder and stakeholder perspective to focus too much on utilizing existing productive resources and too little on increasing or transforming them. This has a lot to do with projects, as illustrated in Figure 1.

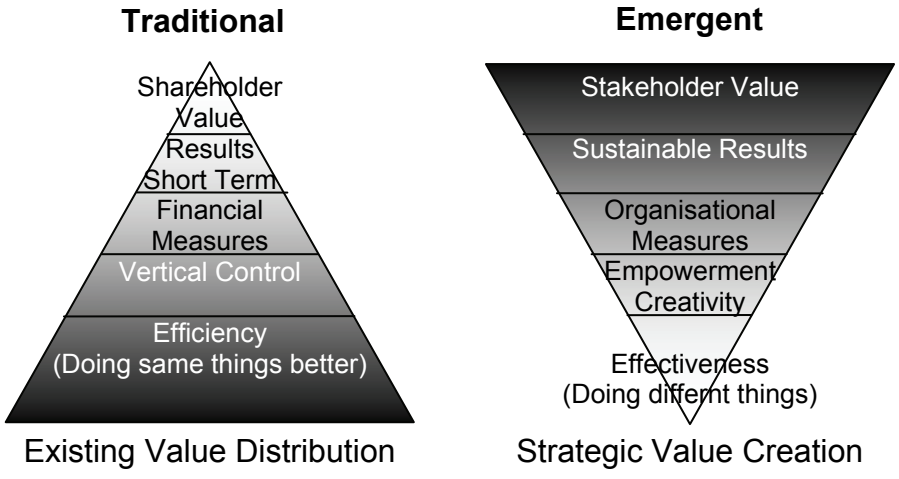

Figure 1 Shareholder and stakeholder value approaches to value creation. Adapted from Thiry (2006).

With the traditional shareholder value model the focus will continue to be on short term results, financial measures, vertical control, and efficiency (doing the same things better). With the emerging value creation model focus will shift to stakeholder value, sustainable results, organisational measures, empowerment and creativity, and effectiveness (doing different things to create more value). Thiry (2006, p. 3) argues this wider set of success criteria will bring an increased focus on the link between expected benefits and results.

The fundamental issues in corporate governance seem to be the same as found in sections 4 – 6 about public sector governance. However, the choice of words is different, mirroring a different setting and organisational tradition and culture. As indicated in section 6 there is signs that the public sector adapts both philosophies, methods and language from private sector. Whether this is a result of what is in at the moment, or sign of more fundamental trends may still be debated. If public sector actually copies private sector, Thiry gave an indication that the aim should be beyond current view of value creation. Maybe public sector can get there first? Focussing major public investment projects may be a place to start.

8 Governance as a means of alignment in society

The previous sections looked at public sector and private sector apart from each other. This gives a fragmented picture but highlights many significant sides to the concept of governance. In this section, the many aspects of society come together in a wider context. Figure 2 shows the theoretical fundament on which we base these discussions. The principal actors and arenas shown in the figure form the basis for defining the basic models of society according to Midttun (2005):

- **The liberal model**: market-based economy based on pluralistic political exchange, competitive commercial exchange, and minimalist market-constitutive regulation. This model dominated in the 19th and early 20th centuries.
- **The welfare state**: mixed economy based on a wider collective welfare preference, active industrial politics and welfare provisions. The political exchange is broader, and the influence over economy is stronger. This model had strong influence in many European countries from the mid-20th century onwards.

Where the liberal models prefer individualistic, self-regulating ideals and a ‘lassez-faire’ attitude towards regulating by government, the welfare state prefers collective solutions with government in an active role, bargaining and partnering with industry and society. It assumes a tighter integration between the three exchange arenas.

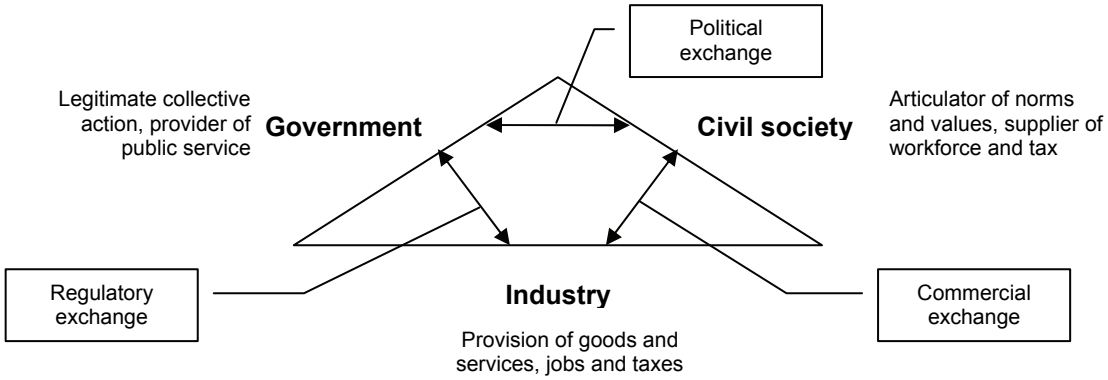

Figure 2 Actors and arenas in societal governance (adapted from Midttun, 2005). This is a basis for discussing governance of the whole society, public and private sector, as well as the public in general.

Midttun (2005, p. 162) points out that the development in the 1980s to 1990s (explained above as the New Public Management reform) was a neo-liberal wave characterized by labour market flexibility, innovativeness, structural or systemic competitiveness, and international economic organization (Jessop 1999). Two major trends seem to have been decisive for this development: the globalization weakened the national state by opening up for exit strategies for industry: if they did not like the regulations they could move to another country. The development of policies and institutions on an international level does not seem to have kept pace with the globalizing markets. The other major trend is the technological advances facilitating international industries and organizations, creating new forms of collective actions and introducing a new governance potential.

Midttun (2005) observes that during recent decades there has been a growing social and environmental agenda, and argues for the definition of a new societal economical model:

- **The embedded-rational model**: This post-liberal and post-welfare model builds on a more reflexive, dialogical rationality. It includes the state in a strategic position, but also relies extensively on embedding governance in the market process and civil society. The intermediation between the three arenas in Figure 2 is far less political than in the welfare model, but less decoupled as in liberal models.

Midttun argues that the embedded-rational model reflects the expectation of social and environmental decency and a need for felt sharing of wealth from global corporate operations. This have still remained in political focus during the liberally dominated 80es and 90es. Large segments of the population, especially in welfare states, are therefore sympathetic to mobilization against some of the negative side-effects of the global market economy (Midttun 2005, p. 164). Democratic politics are still important, but media (public opinion) and voluntary and non-mandated organizing and regulation have a prominent position. Industry is motivated to take part in non-mandatory socialization through branding and reputation (Fombrun 1996), enhancing competitive advantage (Porter and Kramer 2002), and embracing stakeholders are key to success and long-term value maximization (Zadek 2001).

This new model does not only bridge the gap between liberal and welfare models, but also includes new aspects. It anchors the broader welfare concerns as well as more traditional governance concerns in direct civil society intervention and voluntary measures, more than politically mandated regulatory interventions (Midttun 2005, p. 167). The emerging embedded-rational model adds both a partnership role to the public sector in which government may act as participants, conveners or facilitators (Fox et al. 2002) and endorses the 'soft' regulatory agenda which puts stronger emphasis on positive incentives, de-emphasizing (but not removing) the strong regulations of the welfare state. The new model relies less on formal, democratically authorized and administratively implemented measures than on informal structures and processes.

Based on several indicators, Midttun et al. (2006) show that this new embeddedness of economy in a wider societal context is strong in many Western European countries; specifically in the Nordic countries (Norway, Sweden, Denmark, and Finland). At the other end of the scale, with low degree of embeddedness, are the Anglo-Saxon countries (UK, USA and Ireland). Continental countries are somewhere above mid-point and Mediterranean countries below mid-point in embeddedness.

The description in this section confirms that the same patterns are visible on all levels of society and influences not only government, but also the industry (private sector) and the general public. It also adds evidence that there are significant differences between countries and regions. This confirms how important it is to analyse any governance mechanism or effect with great care to take its context into consideration. It also has the consequence that generalization of findings across these borders has to be done carefully.

9 Conclusion to governance

This paper has presented the background and recent history of government and governance as seen in the literature during the last couple of decades. Comparing the descriptions given under the headline multi-level governance and the ones given as multi-actor governance, there certainly seems to be more a shift in weight from hierarchical to interaction-based governance. It does not, however, indicate the hierarchical governance is no longer relevant. Hierarchical (multi-level) governance does not seem popular in the literature from the last decade but, as pointed out by Pierre and Peters (2000, p. 17-18); dismissing hierarchies would be to limit our understanding of policy structures and processes. The new understanding is a more complex concept of governance than earlier.

No general definition of the concept 'governance' is chosen yet. An analysis of the definitions cited in sections 3-5 shows no significant differences in intention or scope, although the words are chosen differently. The fundamental notion that governance is the process of developing common benefits for society, or making such development possible in a wide sense, is still valid. Therefore, we view governance as the modern form of the concept 'to govern'. It is a response to changes in the context for government, rather than result of the invention of a new concept. Several authors have

used phrases which indicate they use governance as a new perspective, not as a new concept. This seems potentially useful.

For a definition of public governance to be useful, it has to be open to both the traditional and the new meaning of governance. The following definition of **public governance** seem to give such room: '*"Governance" refers to the formal and informal arrangements that determine how public decisions are made and how public actions are carried out, from the perspective of maintaining a country's constitutional values in the face of changing problems, actors and environments.*' (OECD, 2005). Note that the definition explicitly refers to the public sector and thus cannot cover the private sector without adaption. The two definitions presented by OECD as representative of public governance (public sector) and corporate governance (private sector, section 7) have both been developed to a certain level of international consensus. They are both relatively new and show general formulations of what governance is about in the first decade of the 21st century.

Based on the discussions above, it seems difficult to present a good definition of governance in general. It is so overly complex and wide in scope that all definitions will be contestable. As shown above, many authors have attempted to define governance and all of them have chosen to highlight what they identify as the most important issues in their formulation of the definition. It seems less than likely that one short formulation can capture all aspects of governance without becoming relatively limited in use. As a living concept it will transform and change more or less continuously as society changes.

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Paper 2

Fundamentals and current measures of sustainability: What are the real sustainability factors?

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Abstract

Sustainability is a very complex issue. In this paper sustainability is studied in terms of its philosophical fundament, its theoretical definition, its practical measurement and assessment initiatives, and the situation today in economy and politics. It is established that sustainability is a changing concept with an increasingly wide range of considerations involved, adapting to the current agenda at any given time. Sustainable development is more a process than an objective in itself. The concept of sustainability has been closely associated with environment, but is actually a wider concept. Ecological, social, economic, and institutional perspectives are equally important to cover the whole concept of sustainability. There is limited knowledge about environmental sustainability in many groups and communities, leading to lack of ability to act on environmental issues. While there has been much debate, actions have been limited. According to influential recent works, there is expected to be only a short time span in which to act before action will become either very expensive or too late.

Investment projects are an arena of action that connects sustainability to specific practical questions. Projects represent a significant share of the actual use of resources and production of benefits and disadvantages such as waste and pollution. This makes sustainability a major concern in projects, and the intention in the present study is to develop a balanced view on sustainability. To be able to assess sustainability it is necessary to apply an analytical framework which defines how to aggregate or present the sustainability assessment. This is important in order to have a transparent process and to be able to explain the considerations made. In this work, the OECD's draft standard on Development Evaluation Assessment is used. It includes five criteria, of which Sustainability is one, and six cross-cutting issues which should be carefully considered: Economic and financial issues, Environmental impacts, Socio-economic aspects, Technological aspects, Institutional aspects, and Policy support measures. Based on the integrated evaluation model of the OECD, the most important long-term factors for sustainable development are identified. These will have to be considered in each case to ensure that a project concept is sustainable. The short-term factors of a project also have to be considered to establish that the potential for a sustainable project is present.

Keywords: *Sustainability, Ecology, Measurement, Sustainability assessment*

1 Introduction

The word ‘sustainability’ or ‘sustainable’ has entered the everyday language of people in the 21st century. The word has been focussed over the last 30 years and has been used in a variety of contexts. This has resulted in a concept that is difficult to define precisely. In this essay the concept will be discussed and several meanings presented as a background for narrowing down the meaning in the context of governance of projects. The aim of this essay is to create an understanding of what sustainability is and how it affects projects. To do this, it is necessary to include both a brief history of how sustainability has been promoted over the last 30 years and a look at the fundament of this development. This will not include a comprehensive summary of economy, ecology or methods developed to obtain sustainability. A major part of this essay is devoted to the measurement of sustainability because studying how it is measured increases the understanding of both what the concept is and how to make projects sustainable.

2 Philosophical foundations of sustainability

Sustainable development is an ambiguous concept, as a wide range of views fall under its umbrella. There is a lot of cognitive dissonance connected to it: conflicting thoughts or beliefs (cognitions) about what we hold to be true and what we know to be true are a source of lack of harmony (dissonance). People do not know what to believe or who to believe. Influential sources of knowledge point in different directions when trying to explain the occurrences and developments observed. The spectrum covers everything from ‘conserve nature at all costs’ to ‘seek a technical fix’ (Brandon and Lombardi 2005, p. 2). This raises the question: What philosophical basis forms how people think about sustainability?

Ecocentrism is a philosophy that recognizes that the ecosphere, rather than any individual organism, is the source and support of all life and as such advises a holistic and ecocentric approach to government, industry and individuals:

> Ecocentrism has been described as post-humanism, for it transfers the reality-spotlight from humanity to the Ecosphere, from the part to the whole. This outside-the-human focus brings with it new standards for thought, conduct and action on such seemingly intractable problems as world population, urbanization, globalization, maintenance of cultural diversity, and ethical duties to the Ecosphere with its varied natural ecosystems and their wild species. The ecocentric ethic provides a new basis from which to examine the questions of how we should value the natural Earth and its systems and of how people should live. (Ecospherics.net 2008)

Ecocentrism does not even distinguish between animate life and inanimate matter or processes. The entire ‘sphere’ of life is important. The root of ‘eco’ is ‘home’, and the ecosphere is the home sphere. Ecocentric thinking is home-centred rather than biocentric, meaning organism-centred:

> Homocentric concepts of governance that encourage over-exploitation and destruction of Earth’s ecosystems must be replaced by those beneficial to the survival and integrity of the Ecosphere and its components. Advocates for the vital structures and functions of the Ecosphere are needed as influential members of governing

> bodies. Such 'ecopoliticians', knowledgeable about the processes of Earth and about human ecology, will give voice to the voiceless. In present centers of power, 'Who speaks for wolf?' and 'Who speaks for temperate rain forest?' Such questions have more than metaphorical significance; they reveal the necessity of legally safeguarding the many essential non-human components of the Ecosphere. (Rowe and Mosquin 2004)

This indicates a philosophy on which many of the contributions to the recent discussion about sustainable development are based. There is an explicit conflict expressed through this description as well: Who are the ones challenged in this conflict?

The word **anthropocentrism** has its roots in the Greek words *άνθρωπος* (anthropos, human being) and *κέντρον* (kentron, 'centre'), and the meaning is that, for humans, humans must be the central concern, and that humanity must judge all things accordingly. Further, '*anthropos*' (the term, like 'human', refers to both men and women) must be considered, looked after and cared for, above all other real or imaginary beings (Wikipedia 2008).

Religion seems to put man at centre of the development above all others of nature's creatures, although it would seem natural to expect a god-centred world view in religion. Lynn White (1967) sees Christianity as the root of the anthropocentric world view that has caused environmental degradation. It seems especially relevant in the Western hemisphere, where some would argue the dominating economic thinking which has led to economic growth, which in turn has triggered some of the most worrying developments we observe today. These thoughts have not only formed economy but also other authoritative thinking influencing governance and management. Similarly, Routley (1980) claims anthropocentrism to be constitutive of traditional Western moral thought.

Some critics use the word 'shallow' about this philosophy. According to William Grey (1993, p. 473), the problem with a 'shallow' viewpoint is not that it is human centred: '*What's wrong with shallow views is not their concern about the well-being of humans, but that they do not really consider enough in what that well-being consists. According to this view, we need to develop an enriched, fortified anthropocentric notion of human interest to replace the dominant short-term, sectional and self-regarding conception.*' Defenders of anthropocentric views point out that maintenance of a healthy, sustainable environment is necessary for human well-being as opposed to for its own sake. One of the first extended philosophical essays addressing environmental ethics was John Passmore's *Man's Responsibility for Nature* (Passmore 1974). His essay has been criticized for its anthropocentric basis, which indicates that concerns about sustainability may well be based on this line of philosophical thinking.

Biocentrism has been proposed as an antonym of anthropocentrism (Wikipedia 2008). It is used about the belief that all forms of life are equally valuable and humanity is not the centre of existence. Biocentric positions generally advocate a focus on the well-being of all forms of life in the consideration of ecological, political and economic issues. Biocentrism also refers to the philosophical position that the attributes of living things form the basis of perception, and thereby form the basis of observable reality itself. According to Worster (1994), the origin of this philosophical

direction is found in British intelligentsia of the Victorian era reacting against the Christian ethic of dominion over nature. Charles Darwin is mentioned as the most important spokesperson for biocentric philosophy.

Deep ecology is a recent branch of ecological philosophy (ecosophy) that considers humankind an integral part of its environment. Deep ecology places greater value on non-human species, ecosystems and processes in nature than established environmental and green movements. Deep ecology has led to a new system of environmental ethics (Wikipedia 2008). The core principle of deep ecology as originally developed is Arne Næss's doctrine of biospheric egalitarianism (Næss 1973). It claims that, like humanity, the living environment as a whole has the same right to live and flourish. Deep ecology is describes as 'deep' because it persists in asking deeper questions concerning 'why' and 'how', and thus is concerned with the fundamental philosophical questions about the impacts of human life as one part of the ecosphere, rather than with a narrow view of ecology as a branch of biological science. Furthermore, it aims to avoid merely utilitarian environmentalism, which, it argues, is concerned with resource management of the environment for human purposes: '*In deep questioning we move toward ultimate premises and norms. In the process of derivation and application we move toward platform support and developing policies and practical actions. This is a continuous back and forth process which keeps our understanding and practices in harmony with a changing world*' (Drengson 1999). Drengson also points out that those supporting the principles of deep ecology may do so from a wide range of different ultimate views.

The word 'ecology' originates from the science of biology, where it is used to refer to the ways in which living things interact with each other and with their surroundings. For Arne Næss, ecological science, which is concerned with facts and logic alone, cannot answer ethical questions about how we should live. For this, we need ecological wisdom. Deep ecology seeks to develop this by focussing on deep experience, deep questioning and deep commitment. These constitute an interconnected system. Each gives rise to and supports the other, whilst the entire system is, what Næss would call, an ecosophy: an evolving but consistent philosophy of being, thinking and acting in the world that embodies ecological wisdom and harmony (Harding 2002).

Deep ecology offers a philosophical basis for environmental advocacy which may, in turn, guide human activity against perceived self-destruction. Deep ecology and environmentalism hold that the science of ecology shows that ecosystems can absorb only limited change by humans or other dissonant influences. Further, both hold that the actions of modern civilization threaten global ecological well-being.

Social ecologists such as Murray Bookchin (1987) claim that deep ecology fails to link environmental crises with authoritarianism and hierarchy. Social ecologists believe that environmental problems are firmly rooted in the manner of human social interaction, and protest that an ecologically sustainable society could still be socially exploitative. Deep ecologists reject the argument that ecological behaviour is rooted in the social paradigm (according to their view, this is an anthropocentric fallacy), and they maintain that the converse of the social ecologists' objection is also true in that it is equally possible for a socially egalitarian society to continue to exploit the Earth (Wikipedia 2008).

Together, the aforementioned descriptions constitute a fundament for understanding the initial position or philosophy on which it is possible to build thoughts and beliefs about sustainability. The focus may be on the organism or the wider sphere, and the 'order' may be hierarchical or independent of hierarchy. This is illustrated in Figure 1. The modern environmentalism which dominates the debates, attention in the media and probably also among laymen is associated with the word 'sustainability' are shown on the right-hand side in Figure 1. The left-hand side shows traditional positions.

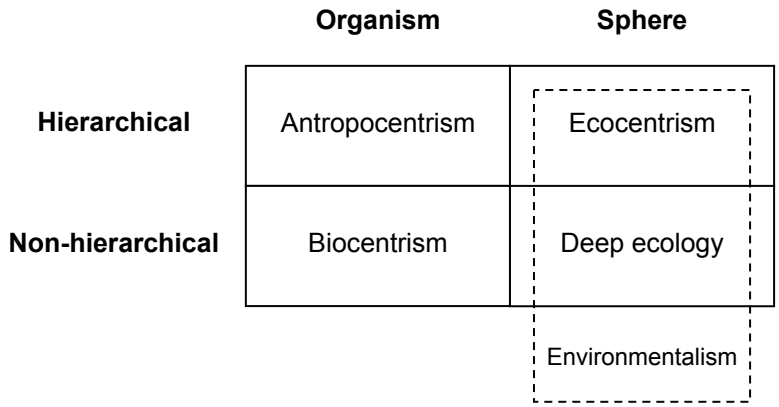

Figure 1 Philosophical fundaments for thinking about sustainability.

The divisions between categories are not always sharp and there tends to be a large overlap between contributors. As we have seen above, those who base their thinking on ecocentrism tend to criticize all forms of focuss on the organism, be they anthropocentric or biocentric positions. Those following the philosophy of deep ecology often criticize anthropocentric philosophy. Social ecologists (in this context placed within ecocentrism) are critical of deep ecology. Anthropocentrism, or human-centredness (homocentric), is believed by some to be the central problematic concept in environmental philosophy, where it is used to draw attention to a systematic bias in traditional Western attitudes to the non-human world (Næss 1973). The division between human-centred and ecology-centred thinking seems to be the deepest form of philosophical conflict in environmental questions. Discussions and conflicts over sustainability issues often mirror this. An example:

Rolston (1995) points out an interesting development: '*"Human beings are at the centre of concerns ... ",* so the Rio Declaration begins, the creed (once to be called the *Earth Charter*) formulated at the United Nations Conference on Environment and Development (UNCED), and signed by almost every nation on Earth.' Further, Rolston continues, '*"Every form of life is unique, warranting respect regardless of its worth to man."* That is how the UN World Charter for Nature begins. It is as nonanthropocentric as the Rio Declaration's beginning is anthropocentric. A total of 112 nations endorsed this charter, though the United States vigorously opposed it.'

The growing awareness and critical thinking that started in the 1960s and 1970s, largely opposing established and dominating political and economic forces, had considerable support and impact, as is evident in the UN World Charter for Nature in 1982. The forces in power fought back, resulting in a change of philosophical basis in

the Rio Declaration in 1992. Rolston (1995) points out that it is possible both for humans to be at the centre of concerns and also for every form of life to have its worth regardless of humans. The most significant point was probably that there was a broad support for and consensus on these aspects being important.

This section has described different philosophical fundaments and the conflicts embedded in thinking about how human beings and nature coexist. The different starting points (fundamental philosophical positions) are identifiable, for instance in discussing assessment methods, where Rees (1992) and Pearce and Warford (1993) divide the methods into ecocentric and anthropocentric. In the following, the sustainability concept and history will be studied further and put into a more operational context.

3 Putting sustainability on the agenda – a brief history

The 1983 the General Assembly of the United Nations passed Resolution 38/161 (United Nations 1982b) titled 'Process of preparation of the Environmental Perspective to the Year 2000 and Beyond' establishing a commission on environment and development. In this document, the General Assembly writes the following:

> *8. Suggests that the Special Commission, when established, should focus mainly on the following terms of reference for its work:*
>
> *(a) To propose long-term environmental strategies for achieving sustainable development to the year 2000 and beyond;*
> *(b) To recommend ways in which concern for the environment may be translated into greater co-operation among developing countries and between countries at different stages of economic and social development and lead to the achievement of common and mutually supportive objectives which take account of the interrelationships between people, resources, environment and development;*
> *(c) To consider ways and means by which the international community can deal more effectively with environmental concerns, in the light of the other recommendations in its report;*
> *(d) To help to define shared perceptions of long-term environmental issues and of the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long-term agenda for action during the coming decades, and aspirational goals for the world community, taking into account the relevant resolutions of the session of a special character of the Governing Council in 1982;*

Formally, the name of the commission was World Commission on Environment and Development (WCED), known by the name of its Chair, Gro Harlem Brundtland, who later became Prime Minister in Norway. There was a growing concern about the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development. In establishing the commission, the UN General Assembly recognized that environmental problems were global in nature and determined that it was in the common interest of all nations to establish policies for sustainable development.

Obviously, this was not the first time someone had thought about sustainability, but the concept of sustainability was introduced in the public debate by the publication in 1987 of the report *Our Common Future* by the World Commission on Environment and Development (WCED 1987). The Brundtland Commission stressed that '*sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*' (WCED 1987, Chapter 2), and this has since become one 'definition' of sustainable development. The commission stressed the essential needs of the world's poor and the limitations of the environment's ability to meet present and future needs. This has a strong element of distributive ethics (Høyer and Næss 2008). It focuses distributional issues, both within generations and across generations. A main point made by the Brundtland Commission was that sustainable development is a process of change, not the goal itself. Sustainability was assumed to rest on three pillars: an economic, a social and an environmental pillar, later to be addressed as the 'triple bottom line'. The interlocking and dependence between the different sectors was one of the main concerns. According to the Brundtland Commission, without satisfactory development in all three areas, society as a whole could not achieve sustainable development.

The WCED report sparked a development towards a growing political awareness worldwide and a series of Earth Summits (Stockholm 1972, Rio De Janeiro 1992, Johannesburg 2002) resulting in declarations and the commitment to act on the signals of deterioration (Agenda 21) and treaties (Convention on Biological Diversity, United Nations Framework Convention on Climate Change, etc.). For a more extensive overview, see Brandon and Lombardi (2005, p. 5).

Sustainability, as defined by this general political movement, is a wide concept indeed. In the context of this paper, the development outlined above is not pursued further, though we will return to some aspects of this development in the process of narrowing down the concept of sustainability. The definition has been criticized for being unclear and because the term 'sustainable development' is a contradictory one – nothing sustainable can grow infinitely. As pointed out by Daly (1990), '*Lack of a precise definition of the term sustainable development is not all bad. It has allowed a considerable consensus to evolve in support of the idea that it is both morally and economically wrong to treat the world as a business in liquidation*'.

A commission appointed by the Norwegian Government in 2004 to develop a core set of indicators for sustainable development (NOU 2005:5, p. 6) commented as follows on the interpretation of sustainability. The same challenges will be relevant in this paper:

> *It seems natural to interpret sustainable development as developments that can continue 'for ever', or at least until the end of the time horizon considered by policy. In addition, developments in question should have a positive quality; to deserve the term sustainable, the situation should not deteriorate. However, whether a given development is good or bad may be difficult to judge and agree on. In economic literature it is usual to define sustainable development as developments where the level of welfare, or living standards broadly defined, are not deteriorating over time. But what is welfare, and how can the level of welfare be measured? These have been fundamental challenges for the Commission in its task of developing indicators of sustainable development*.

4 Sustainability and its measures

One problem with a wide and less than clear definition such as the one given in the introduction to this paper is that it is not operational, meaning it is difficult to use it for the purpose of reviewing the development and propose improvements. The Brundtland Commission's statement '*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*' is useful as a description and 'slogan', but it does not give an understanding that helps in solving the problem. There is nothing in this definition that can be measured or systematically analysed. This section will examine how this methodological problem can be addressed.

During recent decades, different organizations have tried to measure and monitor the proximity to what they consider to be sustainability by implementing what has been called sustainability metrics and indices or Sustainable Development Indicators (SDI). These have the potential to turn the generic concept of sustainability into action. During the last 10 years there has been a remarkable expansion of interest in SDI systems, but there is still a lot to wish for in terms of better measurement. No standardized set of indicators exists, although the OECD and other international organizations are continuously developing improved sets. Several private corporations are creating their own sets suitable for their specific purposes, while national and international institutions are still trying to develop a generic indicator for measuring and monitoring sustainable development. The indicators are often developed by applying the OECD's Pressure-State-Response (PSR) model. Pressure means impacts on the environment from human activities. Ecology is initially in some state and changes as a consequence of the pressure. Responses are human actions needed to mitigate ecological problems caused by changes in state (Høyer and Næss 2008).

There are a large and still growing number of aggregate measures of various aspects of sustainability. They are created to make up indices that provide a more nuanced perspective on development than economic aggregates such as National Product (NP) and Gross National Product (GNP). Mäler (1991) gives an example of how NP should be corrected to take the environment into consideration in a better way. He uses optimal growth theory to derive what he considers to be an appropriate definition of the net national product concept, when there are environmental resources and environmental damage to be taken into account. The basic conclusions are that conventionally defined NP should be corrected by deducting for environmental damage and adding the value of the net change of all resources. NP and GNP have since been replaced by **Gross Domestic Product** (GDP):

> *Gross domestic product is an aggregate measure of production equal to the sum of the gross values added of all resident institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs). The sum of the final uses of goods and services (all uses except intermediate consumption) measured in purchasers' prices, less the value of imports of goods and services, or the sum of primary incomes distributed by resident producer units.*
> (OECD, 2008)

There has been strong criticism that GDP is too heavily focussed on growth. A consequence is that economic development based only on GDP leads to a

development which is not sustainable. Some initiatives are based on improving the GDP concept by taking more aspects into consideration (for example, unpaid household and volunteer labour, environmental damage, crime, income distribution). Two examples of such initiatives are the **Genuine Process Indicator** (GPI) (Redefining Progress, 2008) and the **Index of Sustainable Economic Welfare** (ISEW) (Stockhammer et al. 1997). The concept of 'Green GDP' has been introduced – a popular word for ecologically adjusted GDP, according to the OECD (2008b). It seems implementation is held back by the reluctance of policy makers and statistical services arising mostly from a concern about conceptual and technical challenges. These initiatives are 'purely' economic measures, designed to express the effect on economy from taking social and ecological concerns into the equation.

Assessing sustainability has to do with prognosticating future development. One approach to economic development is the **Index of Leading Economic Indicators** by Conference Board (2008). This index is intended to predict future economic activity by combining 11 leading economic indicators as a forecasting tool, including New orders for consumer goods, Plant and equipment orders, Building permits, Sensitive material prices, Stock prices, and other trends influencing the economic development. The index is published monthly and may indicate something about current and future (short-term) development. Another approach (a method, not an index) frequently used is **Computable General Equilibrium** (CGE), which is a class of economic models that uses factual economic data to estimate how an economy might react to changes in policy, technology or other external factors. External factors may, for instance, be pollution or other environmental effects (Resosudarmo 2003). CGE is used to analyse the expected effect or impact of policies on national economic performance and on household incomes for various socio-economic groups. Another example is the trade and welfare effects of trade liberalization considering imperfect competition (Norman 1990). These models seem potentially able to yield information about short- and long-term development. However, as this is not the line of approach I am looking for here, it is not further discussed.

Other initiatives to measure sustainability are based on measuring the environmental impact of human activities. Examples of such initiatives are the **Living Planet Index** (Panda 2008) and **Ecological Footprint** (Kitzes et al. 2007). Both are published by World Wilde Fund for Nature (WWF) in their The Living Planet Report (WWF 2006). The Living Planet Index reflects the health of the planet's ecosystems by tracking populations of 1313 vertebrate species – fish, amphibians, reptiles, birds, mammals – from all around the world. Separate indices are produced for terrestrial, marine, and freshwater species, and the three trends are then averaged to create an aggregated index. Ecological Footprint is a resource management tool that measures how much land and water area a human population requires to produce the resources it consumes and to absorb its waste products under the prevailing technology. Neither of these measures uses monetary terms. They do not try to add economy and ecology but measure the effect of economical and social activity on the ecology.

A more comprehensive approach is chosen by the World Economic Forum (WEF). They report two complex aggregate indexes: the **Environmental Sustainability Index** (ESI) (Columbia 2008) and the **Environmental Performance Index** (EPI) (Yale 2008). The 2005 Environmental Sustainability Index (ESI) includes 76 variables and 21 indicators into 5 components. It benchmarks the ability of nations to

protect the environment over the next several decades by tracking the following into 21 indicators of environmental sustainability: natural resource endowments, past and present pollution levels, environmental management efforts, and a society's capacity to improve its environmental performance. These indicators permit comparison across the following five fundamental components of sustainability: Environmental Systems, Environmental Stresses, Human Vulnerability to Environmental Stresses, Societal Capacity to Respond to Environmental Challenges, and Global Stewardship. The issues reflected in the indicators and the underlying variables were chosen through an extensive review of the environmental literature, assessment of available data, rigorous analysis, and broad-based consultation with policy makers, scientists and indicator experts (Columbia 2008). The EPI includes 25 indicators in 12 policy categories addressing the two objectives, Environmental Health and Ecosystem Vitality. The EPI is a method of quantifying and numerically scaling the environmental performance of a set of companies or countries. It is presented as a '*data-driven, fact-based empirical approach to environmental protection and global sustainability*' (Yale 2008). These indicators are complex aggregates giving supplementary understanding of what sustainability is and how it can be measured in an ecological perspective.

Since 2005 the World Economic Forum also publishes the Global Competitiveness Report. This is an analysis based on the comprehensive **Global Competitiveness Index** (GCI). This index includes more than 100 indicators, aggregating them up to 12 pillars of competitiveness sorted in three key index groups; basic requirements, efficiency enhancers and innovation and sophistication factors. Countries at different development stages weight these factor groups differently. The 12 pillars are:

- Institutions (legal and administrative framework)
- Infrastructure (extensive and efficient)
- Macroeconomic stability (stable environment for business)
- Health and primary education (healthy and productive workforce)
- Higher education and training (ability to adapt to changing conditions)
- Goods market efficiency (healthy market conditions)
- Labor market efficiency (flexibility to shift between activities)
- Financial market sophistication (sound and well-functioning sector for economic activity)
- Technological readiness (agility to adopt existing technologies)
- Market size (economy of scale)
- Business sophistication (quality of business networks and operations)
- Innovation (maintaining the competitive edge).

This author is skeptical to this index as a sustainability measure. It says (World Economic Forum 2009, p 3): 'the World Economic Forum's annual competitiveness reports have examined the many factors enabling national economies to achieve sustained economic growth and long-term prosperity'. Economic growth and long-term prosperity (especially the last bit) sounds good, but they continue (p 4): 'We define competitiveness as the set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the sustainable level of prosperity that can be earned by an economy.' And 'more-competitive economies tend to be able to produce ice higher levels of income for their citizens. The productivity level also determines the rates of return obtained by

investments in an economy. Because the rates of return are the fundamental drivers of the growth rates of the economy, a more-competitive economy is one that is likely to grow faster in the medium to long run.' This index then shows the potential for growth in a competitive situation and the development of this index over time. This author associates this with competing against others (securing more of the resources for themselves), not with securing a sustainable development where we do not overspend our natural resources and pollute the environment. One might argue this is the kind of thinking that brought us into the currently uncertain and unsustainable situation.

The purely economic or purely ecological measures described above show very different ways to address the measurement of sustainability. The economic measures are monetary, meaning money is the common scale. The ecological measures used several physical measures (counting numbers, amounts of pollution, physical capacities, etc.). When these different physical measures are aggregated, they use different forms of 'points' or 'character marks' to create a common measure or an index. Others do not add effects and thus avoid the problem of different scales. They leave to the reader to interpret the different indicators and draw conclusions based on individual understanding and values.

None of the economic or ecological measures or indexes has reached a position where everyone would agree that they measure every important aspect of development. From the beginning (WCED 1987), the three pillars of sustainability were economy, social welfare and environment. The United Nations adds a fourth pillar: institutional. Institutional indicators inform about the ability to apply to international agreements, investment in RandD, infrastructure, etc. It is widely agreed that sustainable development needs to rest on all these pillars; consequently, measures should also cover all of these pillars. Several attempts have been made to construct such measures.

The European Union has contributed with their **Environmental Pressure Index** (European Union 1999). The first index to be published contains 60 indicators giving an overview of the pressure of human activities on our environment in 10 policy fields: Economic development, Poverty and social exclusion, Ageing society, Public health, Climate change and energy, Production and consumption patterns, Management of natural resources, Transport, Good governance, and Global partnership. The index aims at six target sectors: Energy, Agriculture, Transport, Industry, Tourism, and Waste management. The EU presents the index in the introduction in the following way:

> *[The index covers] not only the well known problems of air pollution or climate change, but also more difficult areas such as bio-diversity and dispersion of toxic substances. … This work will also provide an important contribution to the development of indicators for measuring the effectiveness of the integration of environmental concerns into different sector policies, as requested by the Cardiff and Vienna Summits.* (European Union 1999)

In this index the social dimensions of sustainability are clearly evident, in addition to the ecological ones. Still, this is not a complete sustainability measure in the widest sense.

Addressing sustainable development obviously includes looking at how the institutional capital is managed. This is the main focus of the World Bank initiative: The **Worldwide Governance Indicators** (WGI) (World Bank 2008a). The aggregate indicators combine the views of a large number of enterprises, citizens and expert survey respondents in industrial and developing countries. The individual data sources underlying the aggregate indicators are drawn from a diverse variety of survey institutes, think tanks, non-governmental organizations, and international organizations. The WGI includes six dimensions of governance:

- Voice and Accountability (the extent to which citizens take part in elections, freedom of expression, free media).
- Political Stability and Absence of Violence (likelihood of unconstitutional overtaking of government, domestic violence and terrorism).
- Government Effectiveness (quality of public services, independence from political pressure).
- Regulatory Quality (ability to formulate and implement sound policies).
- Rule of Law (extent of confidence and abidance of law and rules, contracts, police and courts).
- Control of Corruption (extent of public power exercised for private gain, and 'capture' of the state by elites and private interests).

The definition of governance used in the WGI is as follows: 'Governance consists of the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them' (World Bank 2008b). The WGI is an indication of to what degree each country manages its institutional capital in accordance with the World Bank definition of governance.

Attempts have been made to create the 'ultimate indexes', comprising all important aspects of development. The most well known of these include the **Human Development Index** (HDI) of the United Nations Development Programme (UNDP 2000; 2008) and the **Well-being of Nations** reported by the Organization for Economic Cooperation and Development (OECD 2001). These are very complex aggregate measures, composed to cover many aspects of sustainability: the HDI includes 15 themes, 38 sub-themes and 58 indicators. The themes in the Social category are Equity, Health, Education, Housing, Security and Population; in the Environmental category: Atmosphere, Land, Oceans, Seas and coast, Fresh water and Biodiversity; in the Economic category: Economic structure, Consumption and production patterns; in the Institutional category: Institutional framework, Institutional capacity (United Nations 2008). Culture is one of the UNDP's areas of focus (UNDP 2004). The Well-being of Nations (WBN) combines 36 indicators of health, population, wealth, education, communication, freedom, peace, crime, and equity into a Human Well-being Index, and 51 indicators of land health, protected areas, water quality, water supply, global atmosphere, air quality, species diversity, energy use, and resource pressures into an Ecosystem Well-being Index (Prescott-Allen 2001). The WBN is organized in categories of natural capital, produced capital, human capital and social capital, as well as taking into account political, institutional and legal arrangements. There seems to be a parallel thinking in these two initiatives.

Although the choices of structure for the indexes are different, the impression of the whole line of thinking seems quite compatible on the surface. The problem with both initiatives is the complexity, the number of elements; it is hard to see the whole picture.

The most important sustainability measurements are summarized in Table 1.

Table 1 Overview of some selected sustainability measurement initiatives.

Abbr.	Name	Pillar	Publisher	Complexity in measurement
GDP	Gross Domestic Product	Economy	National	1 indicator for all
GPI	Genuine Process Indicator	Economy	Redefining Process	1 indicator for all – GDP expanded for sustainability
ILEI	Index of Leading Economic Indicators	Economy	Conference Board	11 indicators embedded in method
LPI	Living Planet Index	Environment	World Wilde Fund for Nature (WWF)	1 indicator based on 3 trends in 1313 species
-	Ecological Footprint	Environment	WWF	1 indicator showing use of natural resources
ESI	Environmental Sustainability Index	Environment	World Economic Forum (WEF)	76 variables and 21 indicators into 5 components
EPI	Environmental Performance Index	Environment	WEF	25 indicators into 12 policy categories addressing the two objectives: Environmental Health and Ecosystem Vitality
GCI	Global Competitiveness Index	Economy	WEF	>100 indicators aggregated to 12 pillars of competitiveness in 3 key subindexes.
-	Environmental Pressure Index	Environment	European Union	60 indicators, 10 policy fields
WGI	Worldwide Governance Indicators	Institutional	World Bank	6 dimensions of governance
HDI	Human Development Index	Economy, Environment, Social and Institutional	United Nations Development Programme (UNDP)	15 themes, 38 sub-themes and 58 indicators
WBN	Well-being of Nations	Economy, Environment, Social and Institutional	Organization for Economic Cooperation and Development (OECD)	36 socio-economic indicators (Human Well-being Index), 51 environmental indicators (Ecosystem Well-being Index)

Even though it is questionable how 'sustainable' a single country or region may be if the rest of the world is not sustainable (there is an obvious need for a global approach at this level), several countries put a lot of effort into developing indicators and datasets relating to development. The member countries of the UN and the OECD report input data to the models described above and frequently also develop their own models or indicator sets. This development has accelerated over the last decade, motivated by increased focus through Agenda 21, National Action Plans, the UN's Millennium Goals, and several new agreements and conventions (Kyoto Protocol, Climate Convention, UN Convention on Biodiversity, etc.). Some examples of member countries' models or indicator sets are:

- Netherlands: The NEMEA system (grouping together economic and environmental-related variables (Alfsen et al. 2005, p. 11)
- Canada: The Capital Approach (indicators) (Smith et al. 2001)
- Norway: Indicators for Policies to Enhance Sustainable Development.

Norway has had considerable focus on sustainability (Norwegian Government 2007) and generated many initiatives to respond to the environmental challenge. The indicator set for Norway is shown in Figure 2 (NOU 2005:5). Norway is chosen as an example for several reasons. Firstly, it is a quite recent initiative, building on the sources mentioned above, and it is easily accessible. In addition, it is made practical based on a view that precision (complexity, numbers of parameters) has to be a trade-off against the resources put into the measurement and reporting. A simpler model is also considered to be more transparent and credible as it is possible to understand how it works, and how areas are weighted and aggregated. Complex models frequently has created debate on the methodology instead of the substance (Alfsen et al. 2005, p. 11): '*The strategy of the Commission as far as the selection of indicators of sustainability is concerned is therefore as follows: to chose indicators that best reflect the value, defined as the welfare effects, of the various components of national wealth. The strategy is similar to the one Canada has described as a "capital approach"*'.

The starting point of the Norwegian commission was the six main policy areas defined in the National Budget for 2004 (Ministry of Finance 2003), shown as headlines in Figure 2. Figure 2 shows a limited set of 18 indicators with defined measurements. The original table is more specific about what the issues in each indicator are, and which component of national wealth the indicators are linked to. The commission also concludes there might be other indicators added later, the methodology and data may be improved, and frequent reviews undertaken to ensure that the national indicators add value. These indicators are not aimed at predicting actual outcome, but at focussing potential future developments.

OECD (2002b) publishes a wider summary of governance approaches to improving sustainability in different countries. The report includes five countries as case-studies; United Kingdom, Japan, Germany, Canada and the Netherlands. To different extents these countries have taken steps to improve their governance, decision making, and management in a more sustainable direction. The policy tools to improve policy integration includes a) 'greening' of accounts and budgets, and of government operations, b) improved performance management systems and environmental impact analysis, evaluation and systematic cost/benefit analysis and other accountability mechanisms, c) innovative regulatory tools.

No	Indicator	Econ-omy	Social	Envir-onment	Measurement
International cooperation for sustainable development					
1	Norwegian official development assistance (ODA) as percentage of gross national income (GNI)	✓	✓		Monetary (NOK), share in per cent
2	Trade with Africa, by LDC countries and other African countries	✓	✓		Monetary (NOK)
Climate, ozone and air pollution					
3	Emissions of greenhouse gases compared with the Kyoto Protocol target			✓	Physical emission mill. tonnes CO^2 equiv.
4	Percentage of land area where the critical load for acidification has been exceeded			✓	Physical share in per cent
Biodiversity and cultural monuments					
5	Population trends of nesting wild birds			✓	Counted physical stocks (numbers)
6	Percentage of rivers and lakes with clearly good ecological status			✓	Physical share in per cent
7	Percentage of localities (coastal waters) with clearly good ecological status			✓	Physical share in per cent
8	Condition/state of preserved buildings	✓		✓	Physical condition (grade), economic consequence (NOK)
Natural resources					
9	Energy use per unit GDP	✓	✓	✓	Energy use petajoules (PJ) physical per unit GDP
10	Recommended quota, total allowable catch (TAC) actually set and catches of Northeast Arctic cod	✓	✓	✓	Physical (tonnes)
11	Irreversible consumption of productive land	✓	✓	✓	Physical area (m^2)
Health and hazardous chemicals					
12	Household consumption of hazardous substances		✓	✓	Physical (tonnes)
Sustainable economic development					
13	Net national income per capita, by sources of income	✓	✓		Monetary (NOK) per capita
14	Petroleum adjusted savings	✓	✓		Monetary (NOK) per capita
15	Generational accounts: Need for tightening of public finances as share of GDP	✓	✓		Monetary (NOK) in per cent of GDP
16	Population by highest level of education completed	✓	✓		Number of persons (physical)
17	Long-term unemployed persons and disability pensioners as percentage of population	✓	✓		Per cent of population (physical)
18	Life expectancy at birth	✓	✓		Years (physical)

Figure 2 Indicator set and relations to issues of national wealth in Norway (Alfsen et al. 2005; based on *Indicators for Policies to Enhance Sustainable Development* (NOU 2005:5)). These indicators are used actively in improving public decision making (NOU 2009:16).

'Measuring progress on sustainable development (or any other important area of policy) with reliable information is a key ingredient of the democratic process. It makes governments more accountable and gives people a tool to participate more actively in defining and assessing policy goals' (OECD 2008a, p. 102).

Problems with measuring approaches

While sustainability indicators, indices and reporting systems gained growing popularity in both the public and private sectors, their effectiveness in influencing actual policy and practices often remained limited. Based on influence on practical policy, the Norwegian commission behind the NOU 2005:5 report concluded that none of the approximate measures had been successful as an indicator of sustainable development. The main problems are listed as follows:

- Sustainability (the concept) is hard to define.
- Sustainability depends on perspective. Global versus local perspectives illustrate that what is sustainable in one perspective does not necessary mean sustainable in others.
- Prognostication of future developments is difficult. Complexity in dependence between factors and unclear causality makes precision impossible. The system we need to understand holistically is so complex that we are not even close to understanding it in its entirety.
- The starting point is not clear. We do not have a precise understanding of our resource situation in a broad sense. It is less precisely defined for social resources than for human, natural and environmental resources (Dasgupta and Serageldin 2000).
- Data collection is difficult and resource demanding. Focus on interpretation, validity and reliability of the data is more important than the degree of objectivity in the measures. Subjective measures may be more precise than objective (Kaufmann and Kraay 2007, p. 3).
- National wealth is not a precise indicator of sustainability. Questions about whether one resource in growth (i.e. social) may offset the decline of others (e.g. petroleum wealth) are political questions, not technical ones (NOU 2005:5).
- Ethical dimensions add to the complexity (see the discussion of the philosophical basis above): What right do humans have to exploit nature and the environment in a destructive manner in pursuit of short-term increases in national wealth?

These fundamental problems lead to some technical issues for which there are no easy answers:

- The systems we create to make prognosis are so complex that only those making them can understand how they work. This reduces credibility and influence.
- To be able to aggregate the effects of different aspects to an indicator, the effects need to be measured using a common unit of measurement. Money is the preferred common unit, but there are many components for which correct prices are unavailable. Shadow prices are difficult to estimate where there is no perfect market, or in many cases no trade at all. This leaves estimates of national wealth incomplete (NOU 2005:5).

Suggestions for how to handle these problems:

- Do not try to measure everything. Reduce the complexity of system by focussing critical resources (NOU 2005:5) and 'actionworthy' indicators (Kaufmann and Kraay 2007).
- Choose indicators which are relevant to the most important issues at hand. This means that the system/components/indicators will change over time.
- Choose indicators giving clear signals about sustainability. Do not choose other indicators just because they are available. Exploit complementary indicators.
- Accept there is a trade-off between precision and cost. Systems have to be implemented efficiently.
- Be clear about the methodology and the measures – transparency is vital. Especially the margins of error and data collection should be highlighted (Kaufmann and Kraay 2007).
- Do not aggregate where aggregation is not needed and not practical. Individual indicators give a better and more precise message about development than an aggregated indicator. They are also more open to the following political debate.

Measurement is difficult, but aggregating indicators into wider indexes is no simple matter either. OECD has invested a lot of resources in producing guidelines and resource books on how to construct and use performance indicators: a toolbox for constructing composite indicators (OECD 2008c), guidelines for governing regional development policy using performance indicators (OECD 2009), and how to conduct sustainability assessments (OECD 2008d).

Sustainability - result or process?

Focussing measurements may lead to the conclusion, or at least give the impression, that sustainability is an end result. This is not the intention here. Sustainability may be a result of a short term decision (a sustainable solution to a limited problem) the result of a long term development (sustainable solutions to a wide set of issues), but it might also be a characteristic of a development. The over all issue here is the process of making decisions about investments and executing the actions initiated by these decisions. On a strategic level this is a process, and sustainability is then a quality associated with this process when it is successful. It is a way to implement the integration of considerations and trade-offs necessary to make sustainable solutions possible. OECD (2008a, p. 30) adds that sustainability may also be a conceptual framework for developing a more balanced and holistic world view. Sustainability may be a result, a process and a conceptual framework. In this work sustainability is seen dominantly as a process.

5 Current status on sustainability – methods and measurements

In the discussion presented above, it has been established that sustainability has been on the agenda for quite a while, that there is a deep conflict embedded in the philosophical fundament for discussing sustainability issues, and that there is a large and growing interest in indicator sets (SDI) and sustainability reporting systems. Despite this, the influence on practical policy is limited (a lot of talk, and less action).

There are many problems in measurement, as listed above, but these problems are not the whole explanation. Before looking at the sustainability issues as they occur in projects specifically, it seems useful to sum up where we are today, i.e. the starting point for further development. The impression created here is by no means complete or representative of all aspects of the current situation.

In assessing sustainability it is obviously not a question of being 100% sustainable or 100% non-sustainable. It is a question of degree of sustainability, although it may be argued that there are fundamental limitations in nature which cannot be exceeded (Meadows et al. 1972; Hirsch 1976). These 'limits to growth' have been widely discussed (Nordhaus et al. 1992; Ekins 1993; Stokey 1998) and are referred to as a classic view on environmental sustainability. Baumgärtner et al. (2001, p. 367) point out that from a natural science perspective, the limits to growth have to be supplemented with three other central issues: the irreversibility of economic processes and their effects, the limits to substitution, and the ubiquity of waste. These ideas seem to have gained increasing support over time. This is an example of a changing 'sustainability agenda' and the concept of sustainability has changed accordingly.

The area which this discussion refers to is ecological economics. Ecological economics developed in the 1980s as a result of the integration of ecology and economy. Several authors had made contributions even before this date, some of whom are mentioned above. Proops (1989, p. 60) gave the following definition: '*ecological economics studies how ecosystems and economy activity interrelate*'. The economic measures of sustainability mentioned originated from this line of thinking. Ecological economics is an interdisciplinary approach – some even argue it is adisciplinary (Kronenberg 2006, p. 98). It is concentrated on macroeconomic issues and holistic. One particular difference between ecological economics and neoclassical economics is the time horizon; ecological economist's claim that the period considered should be as log as the environmental effects can be traced (Lunney et al. 1997). The problem is that the appearance of environmental effects may be delayed or they may exist longer than the investment under consideration. This is a strong argument for the precautionary principle. According to Kronenberg (2006, p. 100), ecological economy 'discuss issues central to the sustainable development debate; it provides a scientific basis for the concept of sustainable development that remains largely a political argument'.

Another area has grown to become important since the year 2000: industrial ecology. Compared to ecological economy, this area is more limited in perspective, but has many parallels. The strategic dimension in industrial ecology is expressed through the following:

- economies, society and nature co-evolve
- economies and society are embedded in a larger natural system, the carrying capacity of which has to be obeyed
- material and energy flows in industry form part of material and energy cycles in nature and, as such, are governed by the same biophysical laws, including the laws of thermodynamics and their consequences ('resources and energy are not created ex nihilo' – out of nothing, 'all production is joint production' and 'there are limits to recycling')

One idea of industrial ecology (a metaphor) is to imitate natural systems (1. self-maintenance, development and self-realization, 2. replication and renewal, 3. service to other organisms, to other species or to the whole of nature). This is an interesting idea, but economy and nature are fundamentally different, as economy is shaped (by humans) whereas nature shapes itself (Kronenberg 2006, p. 103). Industrial ecology concentrates on industry, products, and material and energy flows between the economy and nature. It is often regarded as a normative field (Kronenberg 2006, p. 107), on a microeconomic level. Kronenberg (2006) concludes that ecological economy and industrial ecology are closely related: they share most of their basic assumptions and industrial ecology can thus be seen as a part of ecological economics.

The sustainability issue, as focussed on in the debates on ecological philosophy and in the media attention is all about the environment, the reduction in natural resources and growing waste problem. Specifically, the serious problems of reduced diversity, deforesting and climate change, and global warming have receive a lot of attention, internationally as well as locally. The most notable documentation of our present situation (judged by the media and political attention) could arguably be *The Economics of Climate Change: The Stern Review* (Stern 2007). The Stern Review discusses the economic consequences of climate change. According to Stern, the changes needed include that the world must reduce greenhouse gas emissions by 50 per cent by 2050, with wealthy countries cutting by at least 80 per cent. Power and transport must be essentially decarbonized. The report is rather optimistic; it is possible to stabilize the development, the policy instruments are available and the cost is not discouraging. However, change has to come rather quickly, not responding now and letting the unsustainable development continue may result in irretrievable damage in some cases, while in others the cost of repairing later will be immense, according to Stern.

Media attention is important, and sustainability issues are given broad coverage in the daily news. The climate change has produced a wide range of dramatic, media friendly footage. Televised nature programmes are very popular. Support concerts and other media hypes are also quite frequent and create a lot of attention. Among lay people this is expected to influence the general impression of what sustainability is about. In the political arena there is a growing attention concerning sustainability, not least due to international conventions and dramatic reports such as the ones mentioned above, as well as events such as the Nobel Peace Prizes recently awarded to Wangari Maathai (2004), and jointly to the Intergovernmental Panel on Climate Change (IPCC), and Albert Arnold (Al) Gore (2007). The debate about sustainability still has a distinct flavour of environmentalism.

Among well-informed people and organizations, the meaning of sustainability is different and includes more aspects. As we have seen, this started with the three pillars of sustainability in 1987: economic, social and environmental. Later, the United Nations added a fourth pillar: institutional. These four pillars (or categories or capitals) are shared by the most important international institutions such as the UN and the OECD and seem to be accepted by many others. The Nobel Peace Prize committee showed similar wide perspectives by awarding the prize in 2006 jointly to Muhammad Yunus and Grameen Bank (both from Bangladesh) for their work in creating economic and social development.

According to Stiglitz (1998, p. 6), for a long period development was seen as:

> *a matter of economics – increasing capital stock and improving the allocation of resources. These changes should lead to higher income and hopefully higher sustained growth rates … Economists of the left and the right differed in how best to improve resource allocation, and what role government should play. Economists of the left attributed the underlying problems to market failures. The Economists of the right assumed, by contrast, that government was the problem: once government could step out of the way, markets by themselves would lead to efficient resource allocation.*

This debate dominated 'mainstream' economic views on development for four decades, up to a point in time when the environmental and social issues were introduced into the political arena by the Brundtland report in the late 1980s.

Even though there is no actual standard on how sustainability should be understood and measured, some of the above-mentioned measures are routinely reported and widely used as an indicator of wealth development and sustainability. The most common one is the Gross Domestic Product (GDP). As seen above, there has been quite a lot of attention paid to the shortcomings of this measure (growth in wealth) as an indicator of sustainability. Many initiatives to improve GDP as an indicator of sustainability have been reported but so far these initiatives have had limited influence. Can the answer be found in a purely economic measure? The answer seems evident through the fact that most of the international organizations mentioned above only used GDP and other economic measures as one of many indicators. This is interpreted as a clear indication that purely economic measures are not sufficient in themselves, but still useful to highlight some important aspects of development – whether sustainable or not.

There may be reasons to be pessimistic about sustainability in an economic perspective. There is a substantial body of literature arguing that the basic growth paradigm underlying the focus on GDP and the whole profit-oriented economy (capitalism) is not viable. Our level of consumption of natural resources and environmental pollution is above the sustainable capacity of nature (Wackernagel and Rees 1996; UNDP 2000; Stern 2007). Continuous growth in the consumption of resources and the 'throughput' of these into pollution and waste is not sustainable (Haavelmo and Hansen 1991). Growth in consumption cannot continue, particularly in wealthy nations, if inequality between wealthy and poor countries is to be reduced (WCED 1987). This is where we find the link to the peace issue which led to the Nobel Peace Prizes mentioned above. Wealth can be expected to promote development of environmentally friendly technologies but CO^2 emissions tend to increase in wealthy, medium-wealthy and poor countries with GDP (Azomahou and Van Phu 2001).

Eco-efficiency and dematerialization have been pointed out as strategies to make economic growth compatible with environmental sustainability (WCED 1987). Næss (2006b) concludes it is not possible to decouple economic growth from limitations in natural resources and increases in environmental load. Infinite growth demands infinite dematerialization to be balanced. Given the growth is based on consumption of natural resources and the production of outcomes such as waste and pollution, the result has to be resource depletion, losses and fragmentation of ecosystems, etc. (Næss 2006b, p. 210). Næss also questions our faith in technology's ability to create cheap,

environmentally friendly energy and material resources needed for a successful eco-effective strategy. His ultimate line of argument is that without the growth paradigm, capitalist economic systems are prone to run into serious crisis, and not de-coupling from growth capitalism is incompatible with long-term environmental sustainability (Næss 2006b, pp. 198–199). A serious economic crisis would, of course, not only influence the sustainability of economic and natural capital, but also involve challenging changes to social and institutional capital.

There may be reasons to be optimistic about sustainability in the economic perspective. Some economists argue that a capitalist economy does not necessarily have to grow (Daly and Cobb 1989) or does not have to include growth in consumption (Johnson 1998). The Redefining Progress policy think tank in the USA claim that '*The good news about Sustainable Economics is that environmental health and economic growth can go hand in hand.*' (Redefining Progress 2008). They argue that not only is it possible, but they claim to have found out how this can be achieved. Figure 3 shows their Genuine Progress Indicator (GDI) indicates that growth has been stagnant since the 1970s. However, while this may indicate that progress has stagnated, does it indicate that development has become more or less sustainable? Sustainability can only be indicated by supplementary measures, as argued above. Redefining Progress indicates the use of Ecological Footprint, Environmental Justice, Climate Asset Plans, and a set of other tools. The GPI is a variant of the Index of Sustainable Economic Welfare (ISEW), first proposed by Daly and Cobb (1989) and published annually. Redefining Progress does not claim that all problems are solved and point out outstanding theoretical challenges, such as relating future impacts to current welfare (Talberth et al. 2007).

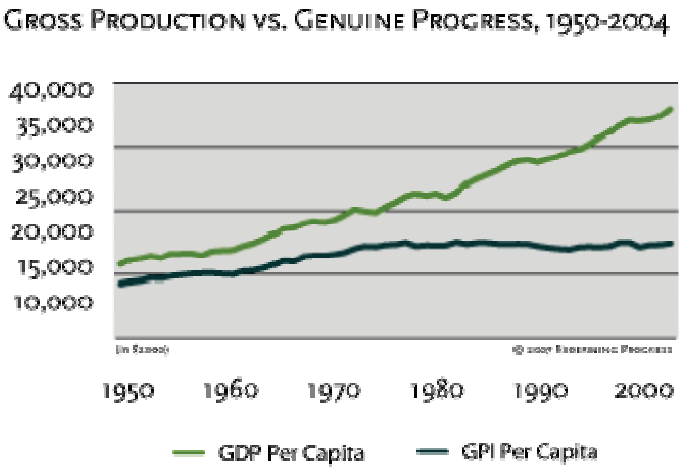

Figure 3. Genuine Progress Indicator (Redefining Progress 2008). The green curve shows the development in official GDP. The blue curve below shows the GPI – indicating growth has been stagnant since the 70's.

The assumptions that allow sustainable development of economy and environment together would demand substantial changes in the economic institutional frameworks (Stiglitz 1998; Kovel 2002; Frensch 2004; Næss 2006b) and cannot be achieved by market forces alone. There has been resistance among companies to such an institutional framework (Næss 2006b, p. 203). Markets are well suited to ensuring an efficient allocation of resources, but not for deciding either the volume of the economy or the distribution of wealth between groups and individuals (Daly and

Cobb, 1989). A sustainable economic development is dependant on powerful pressure from public authorities (Næss 2006b) and policy interventions (Runhaar et al. 2006; Stern 2007). Frensch (2004, p. 389) reports an analysis of models of economical institutional frameworks and outlines their general properties, claiming the following:

> '*To support sustainable growth, quality improvements resulting from firm restructuring and an increasing variety of production from the growth of small and medium enterprises are more relevant than the growth of output. Our model indicates that improvements in the quality of public governance, which are connected to a successful political transformation, facilitate such changes.*'

What about the content of the policy interventions? Eco-efficiency and dematerialization are already mentioned as development strategies. The Stern Review (Stern 2007) follows up with suggesting new policy strategies such as carbon pricing, technology policies, and removing barriers to behavioural change. Governments need to act on these signals, and some of them do. An example of good intentions is the Norwegian Government's policy in the National Budget for 2007. They acknowledged there was a need for changes in patterns of production and consumption. The policy for sustainable development was built on the following: fair distribution (between groups, geographically and over time); international solidarity (cooperation against poverty and the consequences of climate change); the precautionary principle; the polluter pays; and the need for collective efforts (between government, organizations, companies, and the public) (Ministry of Finance 2006). Based on these principles, a new strategy for sustainable development was proposed, along the lines described earlier in this paper. Among other initiatives are the national indicators described above and illustrated in Figure 2.

Good intentions are also demonstrated by many companies in general: social and environmental responsibility is included more and more explicitly in corporate governance (Jacoby 2005) and for several industry sectors, new standards and reporting formats are used to document a responsible attitude (Defra 2008; ICSR 2008). The building and construction sector is a key sector in reducing the impact of human activity on natural resources and waste. It uses 40% of the energy and produces 40% of the waste. It may be used as an example of a sector which has a growing awareness of sustainability and tries to improve its performance. Cole (1997) showed the importance of using holistic prioritizing criteria, not only to address single issues exclusively and in isolation from other considerations. He instituted a search for a framework which provides an overall picture of a buildings and natural world as an interconnected system, explicitly acknowledges and defines a coherent link between the individual criteria, and provides a means of identifying significance. Such a framework was later suggested by Brandon and Lombardi (2005). The Association for Project Management (APM) concludes that project and programme managers are significantly placed to make contributions to sustainable management practices at many levels in their projects, and it gives a wide range of options (Taylor 2006, p. 7).

In a sustainability perspective, Worldwide Governance Indicators (WGI) can reveal something about how well a government is able to create powerful pressure and perform policy interventions to influence the development in a sustainable direction. Joseph Stiglitz, former Senior Vice President of the World Bank, criticized previous

development strategies as they '*failed to see the broader context ... focused narrowly on economics ... confused not only means with ends, but also cause with effect*'(Stiglitz 1998, p. 6). He also described the new paradigm for development strategies, policies and processes as follows, which summarizes where we are today when it comes to strategies for improving sustainability:

> *Development represents a transformation of society ... Key to these changes is the movement to 'scientific' ways of thinking, identifying critical variables that affect outcomes, attempting to make inferences based on available data, recognizing what we know and what we do not know ... Change is not an end in itself, but a means to other objectives ... The development strategy must be aimed at facilitating the transformation of society, in identifying the barriers to, as well as potential catalysts for, change.* (Stiglitz 1998, pp. 3–4)

As mentioned in the introduction to philosophical issues, there is currently a problem concerning who to listen to. This concerns the role of the expert. As pointed out by Mitchell, Carew and Clift (2004), the expert role is no longer the single informed source of knowledge; the new role of the expert is as a broker and a steward. The role of steward means identifying and putting together relevant elements of knowledge (preparing documents as basis for decisions). The role of broker indicates that the expert mediates and negotiates between different points of view and positions to find the best way forward. To this list, this author also adds the role of comptroller. Given strong indications of dominating individual motives and the importance of pressure groups and the use of experts connected to single questions and/or decisions and specific positions in sustainability issues, there is a strong need for a role that keeps control of the experts in their roles as brokers and stewards. Although some probably would interpret this as falling within the role as a broker, this author suggests that this role should have its own value and focus.

Awareness is established in professional and political communities – even among elements of the public. A lot of knowledge is available – but major changes take time. In addition, according to Kaufmann and Kraay (2008) there may be a huge gap between what is decided by governments (the rules on the books) and what actually is done (implemented on the ground). Deciding to do something is easy – actually doing it is often more difficult. Changing individual behaviour may prove to be the hardest part of implementing sustainable strategies. Action is what projects are about, and in the next section we will look more closely at how the quest for sustainability may affect the assessment of projects.

6 Sustainability and projects

Neither measurements nor policies create weak or strong sustainability – after all, they are all about talk. Action does make a difference, and in this context projects represent the action. More specifically we will focus the major public investment projects. They represent a substantial allocation of public money and other resources to a purpose defined by some political or administrative policy. Development interventions such as investment projects are means to achieve defined objectives. The discussion above includes interventions on a methodological level and also rules and regulations. Here, we will concentrate on the content – the actual use of resources and the outcome of this use. How do projects fit into the discussion on sustainability? What does it take to

make sure the project itself is sustainable? These are questions to be addressed further in this essay.
In an economic capital perspective, a project is an allocation of resources for a specific purpose. On the one hand, it uses and binds limited resources and needs financing, while on the other hand, it creates future benefits and potential income. From an environmental perspective, a project is a consumption of nature and creation of unwanted outputs such as waste and pollution, but it may also be designed to protect nature. From a social perspective, it creates opportunities for work and development in the short and long terms and adds other positive potentials for self-realization and formation of good communities. On the other hand, the result may also harm the well-being of some groups or individuals, reducing their social and personal potential. From an institutional perspective, a project is something that needs governance in order to give the intended effect and not step over the limits defined by law and regulations.

Traditionally, projects have been dominated by a result or output focus on the execution phase. The Association for Project Management (APM) points out that project and programme managers should contribute to sustainability at many levels in their projects (Taylor 2006), encouraging the client and/or project owner to incorporate sustainability in the project, including sustainability as a selection criteria for personnel, methods and materials, considering sustainability in the fundamental design of the project, using sustainable technologies, and implementing sustainable standards and best practices, among other things. Hence, it seems useful to look at development interventions, as they have a stronger focus on the outcome. What does sustainability mean in development projects? The following definition of 'sustainability' has been given by the OECD (2002b):

> Sustainability: '*The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time*'.

In order to interpret this definition in terms of the project world, the word 'intervention' may be exchanged for 'project', and development interpreted as the objective of the programme of which the project is a part. Sustainability then refers to whether the positive effects of the chosen public investment project will be maintained after the project has been concluded.

The above definition of sustainability obviously extends beyond the project itself. It is a matter of economic, institutional, social, and environmental effects in a longer term perspective. It depends on whether (to what degree) the positive impact justifies investment – whether future revenue exceeds costs, whether users' support and ability will continue the intended process after the investment, and whether authorities will provide policy support and resources to continue the process. If the project is not viable – if it will not supported by society and users in the future – the project should be rejected or terminated. Given this wide understanding of sustainability, and keeping a strategic perspective, the following discussion will not focus projects as such but rather investments – normally organized as projects.

Public investment projects are important interventions to transform society. This makes the issues relevant for the development of a sustainable society also relevant for public investment projects. Figure 4 sums up the main perspectives. The house is built on three pillars and a fundament.

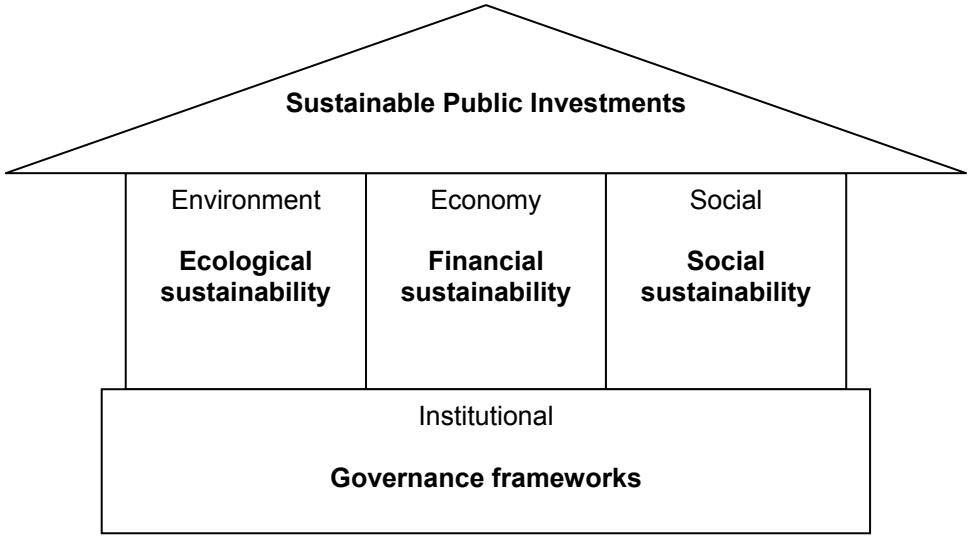

Figure 4 Four perspectives building up to sustainable public investments: Three pillars (triple bottom line); environment, economy and social, and the necessary institutional fundament; effective governance frameworks.

Marrewijk (2003), citing back to Wempe and Kaptein, used a similar approach to describe the relations between corporate sustainability, corporate social responsibility and the triple bottom line. His model did not include the institutional perspective which is added here based on the World Bank (2008a) approach. The combinations of these approaches indicate the necessary perspectives to achieve sustainability in both society and the corporation. Thus relevant to both private sector and public sector projects.

Figure 4 includes five important concepts, of which 'sustainable public investments' are understood as described in the text above. The other four concepts are:

Ecological sustainability: The ecologically sustainable development includes the considerations of renewable resources, such as timber and fish, should be used no faster than they are able to be renewed; non-renewable resources like coal and oil should only be used within the rate of substitution by alternatives; wastes should only be produced within the ability to process or assimilate them. Sustaining healthy, functioning ecosystems and their species are seen by many as the most important challenge. Not only do they provide us with life-support services such as food, water and oxygen, they also nourish us aesthetically and spiritually. Furthermore, they have their own right to exist without the threat of human destruction. Formulated this way by Franklin (2001), referring to Lele; 'The existence of ecological conditions necessary to support human life at a specified level of wellbeing through future generations.'

Financial sustainability: Economic viability depends upon the sustainability of project effects. The economic analysis of projects should include an analysis of the financial sustainability. According to the Asian Development Bank (2009) there are three main aspects of financial sustainability: the availability of adequate funds to finance project expenditures, the recovery of project costs from the project beneficiaries (users), and the long term financial incentive necessary to ensure participation in the project (continued use of the results and harvesting of benefits).

Social sustainability: Gates and Lee (2005) uses the following definition: 'For a community to function and be sustainable, the basic needs of its residents must be met. A socially sustainable community must have the ability to maintain and build on its own resources and have the resiliency to prevent and/or address problems in the future. There are two types or levels of resources in the community that are available to build social sustainability - individual or human capacity, and social or community capacity. Individual or human capacity refers to the attributes and resources that individuals can contribute to their own well-being and to the well-being of the community as a whole. Such resources include education, skills, health, values and leadership. Social or community capacity is defined as the relationships, networks and norms that facilitate collective action taken to improve upon quality of life and to ensure that such improvements are sustainable. To be effective and sustainable, both these individual and community resources need to be developed and used within the context of four guiding principles - equity, social inclusion and interaction, security, and adaptability.' (p. 3).

As pointed out by OECD (2008a, p. 28) the complex web of activities in the world makes all these perspectives interdependent. There is no way to reach the sustainable state within any of these pillars without trade-offs. Solving a problem within any of these will depend on considering effects and aspects of the others.
Governance frameworks: The importance of governance at the institutional level is clearly pointed out by World Bank (2008a). Without having adequate institutional capital sustainable development can not be obtained. These are supporting frameworks based on principles like participation, stability, effectiveness in systems, regulations, rule of law and control of corruption. Specifically for projects the governance frameworks are established to improve the probability of successful investments (Klakegg et al. 2009). They comprise principles and structures established as authoritative within the organization, defining the way business is done. Without such a fundament, none of the three pillars in the triple bottom line are stable and thus unable to secure sustainable development.

7 Assessment of sustainability in investment projects

All projects use inputs (manpower, technology, land, electricity', water, etc.) to produce outputs (schools, roads, computer software, etc.). This is to fulfil the broader goal (education, transport, production, etc.) and subsequently the longer term purpose (economic growth, etc.) (Samset 2003, p. 98). How is it possible to know to what degree a project is sustainable?

To assess whether a project is sustainable it is necessary to include an examination of several factors – there is no indicator or dimension that can tell us the whole truth

about a project's sustainability. For many years the Cost-Benefit Analysis (CBA) was the dominating tool for this purpose. It has been criticized increasingly for being unable to express all sides of sustainability because, for example, some effects are impossible to measure and express in monetary terms (Ding, 1999), and because the value of something for society is not reducible to the aggregate preferences of individuals, let alone their willingness to pay for it (Næss 2006a, p. 38). Today there seems to be a broad acceptance that CBA has to be supplemented with other measures (parallel to the aggregated indicators described in the discussions above), or even totally replaced with other measures (Brandon and Lombardi 2005 p. 129; Næss 2006a).

Accepting that no single measure can represent sustainability sufficiently, there is a call for a wider framework which can help us to obtain a more complete picture. Cole (1997) looks specifically at how environmental criteria should be set in an overall framework. Archer and Ghadsemzadeh (1999) and Shenhar and Dvir (2004) propose selection and classification frameworks. Brandon and Lombardi (2005) introduce a framework for evaluating sustainable development for the built environment. They argue strongly for the need for a holistic and integrated framework which is able to integrate and synthesize all dimensions of an urban system. They also present an extensive overview of assessment methods and techniques used to assess sustainability. Their approach is very interesting, but although a large part of major investment projects can be characterized as built environment, a more general model is chosen here. The thinking is quite similar to that of Brandon and Lombardi.

In this work the OECD's draft standard on Development Evaluation Assessment (OECD 2006) is used. The OECD criteria seem to have a strong position towards public projects and are appropriate for this line of work, in addition to having a position of international consensus. The criteria for evaluation of projects are: Efficiency, Effectiveness, Impact, Relevance, and Sustainability. The OECD model also comprises six cross-cutting issues: Economic and financial issues, Institutional aspects, Socio-economic aspects, Technological aspects, Environmental aspects, and Policy support measures. All of these cross-cutting issues have to be considered for each criterion. The similarity to the development indexes described above is clear, but there are also some differences. A summary of the model is shown in Table 2. In this particular setting it is only the sustainability criterion that is in question.

Table 2 The OECD's draft standard on Development Evaluation Assessment (based on OECD 2006).

5 Evaluation criteria	6 Cross-cutting issues
Efficiency	Economic and financial issues
Effectiveness	Environmental aspects
Impact	Socio-economic aspects
Relevance	Technological aspects
Sustainability	Institutional aspects
	Policy support measures

The following paragraphs are based to a large extent on Samset (2003, p. 96–108).

Economic and financial issues

To decide whether a project is worth investing in, planners compare the value of the inputs with the value of the outputs from the project. If the value of outputs is greater than the value of inputs, the project may be a good investment. There are several ways that the outputs may be produced and the planners' job is to find an efficient way – one that produces the outcome with as little use of input as possible. The set of inputs that can produce the outputs at the least cost is the most cost-efficient. Similar solutions serve approximately the same purpose, though this consideration obviously includes several trade-offs. This design task may be quite complex, but in a wide perspective the level of precision does not need to be very high until more fundamental questions are answered. For now – let us look at it as input data to more important analysis.

The time factor is important in considerations of economy. It is taken into account by discounting the value of costs and benefits back to an equivalent 'present value'. The purpose is to make monetary units comparable. When some costs or benefits are taxed, subsidized or otherwise do not express the real value in a wide perspective, 'shadow pricing' is used to express the real value more accurately. The same inputs may be used in different projects for different purposes. Alternative projects may produce a higher net value when comparing the value of outputs between the projects. These considerations are more important at an early stage of development since they concern more fundamental choices. The perspective is wider since it ideally includes all costs and benefits of the national economy, not only the costs and benefits in the project budget. This is economic analysis, often performed as some sort of cost-benefit analysis or cost-effectiveness assessment.

Cost-Benefit Analysis is used mainly where the utility of a project can be measured in monetary terms. It basically answers the question whether the utility value of the project justifies the cost. To perform this analysis, information about the factors prices, savings, incomes, and values have to be known in comparable monetary terms and shadow pricing is often necessary. Discounting the cost and income factors is usually part of the analysis. The limitations to this form of analysis are determined by the availability of good information. For practical purposes, cost-benefit analysis is often supplemented with non-monetary factors which are given some sort of character marks (positive or negative) for the decision makers to take into account – see other aspects in Table 1.

Cost-Effectiveness Assessment is used where the solution (output) may be produced in several ways for the same purpose. It answers questions about what is the most cost-effective way to produce the wanted outcome, i.e. what design and what processes produce the outcome at the least cost. To perform this analysis, information about the cost of input factors and alternative methods is needed. In this assessment the value dimension is not analysed (it is presupposed to be the same in all alternatives). Shadow pricing and discounting may be relevant. Information about the values and benefits is often hard to come by in monetary terms in the public sector; hence, this method is useful in such situations. To consider whether the cost of the alternatives is at the right level, a comparison with similar projects elsewhere is very

useful. The limitation is that it does not reveal whether an investment is good or not. The decision to invest has to be funded based on other considerations; this assessment will help to avoid wasting financial resources.

In addition to answering the question of whether a project is a good investment and whether it is cost-effective, there is the question of whether it is affordable in the long run, whether there is sufficient funding of the operations in the short-term (execution phase) and long-term perspectives (operation phase). For this purpose, Financial Analysis is used.

Financial Analysis is used to assess whether there are sufficient financial resources available for the project. Compared to the two methods mentioned above, this analysis is easier to perform and normally easier to obtain the necessary information for, because it considers future budgets and/or allocations instead of value. It answers questions concerning whether there is sufficient financing to execute the project and to support the operations in a long-term perspective. The analysis compares the investment and operation costs (operating, maintenance and depreciation) with the available grants and allocations and also operational incomes. Information about future income, operational costs, etc., may be very uncertain and the analysis should reflect that reality. Discounting and shadow pricing is usually not necessary. The following summarizes the most important sustainability factors, expressed through economic and financial aspects:

Is the project worth investing in?

- Cost-benefit factor

Is the project financially sustainable?

- Available financial resources compared to investment cost
- Available financial resources compared to operations in the long term

Is the solution cost efficient?

- Cost for alternative solutions
- Cost compared to other similar projects elsewhere.

Environmental impacts

An introduction to what the environmental impact of ecological perspectives may include has been given earlier in this essay. Projects span from having almost no environmental consequences (computer programs, etc.) to severe environmental consequences (building infrastructure in an ecologically vulnerable location), and may thus vary considerably in how environmental aspects are considered. Projects undertaken in very fragile environments need special considerations, beyond those indicated here.

Most projects have environmental effects and it is important to understand the consequences in advance before decisions are made to invest in the project. Considerations of environmental impact should be performed as early as possible to make sure the premises are resolved at the outset. Correcting later is much more difficult, even if plans are still only at the paper stage. Aspects which have to be considered include a project's use of and effect on natural resources, utilization and

disposal of waste and pollution, effect on climate and ecosystems, effect on human health and well-being, and effect on the human environment (agriculture, valuable buildings and landscapes, etc.). Considerations have to include both short- and long-term perspectives.

A challenge in considering environmental effects is to be able to follow the chain of causes and effects in the first, second, third, etc., order of a project and other interventions in the same area or affecting the same environmental aspects. Direct effects and side-effects, and immediate, delayed and accumulated effects should be explored, as well as downstream and trans-boundary effects. The complexity and ambiguity makes precise measurement and assessment difficult and the considerations should reflect this fact.

Environmental Impact Analysis is used to assess a project's effect on the natural environment, the natural resource base, future management of natural resources, man-made environments, and health of the population. It should answer questions about degree to which the effects of the project are sustainable in these respects. The true norm for comparison is naturally the sustainable capacity of nature – hopefully expressed through current regulations and norms. The analysis includes comparing the effect of a project against national standards and regulations as well as benchmarks from similar projects. In cases where national standards and regulations do not exist or do not reflect current knowledge of environmental effects, international standards and research results should be used. The argument for using the national standards and regulations lies in their legislative position, but they should be used on the basis of critical consideration. The following is a summary of the most important sustainability factors, expressed through environmental aspects:

Are the short- and long-term effects acceptable?

- Use of land and natural resources (compared to standards and regulations)
- Disposal of waste and pollution (compared to standards and regulations)
- Effect on climate and ecosystems (compared to standards and regulations)
- Effect on human health and well-being (compared to standards and regulations)
- Effect on the human environment (compared to standards and regulations).

Are resources carefully utilized?

- Resource use compared to other similar projects elsewhere
- Disposals compared to other similar projects elsewhere
- Effects compared to other similar projects elsewhere.

Socio-economic aspects

Projects have a significant effect on communities, groups and individuals. Socio-economic and distributional effects include how different groups are affected, how their economy and social life is influenced by the project's output and to what extent the benefits from the outcomes are shared by groups and individuals. The socio-economic analysis takes the economic and financial analysis further and looks at the distributional effects and market effects in society. Impact analysis goes beyond the economic effects and looks at how people's lives are changed. Settlement patterns, employment, income, welfare, health, etc., are keywords in this respect. This may

involve large studies where the type and size of the project demands it, or simpler assessments when deemed adequate. Valid and reliable findings may require considerable time and resources and evaluations of similar projects may be important supplements as sources of insight. Close involvement and communication with stakeholders are important in order to obtain good information about the factual situation and to test the degree of consent or conflict.

Economic Impact Analysis (or **Distribution Analysis**) looks at the effect not only on intended users but also on other affected groups. Some groups may be negatively affected by the intended users have their objectives fulfilled. It is important to design a project to be compatible with needs and capabilities of the stakeholders. This form of analysis answers questions about who will be affected and in what way. It includes, for example, economic impact, distributional effects, market effects on consumers, effects on ownership and financial security, and effects on material well-being. The analysis should explore both positive and adverse effects. Also, the means to alleviate adverse effects should be considered.

Other Impacts includes social differentiation, the effect on development patterns (housing, settlements and establishment of services), location of places of work, employment and turnover, effects on hazards and health, and the effect on social welfare. All of these effects may also be either intended and positive or unintended and adverse, and hence alleviating means should be considered too. The socio-economic aspects cover parts of both the economic capital and the social capital measured in many of the development indicators mentioned above. A summary of the most important sustainability factors, expressed through socio-economic aspects is presented in the following:

Are the short- and long-term effects acceptable?

- Economic welfare distribution, effect on material well-being, market effect on consumers, financial security (compared to the situation before impact)
- Ownership, control of resources (compared to situation before impact)
- Effect on social welfare, hazards and health, employment, etc. (compared to situation before impact)
- Effects compared to other similar projects elsewhere.

Are the long-term effects viable?

- Effects in keeping with needs and capabilities of the stakeholders
- Consent from users
- Acceptable level of conflict among stakeholders

Technological aspects

Choice of technology is essential in projects. Technology includes the systematic knowledge, techniques and tools applied to manufacture a product, manage a process or perform a service. It is a key feature in all of our pursuits (Samset 2003, p. 107). Technology is viewed primarily as an economic factor, but it is also important in social and political change and is increasingly linked to environmental aspects as well. It is built into products, processes and institutions, and thus comprises one of the most important characteristics of any society. Technological assessments have to consider two perspectives: the technology as means to produce the projects outputs, and the

implications of the choice of technology for society. This implies that a review team will need both relevant technological expertise and competence in assessing effects of technology in society. The latter may be needed to a limited extent in routine projects, but may be essential in large, complex and innovative projects.

Technological Efficiency Analysis looks at technology as means to produce the intended outputs. It answers questions about what are the best processes, methods and tools, and also how they should be managed for the specific purpose. The focus is on cost, progress and quality of different technologies. In this analysis, technological efficiency is compared between different possible and comparable technologies. This requires an understanding of the technology itself, its needs and requirements for other input factors, its functions and capacities, and its contribution to waste and pollution, health and safety for operators, etc. Examples of issues in a technological efficiency analysis may be choice between different computer programs for performing the same task, rail or road for transport, rig type A or B for production, and electrical or diesel power.

Technology Assessment includes a broader assessment of implications of different types of technology. It answers questions about the effects on society by applying specific technologies. The questions asked in this assessment are not directed towards minor adjustments or optimization of the choice for an individual project, but towards fundamental questions of how appropriate the specific technology is in society. This implies that detailed knowledge of the technology itself is not the key, but rather knowledge of what resources are used and what implications and effects the use will have for economy and society. The focus is on the use of physical and human resources, and environmental, economic and social impacts. The most important sustainability factors, expressed through technological aspects:

Are the short-term effects of the technology acceptable?

- Cost of technology affordable and efficient (compared to alternatives)
- Progress satisfactory with this technology (compared to alternatives)
- Quality, functionality and capacity (compared to alternatives).

Are the long-term effects of the technology acceptable?

- Use of economic and human resources (compared to situation before impact)
- Economic and social impacts (compared to situation before impact)
- Environmental impacts (compared to situation before impact).

Institutional aspects

The PMI (2004) defines a project as '*a temporary endeavour undertaken to create a unique product, service or result*'. Institutional performance and interaction are important in determining and explaining success or failure in projects. This partly concerns internal factors in the project and partly external factors determined by supporting, co-operating and interacting institutions or projects that might affect the performance or the outcome of the project in question. The institutional aspects cover all phases back to when the idea was developed and alliances were formed, through execution, until long after the output has been delivered. Institutional aspects are important in determining whether the outcome of the project will be satisfactory, whether value will be produced and what the distribution of these benefits will be.

Institutional issues include access to human resources (skills, education, turnover, etc.), organizational structure (roles and responsibilities), leadership, modes of co-operation, and information flow.

Internal institutional aspects focus on the people in the project organization, how they are organized, managed and led, and how they communicate and interact. It is a matter of whether the project organization has the necessary competence, skills, commitment, and qualities necessary to perform the tasks, and whether the management is able to motivate, set goals, choose and formulate good strategies, choose solutions, mobilize support and co-operation, and also whether the organizational structure is clear, and the reporting and information flows sufficient to solve the problems involved in planning and executing the project.

Wider organizational aspects include looking at a project as a temporary organization, linked more or less closely to a parent organization. The parent organization may be, for example, a company, a government agency or an international organization, or it may be promoted jointly by several organizations. In this wider organizational perspective there is a wide range of aspects to be considered. Among these are division of responsibilities between project and parent(s), network position and linkages to parent organization, enabling factors and constraining factors in the institutional environment (the wider organization structure).

Institutional interaction is a decisive aspect of projects' success or failure. This includes assessment of the interactions with the owner or parent organization, financing and supporting institutions, user organizations, the customer, government and public institutions, the media, and the public (affected groups and individuals). Network analysis and stakeholder analysis may be helpful instruments for understanding and managing these interactions. The involvement of local institutions, user groups and other stakeholders is important for ensuring sustainable development. The following summarizes the most important sustainability factors, expressed through institutional aspects:

Is the execution of the project sufficiently organized and managed?

- Structure and system clear and implemented (compared to good practice)
- Human resources available and committed (compared to the demands of the task)
- Leadership and management established and functioning (compared to good practice and the demands of the task).

Is the project sufficiently anchored in its parent organization(s)?

- Division of responsibilities clear and implemented (according to governance)
- Necessary funds and resources available and committed (compared to the demands of the task)
- Continued support and other enabling factors secured (according to governance and the demands of the task)
- Constraining factors under control (according to governance and the demands of the task).

Are the interactions with all stakeholders established and working?

- All stakeholders and positions identified and taken into consideration (compared to the demands of the task).
- Involvement established and maintained (compared to the demands of the task).

Policy support measures

Current legislation and policy is an important context for a project, and policy support is a major precondition for sustainability. This means policy support measures are among the main aspects to be considered in terms of the governance of projects. It is important to assess how firmly the project goals are embedded within the context of public and stakeholders priorities, as well as the degree to which stakeholders are committed to the necessary process after a project is completed. From the start, there should not be any serious discrepancies between the project goal and stakeholders priorities. If there is, the probability of having a sustainable project outcome is slim. Investors and key stakeholders probably will not be willing to commit funds to such initiatives. The support has to be analysed and the project evaluated in light of priorities at different levels and among many stakeholders and stakeholder groups. Prevailing political issues and ideology translate into practical policy, priorities, laws and regulations, etc. The question is to what extent a project has support in public funding or credit facilities, price and subsidy policy, wage and personnel policy, regional and district policy, sector support policy, etc.

The 'equator principles' are established as an industry benchmark among financial institutions (Equator 2006, p.1). The Equator Principles Financial Institutions (EPFIs) have adapted these principles in order to ensure the projects they finance is are developed in a manner that is socially responsible and reflects sound environmental management practices. They represent an ambition that negative impacts on project-affected ecosystems and communities should be avoided where possible. The EPFIs considers themselves as promoters of responsible environmental stewardship and socially responsible development. They will not provide loans to projects were the borrower does not comply with the equator principles. The 12 principles are:

1. Review and categorisation (based on magnitude of potential impacts)
2. Social and environmental assessment (systematic process of relevant impacts)
3. Applicable social and environmental standards
4. action plan and management system (addressing relevant findings from assessments)
5. Consulting and disclosure (with affected communities)
6. Grievance mechanism (resolution of conflicts)
7. Independent review (social- or environmental experts not directly associated with borrower)
8. Covenants (compliance incorporated in contract)
9. Independent monitoring and reporting (external verification during loan period)
10. EPFI reporting (commitment to report publicly)

These principles are established within a large number of financial institutions (EPFIs) as a prerequisite to finance investment projects as part of their best practice standard for project financing. Project finance is defined as '*a method of funding in*

which the lender looks primarily to the revenues generated by a single project, both as the source of repayment and as security for the exposure.'

The political climate and priorities may change over time and hence they have to be monitored. How might these changes affect the project and its outcome? Against this background, the question is to what degree the various institutions and stakeholders demonstrate involvement and commitment to a given project. It is important to secure support from relevant political, public, business, and local institutions. The most important sustainability factors, expressed through policy support measures, are summarized as follows:

Is the project well embedded in current policy and consistent with priorities?

- Consistent with current regulations and priorities
- Conflict among stakeholders over objectives and priorities

Is the project able to survive future changes in policy and priorities?

- Consistent with emerging political trends
- Active involvement by key stakeholders
- Explicit and enduring commitment from key stakeholder to the project objectives
- Flexibility and ability to capture emerging potential for added benefit.

In the above, the OECD evaluation criteria for development interventions have been discussed and the most important sustainability factors extracted. The factors are shown summarized in Table 3. In order to identify the most important sustainability factors, a different division is used in Table 3 compared to in the text above: The division is between what is important to assess to ensure that the alternative is a viable option at the front-end (short-term prerequisite to obtain sustainability), and what factors include the long-term development determining whether sustainability is really obtained. All of the factors listed in Table 3 have to be considered when choosing the project ex-ante, or evaluating the project ex-post, but the long-term factors are the real sustainability factors in the perspective of this essay.

Table 3 Sustainability factors for projects: prerequisites for choice and real sustainability factors.

Cross-cutting Issues	Short term factors (prerequisites for choice)	Long-term factors (sustainable development)
Economic and financial issues	- Cost compared to other similar projects elsewhere. - Cost of alternative solutions. - Cost-benefit factor.	- Available financial resources compared to investment cost. - Available financial resources compared to operations in the long term.
Environmental aspects	- Resource use compared to other similar projects elsewhere. - Disposal compared to other similar projects elsewhere. - Effects compared to other similar projects elsewhere.	- Use of land and natural resources compared to standards and regulations. - Disposal of waste and pollution compared to standards and regulations. - Effect on climate and ecosystems compared to standards and regulations. - Effect on human health and well-being compared to standards and regulations. - Effect on human environment compared to standards and regulations.
Socio-economic aspects	- Effects compared to other similar projects elsewhere. - Economic welfare distribution, effect on material well-being, market effect on consumers, financial security compared to situation before impact. - Ownership, control of resources compared to situation before impact. - Effect on social welfare, hazards and health, employment, etc. compared to situation before impact.	- Effects in keeping with needs and capabilities of the stakeholders. - Consent from users and acceptable level of conflict with other stakeholders.
Technological aspects	- Cost of technology affordable and efficient (compared to alternatives). - Progress satisfactory with this technology (compared to alternatives). - Quality, functionality and capacity (compared to alternatives).	- Use of economic and human resources compared to situation before impact. - Economic and social impacts compared to situation before impact. - Environmental impacts compared to situation before impact.
Institutional aspects	- Structure and system clear and implemented compared to good practice. - Human resources available and committed compared to demands of the task. - Leadership and management established and functioning compared to good practice and the demands of the task. - Division of responsibilities clear and implemented according to governance. - Constraining factors under control according to governance and the demands of the task.	- Necessary funds and resources available and committed compared to demands of the task. - Continued support and other enabling factors secured according to governance and the demands of the task. - All stakeholders and positions identified and taken into consideration compared to demands of the task. - Involvement established and maintained compared to demands of the task.
Policy support measures	- Consistent with current regulations and priorities. - Conflict among stakeholders over objectives and priorities.	- Consistent with emerging political trends. - Active involvement by key stakeholders. - Explicit and enduring commitment from key stakeholder to the project objectives. - Flexibility and ability to capture emerging potential for added benefit.

8 Summary and conclusion to sustainability and projects

The historical conflict between anthropocentric and ecocentric world views make it difficult to find unifying formulations of sustainability fundamentals and policy statements. However, as recent developments show, both sides seem to acknowledge that the question of sustainability is important and has to be in focus. As shown, both world views are capable of producing awareness of sustainability issues. Up to the present day, awareness among laymen has been focussed on the environment. This is still the issue that catches media attention, given the current challenges facing the two wide categories of climate change and biodiversity. As shown above, in more balanced political and well-informed circles, sustainability is understood as built on four pillars: economy, ecology, social, and institutional, with the latter perhaps being more of an enabler for purposeful development, but no less important. The role of experts and scientists are changing from informed sources of truth to stewards, brokers and controllers; aiming at helping decision makers reach balanced and sustainable conclusions.

Whereas sustainability has been subject to deep philosophy and extensive debate and theoretical work for more than 30 years, only in the last decade can indications be found of this talk entering the arena of action, specifically in public investment projects and the field of project management. When sustainability thinking turns into action, it changes the focus of the owner in defining objectives for projects, the criteria for choosing the right project alternatives and concepts ex-ante, as well as which criteria are used to consider ex-post whether a project has been a success or not. In this work the OECD criteria and cross-cutting issues are chosen, among several alternatives, as the model for evaluation.

Applying the short-term factors can be described as checking that the initial assumptions, when realistically considered, make the project potentially sustainable. These are enablers of sustainability at the front-end, but do not confirm that the project will actually be sustainable when evaluated ex-post. Important factors are: cost and affordability; resource use and effects compared to similar projects; effects on welfare, ownership and security; quality, functionality and capacity of technical solution; ability to execute investment; consistency with current regulations; and lack of conflict. If all these factors are addressed, the alternative may be sustainable; if not, the concept is flawed.

The real sustainability of an investment depends on the development in the longer term, and this makes the aspect of sustainability more challenging than any other to assess in the front-end. Assessing what will happen in the long run in arenas such as economy, ecology, social and institutional development are not only a matter of knowledge and applicable methods, they are largely a question of understanding and being able to use intuition in a wide range of aspects. Reducing the assessment down to single factors, like the ones shown in Table 3, is an operation of considerable difficulty and risk in itself, but found to be a necessary starting point in developing a fundamental understanding of sustainability.

The most important factors for sustainable investments seem to be:

- available financial resources compared to cost in investment and operations;
- acceptable use of natural resources and disposal of waste and/or pollution compared to standards and regulations;
- acceptable impacts on economy, social and environmental situation compared to before impact;
- effects in keeping with the needs and capabilities of the stakeholders;
- commitment and continuing support from stakeholders; and
- flexibility and involvement enabling consistency with emerging development.

If all these factors indicate sustainable results in the long run, then the concept is probably a good one.

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Paper 3

A robust position in epistemology and ontology

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Abstract

Any researcher should be aware of his or her choices of position towards the relation between theory and practice, research and knowledge, epistemology (theory of knowledge – what is true and what is not true), and ontology (how things really are). On deciding on a specific research strategy for his or her work, the researcher should make an assessment of the potential positions, make appropriate choices and follow them. These choices include deductive versus inductive approaches, positivist versus relativist or realist orientation in epistemology, and objectivist versus constructivist orientation in ontology, which ultimately add up to choosing adequate qualitative or quantitative methods or a combination of these.

Recent development within relevant research areas indicates a growing awareness that there is a need for multidisciplinary, multi-perspective, multi-method approaches in research. The authors discussing these issues also stress the importance of methodological fit – choosing the appropriate research strategy to fit the situation and purpose of the research – and to make assumptions transparent and the chosen research strategy explicitly clear. This makes review and criticism easier, but also helps the author(s) to defend the research if the work is done well.

A robust position is one that can address a wide range of research questions in a multidisciplinary area. This calls for pluralism in approaches and methods. Critical realism is less restrictive than the other meta-theoretical positions and encourages interdisciplinary research. It has some features in common with natural sciences and other features in common with social sciences, but all in all it offers a different and original position. The descriptions and discussions in this essay lead to the conclusion that, for this author, the position of critical realism offers the robustness and openness for plurality in method needed to solve research tasks in the relevant research areas, namely management, project management, organizations, and governance. In other words, this is a robust position likely to produce valuable research in today's complex society.

Keywords: *Philosophy of Science, Meta-theory, Research design, Research methodology*

1 Introduction

The subject of this essay is 'meta-theory' – theory about theory. A meta-theory is a perspective that includes presuppositions about reality. These presuppositions indicate a certain approach to phenomena in research. In other words; this concerns theories about what good research is.

During my entire career as a researcher I have found myself frustrated and uncertain about my position with regards to the question: What is good research and why should I choose one research strategy over the other? This was evident, especially in the beginning of the journey towards gaining a PhD, but also later during the process. The frustration was mainly caused by a strange and distancing language in the philosophy of science. What do words such as ontology, epistemology, positivism, phronesis, and other strange terms really mean? It was (and is) also frustrating because the same terms or names are used to describe positions dealing with totally different questions (in epistemology and ontology), leaving an unnecessary confusion. The attitude and tradition in technological research communities seems to be not to take it up for consideration. As pointed out by Smyth and Morris (2007) and Edmondson and McManus (2007), among others, this is not good enough. It is important to be aware and to make one's position explicitly clear.

This essay includes a brief discussing of why we have to deal with questions of epistemology and ontology and philosophy of science in the first place, and where I find my position in this terrain. It is necessary to start with a brief introduction to philosophy of science to be able to define my position. In addition, a review of current developments within project-related research with regards to research strategy is also included. Based on the understanding built up from basics in philosophy of science and current development in project-related research, my own platform is described. This forms the background for understanding my role as a researcher. It goes beyond the dissertation it is written into. This platform will follow this researcher into future research tasks.

2 Some aspects of philosophy of science

There are several traditions and schools on how the different positions in epistemology and ontology should be named and described. In the following, the main structure follows Bryman (2004), but other traditions are mentioned as well.

Knowledge and theory

The object of study in science is the world or nature (Gilje and Grimen 1993, p. 17). In this essay equally important questions are asked: How to recognize facts? How to recognize good research? This is a part of the philosophy of science – where the object of study is science itself (Gilje and Grimen 1993). The basic discussion of what knowledge and science dates back to the ancient Greek philosophers and possibly earlier. There is no need to go deeply into ancient philosophy here, but due to recent debates I will start by mentioning some concepts developed by Aristotle for explaining different kinds of knowledge (Schram and Caterino 2006, p. 8):

> *Techné* – know-how, craftsmanship
> *Episteme* – abstract and universal knowledge

Phronesis – practical wisdom coming from intimate familiarity with contingencies and uncertainty embedded in complex social settings.

All these concepts of knowledge are necessary and useful, but as the description above indicates, they are not for the same purposes. These types of knowledge will be part of the discussion in the following.

One interesting division is often made between theory and practice. Bryman and Bell (2006) refer to Gummeson (2000), who has studied the relationship between theory and practice in business and management research. One observation is that academic researchers and management consultants as groups of knowledge workers place different emphasis on theory and practice: '*Backed by bits and pieces of theory, the consultant contributes to practice, whereas the scholar contributes to theory supported by fragments of practice*' (Gummeson 2000, p. 9). Bryman and Bell (2006, p. 5) found that the roles of consultants and scholars are fundamentally closely related and said that Gummeson sees them as involved in addressing problems that concern management, thereby reinforcing the view that the value of both groups is determined by their ability to convince the business community that their findings are relevant and useful.

Two other words frequently used to characterize theories are normative and descriptive. *Normative* theories tell how things ought to be (Næss 2004, p. 134), and *descriptive* theories telling how some part of reality is. Another word worth mentioning is *hermeneutic*, meaning 'concerning interpretation'. Hermeneutic[10] are implicit in all research. In many situations the researcher is interpreting other researchers' interpretations, and thus involves a double hermeneutic (Bhaskar and Danermark 2006).

The relations between theory and research can be described as *deductive* (theory guides research) or *inductive* (theory follows from research). Induction means drawing universally valid conclusions about a whole population from a number of observations. Deduction means deriving logically valid conclusions from given premises – to derive knowledge of individual phenomena from universal laws (Næss 2007). According to Edmondson and McManus (2007, p. 1166) scholars have long advocated cycling between inductive theory-creation processes and deductive theory-testing strategies to produce and develop useful theory. Other modes of thought operation are *abduction* – when a particular phenomenon is interpreted from a general set of ideas or concepts, and *retroduction* – a reconstruction of the basic conditions for anything to be what it is. This means that one seeks to identify qualities beyond what is immediately given (Næss 2007). As will be shown later in this section, all these positions are relevant for the definition of a robust position.

With the exception of mathematics and logic, sciences are regarded as *empirical* (based on experience, studying primarily phenomena perceived through the senses. Ideas must be subject to rigorous testing before they can become knowledge. The word *empiricism* is used for this approach (Bryman 2004, p. 7). Empiricism further implies that knowledge of non-observable causes of phenomena perceived through

[10] A different concept is Hermeneutics. This is a specific methodology or approach concerned with the development and study of theories of the interpretation and understanding of texts, for example in religious studies.

senses is denied. This leads to the consequence that causality is perceived as regular correlations (every time X – then Y). Today, this position is considered inadequate, as further discussions of epistemology will show.

When science was first developed as a discipline, nature was in focus. The origin of science was the effort to understand phenomena observed in nature by classic scientists such as Isaak Newton (*Philosophiae Naturalis Principia Mathematica*, 1687) and Carl von Linné (*Systema Naturae*, 1735). All the way up to modern times the rational logic of nature and science was the ideal in research. This is called *rationalism*. Also social scientists oriented their disciplines towards this ideal (Schram and Caterino 2006, p. 2) in their studies of human systems (as opposed to nature systems). This developed into *behavioralism* in political science in the post World War II period. The ideal of the rational approach is accumulating knowledge by revealing the truth of nature, gradually adding new knowledge to the existing knowledge base. In political science, behaviouralism strived to develop predictive causal models to explain human behaviour. The belief that the accumulation of 'facts' is a legitimate goal in its own right is often denoted as 'naive empiricism' (Bryman 2004, p. 7).

Epistemology

A core question in the philosophy of science is what is true and what is not true. The word used for this is ***epistemology*** (theory of knowledge). Epistemological discussions stem back to the Greek philosophers Plato, Socrates and Aristotle. A central discussion today is whether human activities should or should not be studied with the same kinds of approaches as nature (Bryman 2004, p. 11). Epistemology and demarcation between science and 'quasi-science' have been subject to important debates and discourses for many years. Some of the most remarkable contributions to philosophy of science in the 20th century were focussed on these discussions;

Popper (1959) rejected classical empiricism and argued that scientific theories are abstract in nature. They can be tested only indirectly, by reference to their implications. He also held that scientific theory (and human knowledge generally) is irreducibly conjectural or hypothetical, and is generated by the creative imagination in order to solve problems that have arisen in specific historic-cultural settings. Logically, no number of positive outcomes at the level of experimental testing can confirm a scientific theory, but a single counterexample is logically decisive: it shows the theory from which the implication is derived to be false. This asymmetry between verification and falsifiability lies at the heart of his philosophy of science. Falsifiability was suggested by Popper as the criterion of demarcation between what is and is not genuinely scientific: a theory should be considered scientific if, and only if, it is falsifiable. Popper coined the term *critical rationalism* to describe his philosophy.

Kuhn proposed the concepts of 'normal science' as research solidly based on previous scientific work and accepted as a basis for further research in a research community for a period of time (1970, p. 22), progressing steadily and incrementally, and 'paradigms' as generally accepted scientific achievements which for a period of time work as models for problems and solutions within a community of researchers (1970, p. 9). He argued that scientific crisis occurs when a paradigm no longer gives

acceptable results and that the necessary scientific revolution in form of a shift in paradigm is a sign of progress.

Latour (1987) developed the methodological dictum that science and technology must be studied 'in action', or 'in the making'. Because scientific discoveries turn esoteric and difficult to understand, they have to be studied where they are made in practice. Latour introduced the concept of a 'black box'. A black box is a metaphor borrowed from cybernetics, denoting a piece of machinery that 'runs by itself'. It functions only by giving it 'input' and 'output' data. Its inner complexity does not have to be known; one only needs to use it one's everyday activities. Latour also contributed considerably to the actor-network theory (ANT) – a constructionist approach to social sciences.

The following are some of the main directions in epistemology:

Positivism is the name used for the direction based on phenomenalism (only measurable facts count – truth which can be registered by our senses, in contrast to 'metaphysical speculations'), deductivism (theory generates hypothesis for testing), inductivism (the gathering of facts forms the basis for laws and thus knowledge), objectivity (science should, and presumably can, be conducted in a value-free way), and that there is a distinction between scientific statements and normative statements (Bryman 2004, p. 11). A statement is true knowledge if one can explain how to confirm the statement using data. Positivism is regarded as the natural science epistemology. The origin of the concept is to be found in the work of August Comte in the early 19th century. The form described above is the 'modern' form established in the 1950s. In connection with positivism, the term *reductionism* also occurs: the view that all complex systems can be understood by the interactions of their parts. An account of a complex system can be reduced to an account of the individual constituents (Inters 2008). Reductionism is closely linked to *causality*, which in turn claims there is a directional relationship between one event (cause) and another event (effect) which is the consequence (result) of the first.

The rational ideal described above is easy to criticize from the perspective of social sciences, based on observations in practical life. The complexity of the social world makes the positivist assumptions seem unrealistic. Observations and analyses of human actions and social events very often reveal gaps between the projections of theoretical models and the observed reality. Some would argue that it is impossible to find the perfect positivist explanation, not because we are not able to, or have not understood fully the nature of the problem yet, but because such an explanation does not exist. Some argue that the truth is dependant on the cultural and historical context.

Relativism is based on the idea that the studied phenomenon is relative to, i.e. dependent on, some other element or aspect. Humans can understand and evaluate beliefs and behaviours only in terms of their historical or cultural context. Truth relativism is the doctrine that there are no absolute truths, i.e. that truth is always relative to some particular frame of reference, such as a language or a culture. It is held that our own cognitive bias prevents us from observing something objectively with our own senses, and notational bias will apply to whatever we can allegedly measure. In addition, we have a culture bias – shared with other trusted observers – which cannot be eliminated. Relativism does not say that all points of view are

equally valid. In contrast, absolutism argues there is but one true and correct view. Relativism asserts that a particular instance Y, exists only in relation to and as a manifestation of a particular framework or viewpoint X, and that no framework or standpoint is uniquely privileged over all others. Some authors point out that relativism also presupposes philosophical realism, in that there are actual objective things in the world that are relative to other real things. Moreover, relativism also assumes causality, as well as a web of relationships between various independent variables and the particular dependent variables that they influence. Philosophical relativism can be viewed as an anti-dogmatic position that asserts that the truth of a proposition depends on who interprets it, because no moral or cultural consensus can or will be reached.

The origin of relativism is pointed out to lie in Indian religions and the Sophists (the Greek philosopher Protagoras). Modern contributors include Bernard Crick, who suggested the inevitability of moral conflict between people. Crick stated that only ethics could resolve such conflicts, and when that occurred in public it resulted in politics (Crick, 1962). Paul Feyerabend embraced relativism and even 'epistemological anarchy' (Stanford, 2008). He argued that '*all rules have their limits, and there is no comprehensive "rationality"*' (Feyerabend 1975, p. 231). He added that he did not argue that we should proceed without rules and standards.

In sociology the position of the *interpretivism* or interactionism has a similar anti-positivist position. It promotes the idea that nothing in society is determined, and that people can break free of a label as individuals. The origin of this position seems to be Max Weber's (1905) social theories on rationalization of religion and government. Weber described the concept of *Verstehen* (interpretive understanding) which is supplemented with the hermeneutic-phenomenological tradition and symbolic interaction (Bryman, 2004, p. 13). Like relativism, the basic idea is that one has to respect the difference between people and objects of the nature. This requires social scientists to grasp the social meaning of social action. The term 'post-modernism' has been used in respect to such approaches.

The third direction in epistemology is *realism*. According to Bryman (2004, p. 12), realism shares two assumptions with positivism: a belief that natural and social sciences can and should apply the same approach to the collection of data and explanation, and that there is an external reality to which scientists direct their attention (a reality separate from our description of it). According to Mir and Watson (2000, p. 944), the realist tradition may be traced back to the works of Kant, who posited the existence of an a priori reality which existed independently of our comprehension of it. There are two separate directions:

- Empirical realism (reality can be understood through the appropriate choice of method – this position is sometimes referred to as naïve realism).
- Critical realism (this direction recognizes the reality of the natural order, and at the same time the events and discourses of social world – critical realists acknowledge and accept our understanding of reality is provisional). Critical realists hold that generative mechanisms that are not directly observable still are admissible since their effects are observable.

Critical realism is a philosophical approach that defends the critical and emancipatory potential of rational (scientific and philosophical) enquiry against both positivist (broadly defined) and 'postmodern' challenges (relativism and interpretivism). Its approach emphasizes the importance of distinguishing between epistemological and ontological questions. Bhaskar (1997 [1975]) used the terms 'transitive dimension' (theories about the world) and 'intransitive dimension' (the world itself). The world does not change when we change our opinion about how the world really is. This is different from empiricism, in which the world is what we can experience with our senses (Sayer 2000, p. 11). Critical realism agrees that ideas should be subject to empirical studies, but asserts that we can have knowledge of deeper causalities than the ones we observe. This leads to another important acknowledgement, namely the difference between empirical (the domain of experience – which we can observe), actual (what happens when powers of the object is activated - events) and real (whatever exists – the structure and powers of objects including causal powers).

Critical realism holds that reality consists of open systems where empirical regularities seldom occur spontaneously. Some forces reinforce each other and others counteract each other. To measure the effect of a particular causal power exactly, a closed system has to be constructed. This is the tradition in natural sciences, but for several reasons, it is more difficult to achieve in social sciences. This may be explained by different 'strata' (or levels) of reality (examples include society, psychology, biology, and physics). New perspectives and causal powers emerge at each stratum. Causal powers on lower strata will still exist on higher strata. Lower strata are characterized by stronger regularities and sometimes they may be turned into closed systems through experimental control. On a higher level (such as human society), the regularities are unstable and thus experimental control is more difficult (Næss 2007). Critical realism implies the world is characterized by emergence – the conjunction of two or more features gives rise to a new one. Phenomena are not reducible to their constituents, even if the latter are necessary for their existence (Sayer 2000, p. 12). Critical realism acknowledges that social phenomena are intrinsically meaningful and hence that meaning is not only externally descriptive of them but constitutive of them – of course, there are usually material constituents too (Sayer, 2000, p. 17).

Critical realism holds that human behaviour can be plausibly constructed as causes. Causal mechanisms can thus involve the attitude and knowledge base of individuals. Agents are defined in terms of their tendencies and powers, among which are their reasons for acting. Reasons are beliefs rooted in the practical interests of life. For every action there is a set of real reasons, constituting its rationale, which explains it. This does not mean that reasons are always rational, as beliefs may be false and also inconsistent. Reasons are not always followed by action, as what one wants to do may be prevented (Bhaskar 1998). One of critical realism's main concerns seems to be maintaining the possibility for objective critique to motivate social change. Thus, normative thinking has to be possible. Næss (2004; 2006) holds critical realism to be the best way forward between the philosophical trenches of positivism and relativism. It makes projection and planning possible, even when the shortcomings of rationalist approaches are acknowledged. In Næss's view, positivism creates bad planning and relativism excludes the possibility of planning.

Critical realism dates back to when the philosophers Descartes and Locke argued that sense data of secondary qualities do not represent anything in the external world, even if they are caused by external qualities (primary qualities) (Wikipedia 2008). The origin of modern critical realism is held to be the work of Roy Bhaskar, even though initially he did not use the term. The philosophy began with what Bhaskar called 'Transcendental Realism' in *A Realist Theory of Science* (1997 [1975]), which he extended into the social sciences as 'Critical Naturalism' in *The Possibility of Naturalism* (1998 [1978]). The term critical realism is a combination of transcendental realism and critical naturalism. Critical realism shares certain dimensions with German Critical Theory (known from the Frankfurt school and the work of Habermas (1984)). Bhaskar asked the retroductive question: What are the necessary conditions for the empirical practice of science to be possible? His answer was that if no external reality exists, independent of our knowledge of it, then our knowledge would not be fallible, and empirical research in order to improve the reliability of this knowledge would be meaningless. This illustrates that retroductive thinking is important in critical realism, and even one of its characteristics (Næss 2007).

Næss (2007) further held that critical realists agree that knowledge is a social product. This socially constructed knowledge is fallible, but not all knowledge claims to be equally fallible. Critical realists believe in judgmental rationality. Knowledge is about something (the intransitive dimension of science). Nature exists independently of our knowledge of it (but is influenced and transformed by human actions). The social reality is not constructed by social scientists, but is something that is produced or transformed, often unconsciously through the social actions and interactions of all agents in society. Social science can influence the development of society, but this happens with a time lag in relation to the research activity. Social scientists are themselves part of society. Their interpretation of the world may be influenced by their social positions and the discourses in which they engage.

The different epistemological positions may be summarized as follows. Positivism (the natural science epistemology) holds the position that truth will be revealed by empirical testing and that reality is observed via our senses. 'Anti-positivism', represented by relativism and interpretivism (modernist social science epistemology), holds that truth is relative and depends on the one that interprets the phenomenon. These two 'opposite' positions are supplemented with the third major alternative: realism. The three positions are fundamentally different. Realism (and specifically Critical Realism) has some common features with both, but acknowledge that reality consists of different strata, and that multiple causes usually influence events and situations in open systems. According to Bhaskar and Danermark (2006), critical realism is not only the ontologically least restrictive perspective, but epistemologically the most heuristically suggestive one.

Ontology

The next core question in science after knowledge relating to how things are, is how things really are (i.e. we now shift from knowledge about something is to the thing itself). This issue is related to social sciences and is called ***ontology***. Ontological discussions stem back to the Greek philosophers Plato ('being') and Aristotle ('methaphysics') (Bookrags 2008). The core question today points to whether social

entities (for example, organizations) can and should be considered as objective entities with a reality external to social actors (people), or whether they should be considered as social constructions built on the perceptions and actions of social actors (Bryman 2004, p. 16).

One position is known as *objectivism*. This position asserts that social phenomena have a meaning and existence independent of the people associated with them. An organization is made up of structural elements such as hierarchy, roles and responsibilities, and rules and regulations. The degrees to which these features are present vary, but thinking in these terms shows the use of objectivism and the assumption that the organization does not only exist but is meaningfully independent of other social entities. The organization represents a social order and values to which individuals conform. Similarly, one can look at culture and other social phenomena. An objectivist researcher will tend to 'speak truth to power' in the meeting with society (Lasswell 1971; Wildavsky 1979; Hawkesworth 2006, p. 160).

The opposite position to objectivism is called *constructionism* or *constructivism*. This position asserts that social phenomena and their meanings are continually being accomplished by social actors; they are produced by social interactions and in a constant state of revision (Bryman 2004, p. 16). In this perspective an organization is more like a negotiated order constantly worked out by the individuals within the organization. Similarly, culture can be seen as an emergent reality in constant construction and reconstruction. No set of cultural understandings can provide perfectly applicable solutions to any problem (Becker 1982 cited in Bryman 2004, p. 17). Most constructionists accept that this position cannot be pushed to the extreme, but a constructivist will tend to question whether there is a truth to be revealed in the meeting with society.

The discussion of 'truth' is one of the most interesting aspects here. An objectivist will see one absolute truth, where all other positions are 'false'. A pure constructionist will argue that there is no 'truth' – no view to be considered better than other. A more moderate form could be there is a limited number of 'truths' according to different viewpoints, or, like Flyvbjerg (2001, p. 139) claims, the 'pragmatic truth' – truth is dependant on acceptance. One interpretation of this is that it implies the truth is what we agree is the truth. As held by critical realism, the object does not change as a result of us changing our opinion of it. For instance, the problem of climate change does not go away just because we (or the forces in power) decide it is not a problem. This would create serious democratic problems (Hawkesworth 2006). Hess (1997, p. 154) holds that evidence can be established, but always within a social situation that recognizes the power of cross-examination and interpretation.

One important point about ontology is that the researcher's position influences how research questions are formulated and how research methods are utilized. Research questions formulated from a position of objectivism (structuralism) will tend to emphasize formal dimensions of an organization and believes and values of cultures. Research questions formulated from a constructionist position will emphasize the active participation of people in reality construction (Bryman 2004 p. 19).

The epistemological position of critical realism has great ontological consequences. As mentioned earlier in this paper, it is considered that there is a truth beyond what

we can sense, and it is possible for us to identify deeper causes than the ones we can observe. Turning again to Bhaskar and Danermark (2006), reality is viewed as a laminated system where (1) physical, (2) biological, and more specifically physiological, medical or clinical, (3) psychological, (4) psycho-social, (5) socio-economic, (6) cultural, and (7) normative kinds of mechanisms, types of context and characteristic effects are all essential to the understanding of the phenomena in research. In addition, we have the multiple contexts of sociality: every social event can be understood in terms of four dimensions, namely: (i) material transactions with nature, (ii) social interactions between agents, (iii) social structure proper, and (iv) the stratification of embodied personalities of agents. Complexity deriving from scale of social being adds to this: (a) the sub-individual psychological level, (b) the individual or biographical level, (c) the level of micro- and small-group analysis, (d) the meso level concerned with the relations between functional roles, (e) the macro role typically oriented to relationships in 'whole societies', (f) the mega level primed for the analysis of civilizations and traditions, and (e) the planetary level. At all of these levels of reality the mechanisms intermesh. Together, all of these concepts offer great potential for analysis and understanding.

A complicating factor in understanding these concepts is that some sources are not clear about the differentiation between epistemology and ontology. The term 'interpretivism' is sometimes used as an ontological position parallel to constructivism, and the term 'constructivism' is also used in discussion of epistemological issues as a parallel to relativism. Some authors seem to refer to 'realism' as including both positivism and realism as one category, possibly closer to what is referred to as rationalism at the beginning of this section. The frequent use of the terms 'critical' and 'realism' (both together and independently of each other) with different meanings does not help either. The term 'critical realism' has also been used with other meanings, such as in aesthetic theory.

Research strategy

These issues described above are elements of research strategy. The chosen research strategy should mirror the researcher's position in relation to the above questions. Some authors use the word 'methodology' for this: '*A method is a tool or a technique that is used in the process of inquiry. In contrast, a methodology may be regarded as an "intricate set of ontological and epistemological assumptions that a researcher brings to his or her work"*' (Prasad 1997, p. 2). Here, I choose to use the term 'research strategy'.

In research, the question of which method to choose will always be important. As pointed out by many authors and as is obvious from the discussion above, there is no single method which is best in all situations. However, in practical life it is not unnatural to prefer the methods one is familiar with. Bouchard (1976, p. 402) suggests the key to good research lies in asking the right question – and picking the most powerful method for answering that particular question. Consequently, if one wishes to adhere to one research method, one need to ask the right questions: the ones that benefit one's favourite method.

Many researchers find a useful distinction between quantitative and qualitative methods, as indicated in Figure 1 (based on Table 1.1 in Bryman 2004, p. 20, and

significantly extended). These methodological positions are typically a result of looking at research through a set of lenses. On the one hand, the set may be dominated by deductive, positivistic and objectivist positions – leading to a choice of quantitative methods for data collection and analysis. On the other hand, the set of lenses may be dominated by inductive, relativistic and constructivist positions, leading to a choice of qualitative methods for data collection and analysis. The sum of these choices is the chosen research strategy.

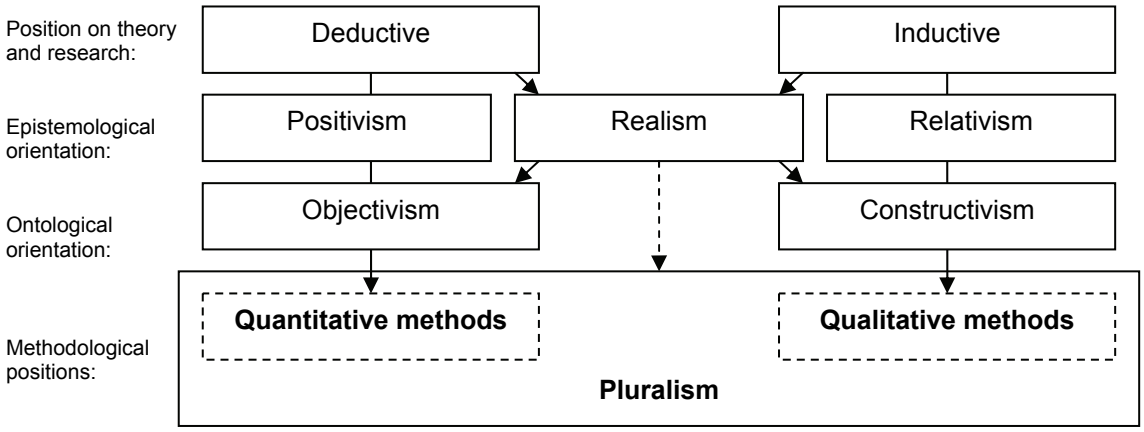

Figure 1 Methodological positions as part of research strategy.

The distinction between quantitative and qualitative methods is useful as a sorting criterion for categorizing methods and tools. On the surface, the distinction implies researchers employing quantitative methods use measurement, and those using qualitative methods do not. It is, of course, not quite that simple; quantitative, statistical analysis may also be used in an inductive fashion in exploratory analysis without testing any given hypothesis.

In Figure 1 it is readily apparent that the distinction between quantitative and qualitative methods goes deeper than just the choice of method, and has to do with the whole research strategy. The distinction between quantitative and qualitative has been characterized by writers as implying everything from fundamental to simply false. Examples of critical authors are Layder (1993, p. 110), Flyvbjerg (2001, p. 49), Schram and Caterino (2006, p. 3). Bryman (2004) talks about breaking down the quantitative/qualitative divide and combining quantitative and qualitative research. He also points out that we should be reluctant to drive a wedge between the two. Flyvbjerg said we should not think in terms of 'either – or' but in terms of 'both – and'. Swartz-Shea (2006) discusses the plurality position and divides it into three scenarios (I have put a name on scenario 2):

1. 'Happy pluralism', where any approach contributes; rules, logic, signs and rationality are not criticized as such and 'all are good'.
2. 'Conscious pluralism', where judgments are made about the significance of the problems defined and researched by different research approaches.
3. 'Reflexivity', where researchers think more critically about the value of their research and how it will be used – not only in a pragmatic way but also in a

political way that goes beyond 'both – and'. The researcher's role in socio-political-economic power structures is important.

The description of the pluralist positions here makes it very clear that the first scenario is rather naïve (see also the parallel to empirical realism mentioned above). Researchers should be more critical about their work. Lynn, Heinrich and Hill (2000, p. 249) indicates a warning by saying 'A logic of governance can accommodate a wide range of theories, models, and methods, but not the relatively atheoretical eclecticism that is popular with many governance and public management researchers.'

The conclusion to this section is that researchers should be very cautious in choosing their research methods and be aware of the consequences of the different positions they inherently have to choose from when planning their research. Researchers may not have to say much about their position explicitly as long as they stay within an established tradition and a well-known research area, but as soon as they approach the boundaries of their chosen area they need to make some conscious and adequate choices. One may also suspect that some research traditions are dominated by research praxis not reflected upon.

A 'robust' position in epistemology and ontology is one that can address a wide range of research questions in a multidisciplinary area. Such a position has to allow the researcher to choose both deductive and inductive approaches and see the world through lenses characterized by both objectivism and constructivism. Finally, a robust position has to open up for pluralism in choice of methods. From the criticism of the division between quantitative and qualitative methods, there seems to be a growing acceptance that this pluralism is necessary and possible to obtain within all the epistemological positions mentioned above. Arguably, the most robust position seems to be critical realism.

3 Recent developments in project management and research

It is necessary to have a closer look at what has happened to research strategy recently in areas relevant to my research. My work is anchored within management. A dominating part of the investment projects studied is physical infrastructure such as buildings and constructions, and hence the core area is more specifically project management.

One of the most interesting recent discussions in the field of research strategy was sparked by Bent Flyvbjerg and his book *Making Social Science Matter* (Flyvbjerg 2001), in which he argued strongly for the importance of practical wisdom – phronesis – if social science (again) should become important in forming society. In his argumentation was criticism against mainstream social and political research putting too much emphasis on trying to emulate natural sciences, and he advocated in favour of plurality in the choice of research strategy. Flyvbjerg's initiative is based on his work within planning and studies of mega-projects, which makes it relevant to project management as well.

A substantial part of the debate about these questions was documented in the book *Making Political Science Matter*, edited by Sanford Schram and Brian Caterino (2006), where the challenge was taken by several authors and interesting perspectives were described, some of which are referred to above. There is both criticism and support for Flyvbjerg's position, but the book leaves no room for doubt about the importance and relevance of the initiative. The book discusses many sides to Flyvbjerg's challenge and, as I understand it, confirms the importance of interdisciplinary research, pluralism, and understanding the political dimension of research and the researchers' role in society.

In *The Sage Dictionary of Qualitative Management Research*, Flyvbjerg (2008) presents the concept of phronetic organizational research. Here, he refers to Aristotle and emphasizes that phronesis is the ability to think and act in relation to values, to deliberate about 'things that are good or bad for humans'. This, he argues, makes phronesis the most important of the three virtues of episteme, techné and phronesis, because it is the activity by which scientific and instrumental rationality is balanced by value rationality (Flyvbjerg 2008, p. 154). Such balancing is crucial to the viability of any organization.

Returning to management, the question is what has happened in research strategy in this respect. In the following the paper gives a chronological[11] summary of some important contributions, with a special focus on contributions relating to project management.

The area of building and construction is naturally dominated by technological and economical issues and research is consequently dominated by natural science and quantitative research strategies. This is well known and will not be discussed further. In 1990, Graham Winch started looking at how social sciences could be applied within construction management. He looked at scientific disciplines such as economics, history, sociology, anthropology, and psychology, how these have been used in studies of construction management, and how they can lead to new understanding of construction management. His main conclusion was that there is no 'best way' to apply the social sciences to research and teaching in construction management. He held the opinion that the sign of good research is clear specification of the issue being addressed and careful selection of an appropriate conceptual and methodological framework for the analysis (Winch 1990, p. 205).

Management, and specifically strategic management, is an important area in my work. Raza Mir and Andrew Watson (2000) studied philosophy of science in this setting. They used a slightly different distinction between epistemological and ontological positions than the one discussed in this essay, but their conclusions are interesting: They advocated the use of constructivist methodology and argued that constructivist methodologies work at the level of assumptions, rather than at the level of technique. Constructivist methodology brings those assumptions made by the researcher to the foreground that other methodologies remain silent on. Further, Mir and Watson held that a healthy mix of realist and constructivist perspectives will help strategy researchers address issues that a purely realist perspective misses. In particular,

[11] The chronology is broken by the contribution from Petter Næss being pushed forward two places. His contribution is more fundamental and not a natural part of the following project management sequence.

constructivism will help in the understanding of the context-driven nature of strategy, and the active role of the researcher in shaping a theoretical perspective (Mir and Watson 2000, p. 950). They pointed out that quantitative methods (e.g. statistical analysis) may be deployed within a constructivist methodology. Similarly, qualitative methods may be deployed within a realist methodology (Mir and Watson 2000, p. 947). Their definition of realist was closer to the definition of positivist position used in this essay.

Another area of interest to my work is societal and public planning. Planning is also a fundament for most of the projects which include changing our physical surroundings. Petter Næss (2004) discussed the possibility for predicting social phenomena and the use of research methods. He held that critical realism is the best epistemological position as the basis for planning. He also pointed out that this opens up for the necessary methodological plurality to describe different sides to society. He concluded the necessity of being able, at least to some extent, to predict outcomes for planning to exist. This is important in order not to risk that decisions are left to undisputed claims by project-promoters and being misused in the interest of power elites (Næss 2004, p. 163). Instrumental rationality has been characterized by Habermas and others as suppression by the rulers. As Næss shows, planning is anchored in multiple goals and represents a form of instrumental rationality that may well represent protection of society against destruction of the environment, among other things, and is necessary for the effectiveness of such interventions.

Alberto Melgrati and Mario Damiani (2002) challenged the dominating epistemology in project management and suggested rethinking the framework for project management. They point out the dominating rational foundation of project management, but also how other perspectives emerge over time. They conclude that the theoretical-epistemological foundations of project management ideology are solid, but that there is criticism pointing to fundamental contradictions (Melgrati and Damiani 2002, p. 371). They set out to define a new framework, removing some of these contradictions. They chose a socio-constructive approach and based their work on subjectivism (reality cannot be known), no social or organized event is subject to immutable laws or rules, reality is constructed by interaction, and the project is understood as a temporary system (Melgrati and Damiani 2002, p. 373). They pointed out that projects are born from a desire for change and that the strategist knows he or she must take account of the fact that others react to his or her actions. Hence, a pragmatic approach is needed to meet these challenges (Melgrati and Damiani 2002, p. 378).

Magnus Gustavsson and Kim Wikström (2004) introduced the idea that reflection is a key to improve business processes and projects. Intuitive decision making is important in the value creation process. They discuss the fundamentally different approaches ‘rational’ and ‘intuitive’. The rational approach is based on projects as closed systems and the intuitive as open systems. The authors warn against the overflow of information created by the rational approach and its limitations in understanding causal chains. Rational and intuitive approaches should co-exist in the business. Still there is a need for time to think and reflect on its goals and processes and to have the courage not to define everything in detail (2004, p. 9).

Jonas Söderlund (2004, p. 183) points out the basis of project management has been planning-oriented techniques and application of optimization theory, but there is an increasing interest from other academic disciplines. He argues that project management is a complex subject and usefully examined from many perspectives. A divide in project management literature goes between seeing project management is a problem solving method (projects as a unique task) and project management as organisational and behavioural (projects as temporary organisations). [This author adds the comments in parenthesis.] Söderlund (p. 185) suggest project can be viewed as 'a construct for analytical purposes'. Further 'It is created by practice and recreated, or modified, by the researcher who sets out to study the project… Projects are important and interesting phenomenon from which it is possible to build strong and interesting theories in order to increase our knowledge of certain parts of social life.' He proposes (p. 186) there is a need for differentiation in empirical and theoretical research. He concludes by extracting 5 key questions for future research in project management from his own position on the organisational science side.

Cicmil, Williams, Thomas and Hodgson (2006) put forward the position that there is a need for more knowledge of the 'actuality' of project management, whereas the traditional project management [the rational fundament – my comment] is well covered. They explore epistemological, ontological and methodological assumptions of such research. They hold that attention should be refocused on praxis, on context-dependent judgement, on situational ethics, and on reflexivity which enables social actors to see how power functions in context (Cicmil et al. 2006, p. 675). They look at project management practice as social conduct, defined by history, context individual values and wider structural frameworks, implying deep interest in lived experience. They use the phrase 'think in action' (p. 676) which gives a link to the work of Latour without actually referring to him. They give considerable attention to 'sense-making', referring to Weick (1979), and advocate a more processual and less static view of project management skills than that traditionally held (Cicmil et al. 2006, p. 679). They also refer to Flyvbjerg's suggestion of phronesis as ideal. In this view the project manager is 'virtuoso social and political actor', whose virtues include reflexivity, ethics and value rationality, and the use of judgement and intuition in context (Flyvbjerg 2001, p. 60; Cicmil et al. 2006, p. 679). They conclude that methodological issues (epistemology, ontology and representation) are of dominant concern in recent studies and that empirical research must proceed simultaneously on macro- and micro-levels of analysis within both objective and subjective methodological traditions.

Bent Flyvbjerg (2006) put forward a strong advocacy for the use of case studies in social science. He examines and systematically rejects five misunderstandings about case studies. The misunderstandings, representing what Flyvbjerg called conventional wisdom, are: (a) theoretical knowledge is more valuable than practical knowledge; (b) one cannot generalize from a single case, therefore, the single-case study cannot contribute to scientific development; (c) the case study is most useful for generating hypotheses, whereas other methods are more suitable for hypotheses testing and theory building; (d) the case study contains a bias toward verification; and e) it is often difficult to summarize specific case studies. Flyvbjerg (2006, p. 226) referred to Kuhn when concluding that the most important precondition for science is that researchers possess a wide range of practical skills for carrying out scientific work. He showed that cases are important in human learning and that it is context-dependent

knowledge that makes it possible for people to develop from beginners to become virtuoso experts (Flyvbjerg 2006, p. 221).

Damian Hodgson and Svetlana Cicmil (2006) edited a collection of interesting contributions challenging the traditional project management (PM) research in the book 'Making Projects Critical'. It is not practical to go into each of the individual contributions, but they all represent alternative approaches from different constructivist starting points. The objective of the book was to evaluate the foundations of PM as a field of practice and research, to understand the obstacles to innovative research and creation of knowledge relevant for practitioners (p. 3). Their explicit goal is a critical approach in order to enhance the intellectual basis for understanding PM. They wanted to provoke discussion, and succeeded, as the Afterword by Peter Morris clearly shows. He discusses the positions and conclusions of each contributor and states 'There is a fine line in critical theory between subversion and understanding and I am not sure it isn't sometimes crossed over in one or two of these chapters' (p. 337). His concluding remarks include the comment that projects 'offer a blend of instrumental rationality with reflective, social knowledge' (p. 345).

Carol Linehan and Donncha Kavanagh (2006) is one of the contributions of the above mentioned book edited by Hodgson and Cicmil. This author wants to include this specific reference due to a new set of ontologies (originally suggested by Robert Chia in 1995): The ontologies are named 'being' and 'becoming'. They suggest (p. 52) the being ontology is the dominant one in organisational analysis. In this ontology primacy is given to objects, states, events and described by nouns. This leads to thinking about projects as things, as entities, functions. This gives structure and stability in a complex, ambiguous world. The being ontology tends to evacuate values and ethical considerations out of the situation (p. 54). The becoming ontology emphasises process, activity and the construction of entities and are described with verbs. It calls attention to the dynamics of developing structure, the negotiation of governance principles and structural arrangements in actual practice. Projects are about change and movement, and as basis for thinking about projects this ontology makes more sense according to Linehan and Kavanagh. It demands that we continuously question categories and divisions that are routinely seen as fixed (p. 55).

Julien Pollack (2007) studied two 'paradigms' of project management research and showed that there are two broad tendencies, termed 'hard' and 'soft' paradigms (cf. Kuhn). These follow more or less the same pattern as discussed above, referred to as the epistemological and ontological positions leading to the choice of quantitative or qualitative methods. He confirms the tendency of traditional project management to be based on the 'hard paradigm' (based on a positivist epistemology) but also a growing acceptance of the 'soft paradigm' (based on interpretive epistemology). Pollack also showed that in the field of systems thinking authors have demonstrated that different paradigms and methodologies are appropriate for different contexts and are effective in reaching different ends (Pollack 2007, pp. 266–267). In addition, he observed that tools which are typically associated with one paradigm can move across to the other paradigm (Pollack 2007, p. 271).

Hedley Smyth and Peter Morris (2007) noted that the epistemological base for research and practice in project management is weak and asked whether enough

careful consideration is made in the selection and application of methodologies. They concluded that a unified theory of the management of projects does not exist and that projects are context-specific and located in open systems. They noted that researchers seem to acknowledge this, but research methodologies still often overlook this – the epistemological context is frequently missing. They observed a multidisciplinary nature in projects and that research in project management draws on a range of social and natural sciences, but that the word 'methodology' often is misused. Based on a critical study of literature, and drawing on other researchers' literature studies, Smyth and Morris identified a large number of 'paradigms', each supported by a large or small body of literature (Smyth and Morris 2007, pp. 423–424). They used critical realism as an example of an epistemology with large potential and would stimulate to its use. They analysed all papers published in the *Journal of Project Management* in 2005 and show that 90% of the authors did not explicitly state their position, 66% of the papers was actually based on positivism, 22% on empiricist positions, and 10% on other methodological bases (including interpretivism). Critical realism was not represented at all. Only 22% reflected on methods. They stated that positivism seeks general explanations and interpretivism seeks particular explanations, and that the methodologies were often applied in inappropriate ways. They reached the conclusion that the current absence of transparent and robust methodological application is hindering progress and tending to obscure weaknesses in methodology selection and the integrity of application (2007, p. 433).

Amy Edmondson and Stacy McManus (2007) introduced a framework for assessing and promoting methodological fit as an overarching criterion for ensuring quality field research. Methodological fit is defined as internal consistency among elements of a research project (Edmondson and McManus 2007, p. 1155). They observed that articles in leading academic journals show a high degree of methodological fit, although methodology is given little explicit attention and no guidelines are available. They especially focussed on the conditions under which hybrid methods that mix qualitative and quantitative data are most helpful in field research. They proposed that qualitative and quantitative methods can be successfully combined in cases where the goal is to increase the validity of new measures through triangulation and/or to generate greater understanding of the mechanisms underlying qualitative results in at least partially new territory (Edmondson and McManus 2007, p. 1157). From analysing a wide range of examples, they observed that this typically is found in what they call the intermediate theory research (see Figure 2).

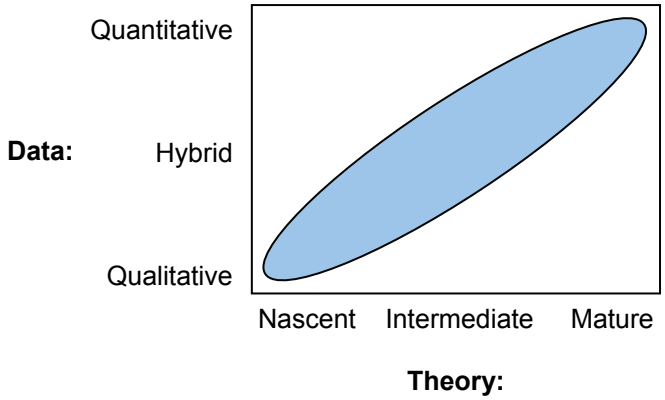

Figure 2 Methodological fit as a main tendency (Edmondson and McManus, 2007, p. 1168).

Intermediate theory studies typically proposed provisional models that address both variance- and process-oriented research questions. Mature theory research was dominated by more precise models, correlation- based methods consistent with causal inferences supported by logic. Nascent theory research (where little or no previous theory exists) was dominated by gathering of rich, detailed and evocative data, using methods for open-minded learning, and grounded theory approaches. This seems to suggest that a good methodological fit typically will be dominated by qualitative methods in a new (nascent) research area, combinations of qualitative and quantitative methods in an establishing (intermediate) research area, and quantitative methods in an established (mature) research area. Edmondson and McManus' discussion of problems occurring when methodological fit is low is shown summarized in Table 1.

Table 1 Problems encountered when methodological fit is low
(based on Edmondson and McManus 2007, p. 1170 (Table 6)).

Prior work on the relevant research question	Data collection and analysis	Problems encountered
Nascent	Qualitative	Fishing expeditions (finding results by chance, not convincing).
	Hybrid	Quantitative measures with uncertain relationship to the phenomenon (not convincing).
Intermediate	Qualitative	Lost opportunity (insufficient support for new theory, reduced potential).
	Quantitative	Uneven status of empirical measures (new constructs weak in reliability and validity compared to existing measures, reduced potential).
Mature	Hybrid	Uneven status of evidence (research fails to build effectively on prior work).
	Qualitative	Reinventing the wheel (study findings being obvious or well known).

An alternative to Edmondson and McManus' interpretation could be that the more mature a field of research becomes, the deeper insight into causal mechanisms is possible. This would not exclude the qualitative methods or new quantitative analysis in the same area.

Edmondson and McManus also observe that iterating between data collection and analysis provides the flexibility needed to follow up on promising leads and to abandon lines of enquiry that prove fruitless (Edmondson and McManus 2007, p. 1164).

The conclusion to this section is that there is an emerging awareness about the limitations given by the chosen research strategy, and a growing attitude that traditional positivist strategies on which project management is often based have to be challenged. The development seems similar in organizational research and management in general. The importance of choosing an adequate research strategy (good methodological fit) has been highlighted in many recent contributions, and there seems to be a growing opinion that researchers should explicitly state their position in order to increase transparency and make critical reviewing easier.

A robust strategy will involve explicitly stating one's position, taking the consequences of this position and sticking with the resulting research strategy. This implies carefully considering all aspects of the choice on everything from the formulation of research questions, to choice of assumptions, the collecting of data, the analysis, and the drawing of conclusions. Although easier to review critically, the research will also be easier to defend if it is done according to the chosen strategy.

4 My fundamental platform for further research

In the previous section both the basics of philosophy of science and recent developments in relevant research areas have been discussed. Although not a complete literature study and certainly not a presentation which gives justice to all possible positions in epistemology and ontology, this basis gives an overview – a map on a large scale. The purpose of this exercise has been to find my own position as a researcher. This position will influence my research strategy in the writing of the current dissertation and beyond.

I relate to all of Aristotle's virtues or knowledge concepts: techné (craftsmanship) in performing good research, and episteme in the cases where I search for universal knowledge or at least the possibility to generalize conclusions from any of my research projects. Most of all, my work will hopefully bring me closer to phronesis (practical wisdom) about the phenomena I study. My combined background as a practitioner and researcher makes this the natural ideal. The observations by Gummeson (2000) on the relationship between theory and practice (researchers and consultants) means this background seems to add natural robustness to the position, since it gives added access to fragments of both theory and practice.

Theory is not always much in focus in my work, but there will be traces of both deductive and inductive approaches. Using both, in an iterative process seeking better understanding of both theory and practice will be a natural choice. In several situations studying elements of human society, retroductive approaches will be the right choice. The use of these approaches, deductive inductive or retroductive, or combinations of these, has of course to be considered in each case.

The research area I am working in is multifaceted. Governance of public projects is based on management, and specifically project management. It is about technical systems and organizational structures, and it includes decision making and understanding the consequences of physical and economic interventions in society and nature. Project management and especially governance of projects have to be considered as new areas ('nascent' in the words of Edmondson and McManus), whereas theories of management, economics, etc., are well established. This makes it natural to put the label intermediate on the research area as a whole. I have entered a new area with a toolbox equipped with well-established tools and methods. According to Edmondson and McManus (2007), I should look for hybrid methods to obtain good methodological fit. This is the position that Swartz-Shea (2006) and others have called pluralism.

My position in epistemology and ontology is a consequence of my choices as argued above. Although there may be traces of both positivist approaches and relativist approaches in my previous and current research, I do not choose either positivism or relativism as my position in epistemology, but critical realism. This is a different epistemological position, not a compromise between the two. Sørensen (2006) has pointed out that the works of Latour and others (in particular, the actor-network theory (ANT)) make the same position possible using a different approach. To me, the point is not what label is put on it, but the balance between the positivist- and anti-positivist positions – not by having equal emphasis on both but by having a different position that respects both the fundamentals of nature and that social phenomena have to be understood within their context. As researchers, we need to make sure our position has a wide perspective and keeps open the possibility of purposefully creating a better future.

Leaning again on Bhaskar and Danermark, I would argue that critical realism is ontologically less restrictive than other meta-theoretical positions and therefore inclusive as to potentially causally relevant levels of reality. Critical realism is also the most heuristically suggestive position (Bhaskar and Danermark 2006). Critical realism therefore encourages interdisciplinary research instead of prohibiting it. Social events and processes must be understood in terms of physical, biological, socio-economic, cultural, and normative kinds of mechanisms, types of contexts and characteristic effects. The critical realist model of applied explanation normally involves an explanation of a specific event or thing in terms of a multiplicity of mechanisms, potentially of radically different kinds corresponding to different levels of reality. Critical realism's position on causality matches the multiple-cause situation that a researcher faces when trying to explain social behaviour, and it acknowledges structures (social and natural) as capable initiators of mechanisms that might (or might not) result in empirical events. Retroduction and counterfactual thinking are helpful devices for postulating (and documenting) structures' ways of creating mechanisms. Generalizations and predictions are indispensable in planning, corresponding to the possible level of prediction in critical realism: crude rules of thumb based on available knowledge, informing something about the direction and order of magnitude of the likely influences (Høyer and Næss 2008).

My position in ontology is that both objectivism and constructivism – used as different perspectives – cover important sides to social phenomena. My choice would not be locking into either of these positions. Rather, truth lies somewhere between the

extremes, and there may be more than one truth. In this position it is not a question of finding a correct position but of utilizing the strong sides of both.

My methods are both quantitative and qualitative (although qualitative methods dominate my current research). Consequently, I require a multi-methodological platform. I do not want to limit my work to a certain set of methods. Hence, the substantial discussion on pluralism in recent debates appeals to my way of thinking about these issues. In this respect, Swarts-Shea's (2006) discussion on pluralism presented in the previous section helps in identifying a position: my current position would probably be described as 'conscious pluralism'. My future ambitions are to reach the reflexivity stage of pluralism.

In the end, my choice of research questions and methods and also my conclusions will be a result also of values and practical considerations. Values are important to every human being. Although the value-free, objective research has been, and still is, an ideal for many researchers, to me this seems more like a guiding objective than a description of reality. We are all a result of our previous history and experiences, we all work within a set of situational parameters and we have our own subjective understanding of the world and its realities. As a researcher, I am aware of these biases and do not ignore or suppress them. Practical considerations are also important in the choice of focus and limitations of research tasks, choice of methods, etc. Such work is performed within the limits of time and other resources, and some information is not available or impractical to access. As will be discussed in each research project, these issues matter, and to some extent the choices available are not always the ones we would ideally like to have.

This essay has shown my path to a robust position in epistemology and ontology. The next question is: Can the author live up to the challenges this position gives?

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Paper 4

Front end Governance of Major Public Projects

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Paper presented at the EURAM 2006 Conference in Oslo 18. May 2006

Abstract

Governance regimes for major investment projects comprise the processes and systems that need to be in place on behalf of the financing party to ensure successful investments. This would typically include a regulatory framework to ensure adequate quality at entry, compliance with agreed objectives, management and resolution of issues that may arise during the project, etc., and standards for quality review of key governance documents.
The challenges are abundant: How to ensure projects' viability and relevance up-front; how to avoid hidden agendas during planning, underestimation of costs and overestimation of utility, unrealistic and inconsistent assumptions; how to secure essential planning data, adequate contract regimes, etc.

Public investment projects do not always meet the expectations of different stakeholders. Many are delivered too late, at a higher cost, and do not meet agreed quality standards. These are common problems that might have considerable adverse effect on operational costs and even the economic viability. In most cases, however, the long term effects of such problems are minor. For instance, the Norwegian national university hospital was completed with considerable cost overrun. This, however, was equivalent to only some months of operational costs. The more serious type of problems associated with projects are when they are not able to produce the anticipated effect. Public resources are wasted. Clearly, a key to successful projects lies in the choice of concept and the fundamental design.

This paper discusses measures in terms of governance regimes that might improve success in public investment projects. There are numerous questions to be answered, such as: Which are the current procedures applied in different countries and agencies - and what are their effects? What would it take to develop more effective governance regimes at international, government or corporate level to ensure maximum utility and return on investment for society and investors? What would be the optimal mix of regulations, economic means and information in improved governance regimes for major investment projects?

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Introduction

Major public projects are typically conceived as the result of politically expressed needs in dialogue between various stakeholders. This is followed by some lengthy process to develop the project and make necessary decisions. This typically involves government at various administrative levels, local government, political institutions, the public, media, and consultants and contractors in the private sector. Such processes are often complex, disclosed and unpredictable, as described and analysed in the in-depth IMEC study of 60 major projects where the focus was on the reconciliation of uncertainty and feasibility in the front-end phase, Miller and Lessard (2000). The processes can also be deceptive and irresponsible, affected by hidden agendas rather than openness and social responsibility, as discussed by Miller and Hobbs (2005) and Flyvbjerg (2003). In the field of Project Management, the focus has been on the complexity itself, the improvement of the processes and procedures involved, rather than the governance framework that could or should give direction and help improving the outcome of these processes. Projects Governance has only recently become an issue of importance in the project management community.

Experience in the past clearly suggests that the government as the financing party in major public projects needs to improve existing governance regimes in order to secure cost efficiency and effects of investments, while avoiding direct involvement from the project is initiated until it is completed and enters its operational phase. The government, as represented by the responsible ministry, would normally have neither the necessary competence nor the need to interfere in the design and management of projects at tactical or operational levels. Ministries will usually have a strategic perspective, and a restricted role in facilitating structured, responsible and efficient preparation and implementation – in order to maximise the benefits from public investments as seen in a long term perspective. Direct involvement of central government at tactical or operational levels tend to fail as evidenced in a study of 250 international development projects, *Samset (1998)*, where the main problem seemed to be that the government was left with both the responsibility and the risk, which could otherwise been handled both more efficiently and effectively by others.

Policy to facilitate public management reforms

The political trend in many industrial and developing economies the last decades towards increased liberalization and privatization has resulted in various types of public management reforms. The aim is to build effective and accountable institutions in the public sector and facilitate investment and initiatives in the private sector. The objectives are to improve performance in public sector and promote economic development under what is termed good governance. Trends towards increased autonomy of public and private institutions have been followed by a corresponding trend to increase control measures and regulation. In the stricter sense this would imply that an increasing number of agencies are being established in order to enforce regulations. In a less rigid sense, regimes are introduced that are based on degrees of self-regulation exercised by the institutions involved with reference to publicly endorsed rules and standards. This is much in the same way as the private sector adopts standards for accounting and auditing prescribed by the public. While the regulatory features of such regimes may represent new restrictions and administrative

challenges, they are introduced in different areas essentially to facilitate autonomy and increase efficiency.

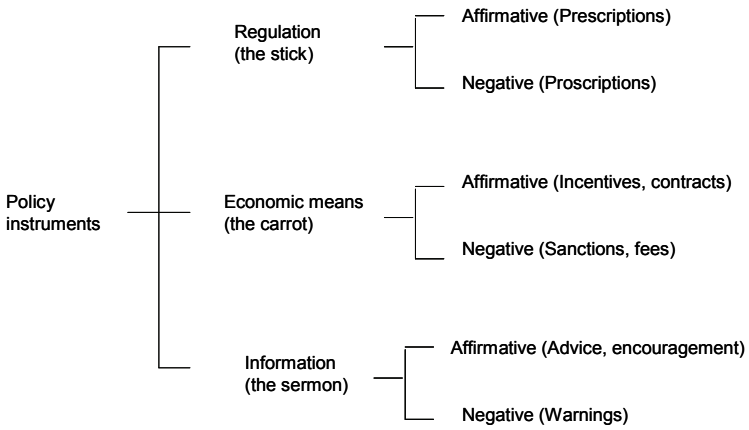

Figure 1 Policy instruments to improve governance in public sector.
Source: Bemelmans-Videc, Vedung and Rist (1998)

The policy instruments available to the public in order to bring about such changes are not restricted to the use of regulations, but would also comprise economic means and information, as discussed by Bemelmans-Videc, Vedung and Rist (1998). The instruments can be either affirmative or negative. Regulations can be either prescriptive and provide rules to be followed, or proscriptive, specifying what is not allowed. Economic means can be either incentives, for instance in terms of benefits or refunding arrangements, or negative sanctions in terms of taxation or fees. Information can be either in terms of advice and encouragement giving guidance of what can be achieved and in which way, or in terms of warnings or description of pitfalls and possible adverse effects. The generic model in figure 1 is matched by the World Bank's model to enhance state capability, the World Bank (2000), where the regulatory part is described in terms of rules and restraints, the economic part in terms of competitive pressure, and the information part in terms of public 'voice' and partnership. The Organisation for Economic Co-operation and Development, OECD, highlights what is termed the principles of good governance, which include: (1) *Accountability* - government is able and willing to show the extent to which its actions and decisions are consistent with clearly-defined and agreed-upon objectives. (2) Tr*ansparency* - government actions, decisions and decision-making processes are open to an appropriate level of scrutiny by others parts of government, civil society and, in some instances, outside institutions and governments. (3) *Efficiency and effectiveness* - government strives to produce quality public outputs, including services delivered to citizens, at the best cost, and ensures that outputs meet the original intentions of policymakers. (4) *Responsiveness* - government has the capacity and flexibility to respond rapidly to societal changes, takes into account the expectations of civil society in identifying the general public interest, and is willing to critically re-examine the role of government (5) F*orward vision*- government is able to anticipate future problems and issues based on current data and trends and develop policies that take into account future costs and anticipated changes (e.g. demographic, economic, environmental, etc.), and (6) *Rule of law* - government enforces equally transparent laws, regulations and codes.

Again, the aim is to increase autonomy and efficiency in society. Such policy instruments as the ones mentioned can be used as a reference when discussing systems for improved governance of public investment projects.

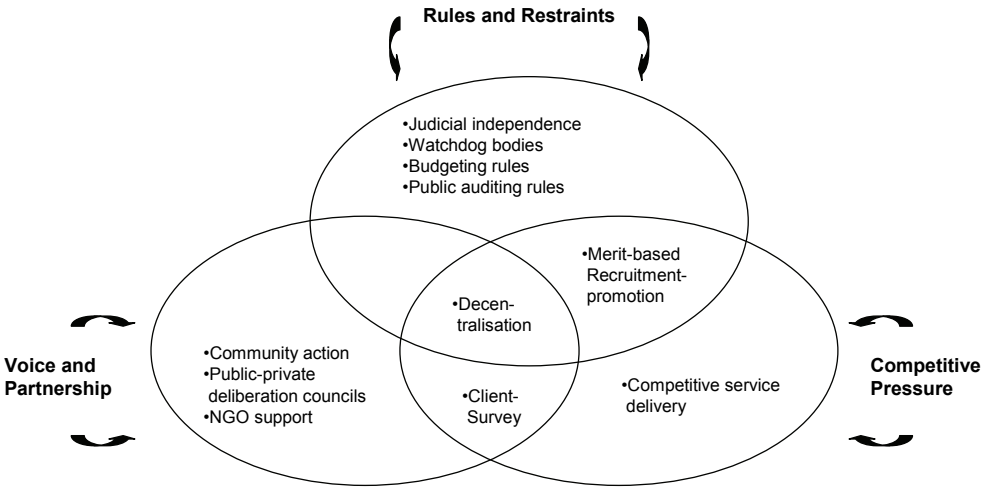

Figure 2 Mechanisms to Enhance State Capability: Three Drivers of Public Sector Reform. Source: the World Bank (2000)

Problems encountered up-front in public projects

Many of the problems facing major public investment projects can be interpreted in terms of deficiencies in the analytic or the political processes preceding the final decision to go ahead, and the interaction between analysts and decision makers in this process.

The more fundamental problems that have to do with the project's long-term utility and effect could typically be traced back to the earliest preparatory phases of the project, while the more marginal problems of cost efficiency, delays and cost overrun are management issues that arise during the project's implementation.

The more fundamental challenges would typically be to deal with problems such as tactical budgeting in responsible agencies at various levels, that is done in order to increase the chance to obtain government funding for a project. Another challenge is to increase the chance that the most relevant project concept is chosen. Yet another challenge is to ensure a transparent and democratic process and avoid adverse effects of stakeholder's involvement and political bargaining. But also to make the process predictable is a major challenge since the front-end phase in large public projects commonly would extend over at least one parliamentary election period.

Principles for front-end governance of projects

Governance regimes for major investment projects comprise the processes and systems that need to be in place on behalf of the financing party to ensure successful investments. This would typically include a regulatory framework to ensure adequate quality at entry, compliance with agreed objectives, management and resolution of issues that may arise during the project, etc., and standards for quality review of key governance documents.

Miller and Hobbs have discussed the need for design criteria that should be brought to bear when developing a governance regime for a megaproject, in light of the complexity of such projects, Miller and Hobbs (2005). Their assumption is that these would contrast with the traditional conception of governance as a static, binary, hierarchical process. Governance regimes for megaprojects are time-dependent and self-organising. Because the process is spread out over a long period of time, there is an opportunity to transform the governance structure as the project unfolds. Rather than thinking of the design of megaproject governance structures as a search for the one best structure, the design of such regimes can be thought of as a flexible strategic process that will draw on a variety of governance regimes to deal with different issues in different phases of the project life cycle. Some of these issues are predictable while others will be emergent. This opportunity is unique to large complex projects.

Flyvbjerg discusses ambitions, risk and effects in megaprojects based on large samples of projects, Flyvberg, Bruzelius, and Rothengatter, (2003). The authors conclude that the problem with such projects is mainly one of risk-negligence and lack of accountability on behalf of project promoters whose main ambition is to build projects for private gain, economical or political, not to operate projects for public benefit. Their suggested cure for what is termed the megaproject paradox is (1) that risk and accountability should be much more centrally placed in megaproject decision making than is currently the case, (2) that regulations should be in place to ensure that risk analysis and risk management is carried out, (3) that the role of government should be shifted from involvement in project promotion to keeping and arm's-length distance and restricting its involvement in the formulation and auditing of public interest objectives to be met by the megaproject, and (4) that four basic instruments be employed to ensure accountability in decision making: by (a) ensuring transparency, (b) specifying performance requirements, (c) making explicit rules regulating the construction and operations of the project, and finally (d) involving risk capital from private investors, the assumption being that their willingness to invest would be a sound test on the viability of the project up-front.

Norwegian front-end governance of investment projects

Year 2000 the Norwegian Ministry of Finance introduced a mandatory quality-at-entry regime and a research program to meet the challenges described above. The focus in the early stage of the Quality-at-entry regime was to reduce implementation cost. From 2005 onwards, the regime was expanded to include quality assurance of the early choice of concept. This is a vital step to make sure the right projects get started, and to dismiss unviable projects. Thus, it is vital to enforce changes in

existing processes early enough when there are still real options available. In parallel, the ministry initiated a research program designed to study the effects of the regime and focus on front-end management of major public projects. The research aims to improve the Quality-at-entry regime continuously.

The Norwegian governance system was designed to improve analysis and decision making in the front-end phase, and particularly the interaction between the two. It was based on the notion that the necessary binding rules for decision making already was in place; however, there were no binding rules that could ensure quality and consistency of analysis and decisions.[15] In an ideal technocratic model for decision making this would not be necessary. Here decision and analysis follow in a logical and chronological sequence that would eventually lead to the selection and go-ahead of the preferred project without unforeseen interventions or conflicts, as illustrated in Figure 3. In reality, the process may to a larger degree resemble an anarchic process affected by various stakeholders, which is complex, less structured and unpredictable. Analysis may be biased or inadequate. Decisions may be affected more by political priorities than by rational analysis. Political priorities may change over time. Alliances and pressures from individuals or groups of stakeholders may change over time. The amount of information is overwhelming and may be interpreted and used differently by different parties. The possibility for disinformation is considerable, etc.

A response to these challenges would obviously not be a strict and comprehensive regulatory regime. It would rather seem to be (1) to establish a distinct set of milestones and decision gates that would apply to investment projects in all sectors regardless of existing practices and procedures in the different ministries or agencies involved. (2) To ensure political control with fundamental go/no go decisions. (3) To ensure an adequate basis for decisions, and (4) to focus decisions on essential matters not on the details. What seemed to be the answer was (1) to anchor the most essential decisions in the Cabinet itself. (2) To introduce a system for quality assurance of the basis for decisions that was independent of government and sufficiently competent to overrule the analysts, and (3) to make sure that the governance regime was compatible with procedures and practices of the affected ministries and agencies.

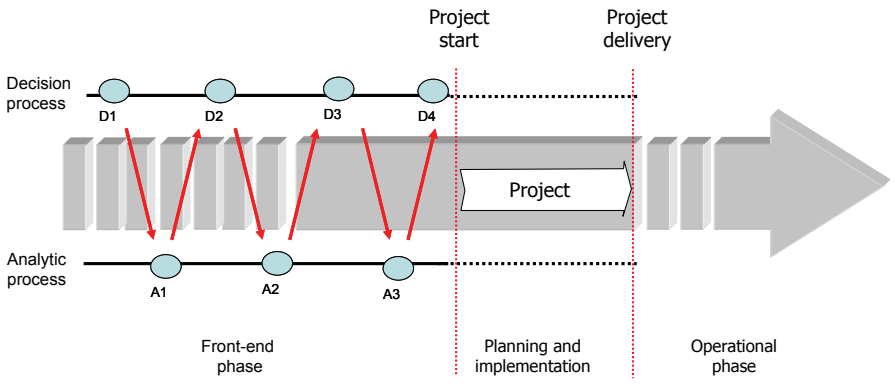

Figure 3 A model of technocratic decision making up-front in projects

[15] A parallel here would be the private financial institutions where investment projects are handled almost exclusively based on a review of the investors credibility and collateral available, and with little regards to substantial issues or characteristics of the investment project as such.

Under the Norwegian Quality-at-entry regime, pre-qualified external consultants are assigned to perform quality assurance of the decision basis in all public investment projects with a total budget exceeding 60 Million Euro. During the first four years, this applied to some 50 projects where cost estimates and decision documents were scrutinised prior to Parliamentary appropriation of funds. Based on the experience gained, the regime was expanded in 2005, to include two separate quality assurance exercises in sequence, that is to secure the decision basis for: (1) the choice of concept (QA1), and (2) the budget, management structure, contract strategy etc. for the chosen project alternative (QA2).

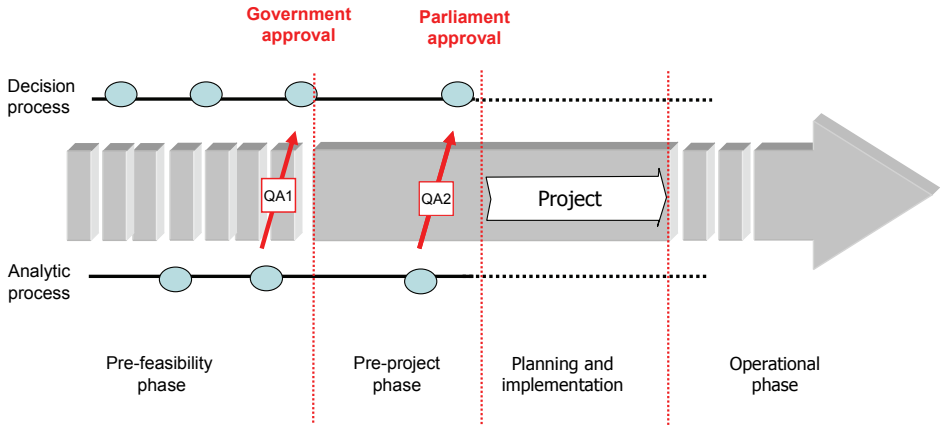

Figure 4 The Norwegian quality-at-entry regime for major public investment projects

QA1 should help ensure that the choice of concept is subject to a political process of fair and rational choice. Since the choice of concept is a political one, the consultants' role is restricted to reviewing the professional quality of underlying documents constituting the basis for decision. The decision is anchored in the Prime Minister's Office and will initiate a pre-project to analyse the feasibility of the chosen project. As decision basis the responsible ministries are now required to explore at least two alternative concepts in addition to the zero-alternative (doing nothing). They should prepare the following documents:

1. *Needs analysis* that would map all stakeholders and affected parties and asses the relevance of the anticipated investment in relation their needs and priorities
2. *Overall strategy* that should specify on this basis consistent, realistic and verifiable immediate and long term objectives
3. *Overall requirements* that need to be fulfilled, for instance functional, aesthetic, physical, operational and economic requirements
4. *Alternatives analysis* that defines the zero-option and at least two alternative concepts, specifying their operational objectives, essential uncertainties, and cost estimates. The alternatives should be subjected to a full socio-economic analysis.

QA2 is performed at the end of the pre-project phase, aimed to provide the responsible ministry with an independent review of decision documents before Parliamentary appropriation of funds. This is partly a final control to make sure that

the budget is realistic and reasonable, and partly a forward-looking exercise to identify managerial challenges ahead. The analysis should help substantiate the final decision regarding the funding of the project, and be useful during implementation as a reference for control. Focus is on the strategic management document, and the consultant will review its consistency with previous decisions when the concept was decided (QA1) as well as the implications for the project of possible changes that might have occurred afterwards, and the cost frame, including necessary contingency to make sure the budget is realistic.

Discussion

The quality-at-entry regime is essentially a top-down regulatory scheme that was introduced to enforce a qualitative change in government practice and improve quality at entry of major investments. During its first four years it did not interfere with current procedures, but merely aimed to improve on existing documents that are an essential basis in the political decision process. Experience is that although the regime has been controversial, it has also been met with essentially constructive responses from the ministries and agencies involved, which have adapted their practices to meet the new quality requirements, and in some cases also adopted the scheme as a self-regulatory procedure.

This is possibly due to three factors: (1) the regime does not interfere with existing procedures for analysis or political decision making, but merely aims to lift the standard for underlying documents. (2) It does not require altered procedures in the involved institutions. (3) The introduction of the scheme has been supported by establishing an arena for exchange of experience. This is in the sense of meetings at regular intervals headed by the Ministry of Finance, with representatives of ministries, agencies, consultants and researchers. This has facilitated openness and cooperation among the parties to discuss standards and practices and develop the scheme further.

The resistance against the scheme is first and foremost rooted in the fact that it challenges the conclusions and professional judgement of the involved agencies, but also that it has caused increased attention and media debate about cost estimates and budgetary compliance in public investment projects.

The extended quality-at-entry regime, however, that was introduced 2005, adds another dimension to the regulatory feature of the scheme, in that it anchors the decision regarding the choice of concept in the Prime Minister's Office. The reason for this is that the choice of concept is considered the single most important decision that will determine viability and utility of a project, and hence the extent to which public funds are being used effectively. Lifting the decision from the administrative to the political level provides a distance from narrow perspectives and professional biases. It also introduces authority that is expected to have a trickle-down effect on professional conduct at agency level. For these reasons, it is expected to be controversial. The response, however, seems to be rather coloured by an understanding that this is a sensible and logic step in the right direction, and in agreement with fundamental democratic principles.

One fundamental aspect of the governance regime is that at least three alternative concepts should be considered, and it should be done at an early stage when options

are still open. The alternatives should have the same degree of specification, to help making fair assessments of alternatives. This has triggered a debate regarding what should be considered a concept. Should it be restricted to a distinction between different technical solutions to the same problem, for instance bridge versus tunnel in an infrastructure project for crossing a fjord, or should it be related to the differences in the combined effects of different projects in the broadest sense. Whatever the answer, since the regime has put this on the public agenda it is expected to have a considerable effect on analysts, politicians and the public in the time to come. This, and the emphasis on socio-economic analysis, might prove significant in the aim to identify relevant alternative concepts and select the most viable project alternative.

In terms of tactical cost under-estimation up-front, the government agency is now required to come up with a realistic preliminary cost estimate at an early stage where alternative concepts are being considered. The fact that this estimate will be subjected to a second external review once the pre-study is completed is expected to have a disciplining effect on analysts and reduce large cost overrun as we have seen in the past.

Conclusion

In this paper we have discussed the necessity of governance regimes in securing the interests of the financing party in public investment projects – to improve overall decisions and the effect of public investments on the one hand – and increase autonomy and the performance of those responsible for planning and implementation on the other hand. This seems to require some regulatory measures. We have discussed by example one way to proceed, by introducing top-down regulatory measures, and anchor major decisions at the political, rather than the administrative level of government. By limiting interference in existing practices and procedures, this may be effective, and might even be adopted in terms of self-regulatory schemes, that could ultimately make central top-down interventions unnecessary. Openness and transparency seems to be essential in improving governance of public investments.

However, project governance has only recently become an issue in the project management community. In order to move forwards in this field there are numerous questions to be answered: Which are the current procedures applied in different countries and agencies - and what are their effects? What would it take to develop more effective governance regimes at international, government or corporate level to ensure maximum utility and return on investment for society and investors? What would be the optimal mix of regulations, economic means and information in improved governance regimes for major investment projects? Etc. What seems to be an issue for the project management community is to lift their perspective beyond the delivery of the project itself and onto the broader issues of the project's utility and effects. An increased understanding and sensitivity in this area could be of mutual benefit to both the financing and the implementing parties.

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Paper 5

An Empirical Illustration of Public Project Ownership

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Abstract

This paper studies different aspects of project ownership in public projects. First, project ownership and project governance are discussed. We find that literature on project management tends to assume that one organisation has the characteristics of an owner. A review of seven public projects, shows that the characteristics of project ownership are spread between several different organisations. Based on these results, we challenge the stereotype of a single project owner. In an attempt to contribute to a more nuanced understanding of project ownership, the paper introduces a framework for description and analysis of project owner roles on strategic and tactical levels. The descriptive model for project ownership offers an improved definition of the owner role, by defining the most important owner functions on both strategic and tactical levels. We also point out the interfaces with other project roles. We have tested the framework on public and private sector cases and conclude that the model can be applied on both types of projects. The model appears transferable to other countries and government models than the Norwegian one alone, even though some adaptations may be necessary. Some potential further developments are suggested.

Keywords: *governance; projects; public investments; public projects; project organization; owner; ownership; Norway.*

Biographical notes:
Ole Jonny Klakegg has an MSc from the Norwegian University of Science and Technology. His current position is Research Director of the Concept Research Programme. This article reports part of ongoing research in this programme into governance of projects and ownership in major public investment projects. Klakegg has 9 years of experience in private sector as a consultant, and 10 years in teaching and research in the field of project management.

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Paper 6

Complex Projects: Evaluation Criteria for Front End Governance

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June 2008

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Printed version is without references.

Abstract

There is international agreement that there is need to develop improved methodologies for documentation and evaluation of project concepts in order to bring the typical problems of large, complex projects under control. The Norwegian Ministry of Finance has recently introduced a Quality Assurance regime that applies an intervention logic that complies with, for instance, the principles of Logical Framework Approach (LFA) and integrated evaluation criteria recommended by OECD for international development projects. This article describes how these frameworks have been useful in improving Front-end Governance.

Keywords: Complex projects; Governance of projects; Governance frameworks; Governance mechanisms; Evaluation criteria; Front-end planning; Public projects; Logical framework approach

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Paper 7

Governance frameworks for public project development and estimation

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Project Management Journal, Vol. 39, Supplement, S27-S42. March 2008.

Abstract

This paper investigates how the interface between governance and project management worlds for public projects. It describes governance frameworks, analyzes embedded governance principles, and discusses the consequences. Based on an initial literature study giving theoretical underpinning, a characterization of frameworks is developed and used to investigate three public-investment-project governance frameworks in Norway and the United Kingdom. This gives a systematic comparison of framework scope, structure, and embedded principiples, and shows the differences between the frameworks and elements, despite the stated purposes being the same: increasing value for money and better use of public spending. The analysis shows the frameworks have to be politically and administratively well anchored. A case study particularly looking into cost and time illustrates how the framework influences the project through scrutiny. The analysis shows the governance frameworks are important in securing transparency and control and clarifies the role of sponsor. This work will be useful in establishing frameworks in other contexts and should be helpful in working with governance of major public projects.

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Paper 8

An investigation of governance frameworks for public projects in Norway and the UK

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This paper describes four case studies which formed a key part of an investigation into public investment project governance frameworks in Norway and the UK. The studies looked at how the embedded governance principles worked out in practice , how they affected PM, and how consistent their effects were with their aims. Conclusion are made about the actual effects of the frameworks,and various areas for improvement or further study are highlighted.

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Paper 9

Framework Redesign: An Industrial Ecology Perspective on the Norwegian Quality-at-entry Regime

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Unpublished essay
Originally written in 2005, updated May 2008

Abstract
Government investment projects are often delivered too late, too costly and do not meet the quality standards they should. Even worse, they do not give the effect they were supposed to. Such waste of public resources is not acceptable. This article discusses improving the performance in government decision making on investment projects. The Norwegian government has developed a Quality-at-Entry regime to improve the quality of major public investment projects. This regime is described and discussed in the light of industrial ecology and systems engineering. The purpose is to identify potential improvements to the established regime. Applying an industrial ecology perspective has the potential to improve the planning and performance of government operations, including local, regional, and national levels of infrastructure. A substantial number of possible improvements were found and are presented in the concluding section. These findings are potentially important to the Quality-at-Entry regime and the work to improve decision making in major public investment projects.

Keywords: decision making, front-end management, governance principles, major public investments, quality assurance, public projects, Quality-at-Entry, systems engineering

The need and potential for improvement in public investment projects

All governments have the same basic need to make the most of their resources. Resources are limited and there is an infinite amount of good purposes. Hence governments need to use the right amount of resources (money and other limited resources) to do the right thing at the right time – and be able to repeat this every time. Since governments perform more and more of their activities and initiatives as projects, their success is closely linked to the ability to execute successful projects. In the project perspective, Cooke-Davies (2004) summarized this in three levels of project success: '*Doing projects right, doing the right projects, and doing the right projects right, time after time.*' The perspective chosen in this paper focusses more on systematically on being able to choose the right projects, than on executing them well. A government's success may be achievable when the decision makers are able to make the right

decisions. There is no way that a wrong decision can be corrected or compensated for by excellent execution (Miller and Lessard, 2000; Dinsmore and Ribeiro, 2007). The professional planner's job is to make sure there is a basis for decision making that properly highlights the right needs, shows the relevant alternatives and includes a realistic assessment of the effects and consequences of the given government investment. Given this, the decision makers will potentially be able to make the right decision. This is a simple statement, and yet a very difficult task.

The need for right decisions calls for better ways of assessing the needs, defining good investment alternatives and choosing the right one. To choose the right one, it is vital to understand the effects and perform systematic analysis of the consequences of the project. In this paper, the definition of success is simply being able to make the right decisions about public investment projects. Increasing the probability of success will come when we are better able to deal with the problems of decision making and management addressed in previous investigations (Miller and Lessard, 2000; Flyvbjerg et al., 2003; Altschuler and Luberoff, 2003; Klakegg, 2004; Næss, 2004; OGC, 2005). The documented problems include, for example, hidden agendas, tactics among planners and local government, poor or incomplete planning and analysis, inconsistency or wrong assumptions in prognosis, analysis, estimates, and planning, and lack of good planning data. Projects have a tendency to grow larger over time, and substantial cost increase is usual.

A variety of possible actions can influence the decision making process and thereby increase the probability of success in public investment projects. Different countries have chosen different ways to improve their decision making processes respectively, and the following are some examples:

- Italy has chosen to perform internal improvement processes in government agencies based on business process re-engineering methodology to improve their project performance (Arnaboldi et al., 2004).
- The United Kingdom (parallels are found in the USA, Canada, Australia, and New Zealand) has developed an improved set of government procedures, introduced systematic performance measurement (Key Performance Indicators) and given a specific government agency responsibility to follow up the use of these methods in other government agencies and their suppliers. See the web pages of the Office of Government Commerce (OGC, 2008) for an example.
- Australia has given the Auditor-General an instrumental role in evaluating project performance repeatedly after the implementation period (Concept, 2003).
- France has introduced a pre-specified total project model with detailed instructions which have to be followed every step of the way (Concept, 2003).
- Norway has introduced a Quality-at-Entry regime (Berg et al., 1999; Magnussen and Samset, 2005), and a research programme to support it (Concept, 2008).

One would expect the reason for choosing one way or the other to be as different as the situation in each country. That is not the issue here. Only the Norwegian choice will be discussed and analysed in this paper. In Norway, the Ministry of Finance introduced a Quality-at-Entry regime in the year 2000 to increase the probability of success in major public investment projects. The regime forms the core part of a governance framework for all major investment projects financed by the Norwegian State. Based on the experience from the first years, the Ministry extended the governance framework in 2005 into the version briefly explained later in this paper. The Ministry of Finance originally developed the

Quality-at-Entry regime based on economy, decision making theories and experience from engineering. The core of the present paper is a discussion concerning further development of this specific framework. The ideas behind this approach can be with reference to the following: the best way to learn a system is to design it (Churchman, 1971), and system design is a useful tool in social development (Gaharajedaghi and Ackoff, 1986).

Industrial ecology – and the methodology in this study

This article will look into the Norwegian Quality-at-Entry (QAE) regime to investigate whether there is potential for improvement, looking at it from an industrial ecology (IE) and systems engineering (SE) perspective. IE looks at industrial systems (Lowe et al., undated, cited in Fet, 2005). Using this perspective in relation to public systems seems to be an interesting and useful expansion of its application, at the same time as giving new inputs to development within the public sector. This is one of the fundamental assumptions in this paper. Another fundamental assumption is that the use of systems engineering as an analytical tool will be useful. SE includes generic methods for developing all kinds of systems. As pointed out by Dahl (2001), it is also suitable for improving existing systems. Using elements of systems engineering seems to be a very natural step in the further development of the regime. One could argue that this would be a natural way to develop the system of public decision making in the first place.

The method used follows this process:

1. Describing the multidisciplinary problem of public decision making
2. Describing the QAE regime as it is, focussing on the Quality Assurance scheme
3. Describing it again, from an IE perspective (direct comparison)
4. Systematically reconstructing the QAE regime using methods of systems engineering (in particular the 'six-step model')
5. Sum up and conclude possible improvements.

Industrial ecology (IE) has emerged during recent years as a new area of research and analytical work. At Kungliga Tekniska Högskolan (KTH) in Sweden, IE is described as 'science for a sustainable development', pointing out that IE helps companies, communities and governments to become more competitive and at the same time improve environmental performance and protect and develop their business base. KTH specifically points out that IE '*helps government agencies design policies and regulations that improve environmental protection while building business competitiveness*' and further, '*Application of IE will improve the planning and performance of government operations, including local, regional, and national levels of infrastructure*' (KTH, 2008). Core methods in IE are system engineering and system analysis, environmental accounting, risk management, and evaluation methods. This description indicates a potentially close relationship between the governance frameworks studied here and IE.

Industrial ecology relates to economy and more specifically to ecological economy. Kronenberg refers to Proops (1989, p. 60), who states that '*ecological economics studies how ecosystems and economic activity interrelate*'. These interrelations are found on a primary level (biology, physics, ecology, biology, etc.), secondary level (economy) and tertiary level (systems thinking) (Kronenberg, 2006, p. 96). Kronenberg further points out that an interdisciplinary approach is a prerequisite in ecological economics, searching for a common language, so that specialists from different disciplines can cooperate. His conclusion is

(Kronenberg, 2006, p. 109) that industrial ecology and ecological economics share most of their basic assumptions (paradigms, pre-analytic visions or mental models). The two areas of economics share the same tools, but do not always have the same views on how to reach strategic goals. Together, they form a consistent body of knowledge, and can provide a theoretical background for policies that refer to the rather vaguely understood concepts of sustainable development and the sub-concepts of sustainable production and consumption. Ecological economy is a wider concept and includes industrial ecology.

A quotation from one book on industrial ecology (Graedel and Allenby, 1995) shows another side of IE:

> *Robert Sievers of the University of Colorado points out that governments have many critical short-term issues demanding their attention: achieving economic stability, feeding growing populations, establishing politically viable nations, making the transition from centrally controlled to free market economies, and so forth. The activities of many governments may thus be rather insular for the foreseeable future. At the same time, corporations are increasingly multinational, have longer time horizons, and depend for their survival and prosperity on relatively stable global business conditions and on responding to the desires and concerns of many different cultures and populations. Private firms, not governments, choose, develop, implement, and understand technology. Hence, responsible corporations may turn out to be among the global leaders in the transition between nonsustainable and sustainable development, but they will need the help of governments and nongovernmental organizations in establishing broad, insightful approaches and frameworks to the complex interactions that are involved.*

In the above quotation, Sievers points to the government responsibility to develop frameworks that are able to stimulate sustainable development. The Norwegian QAE-regime described in this article may be seen as an element in such a framework for public investment projects.

A workshop titled *Linking Industrial Ecology to Public Policy* was held at the White House Conference Center in Washington DC, on 30 April 1998, and sponsored by the National Science Foundation. It gathered representatives from central and local government, private companies and academia. The goal of this workshop was to establish a dialogue between the industrial ecology research community and environmental policy makers. The workshop included sessions on achievements, emerging issues, and new goals for industrial ecology (Andrews, 1998). The workshop reached the following conclusions: '*Future efforts (for researchers) should also address the perspectives of decision-makers at several temporal and geographical scales. ... At all levels of policy-making, procurement policies, tax code changes, and infrastructure investments can benefit from industrial ecology insights*.' The present article relates directly to the last conclusion mentioned, and which represents a way to benefit from IE insight to an area developed from other disciplines.

The multidisciplinary challenge

The decision making problem concerning public investments is extremely multidisciplinary; examples include roads, railways, public buildings, software systems, and defence material. As shown in Figure 1, all aspects have to be considered, and the decision making includes lots of trade-offs between political, social, economical, technical, and ecological issues. There is no one-and-only answer as to how to do this. Many researchers have given good advice on how to perform adequate decision methods and many tools are available to help this decision

process; examples include Arrow (1951), Tversky and Kahneman (1974), Edwards and Newman (1982), Keeney (1996), Santos et al. (2002), and Mitchell et al. (2004). Still, as experience tells us, there is a long way to go before early decisions about public investment projects will always turn out right.

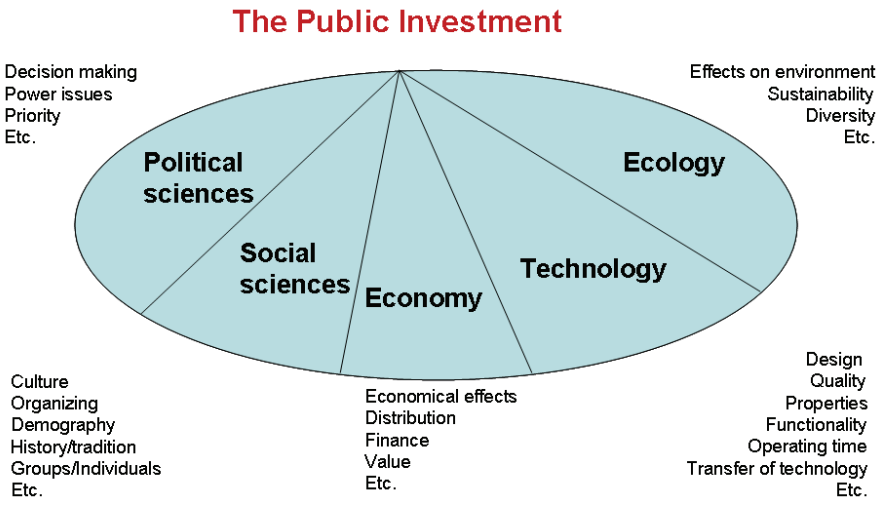

Figure 1 The multidisciplinary challenge of public decision making.

The multidisciplinary challenge can be exemplified by taking the hypothetical case of making a decision about whether or not to build a new road between towns A and B. Assume there is a well-documented needs assessment identifying and specifying the stakeholders and their real needs. Among these stakeholders there are industry and also travellers wanting to reduce their travelling time. There are also investors seeking new possible building areas for dwellings, the public is using the woodlands between the two cities for recreational activities, and environmentalists are pointing out the need to preserve diversity (there is, among other things, a location in the area with a rare species of salamanders) and to reduce emissions. There is also the road authorities' transport policy defining increased security in road traffic as a main issue, at the same time as they have strict instructions as to fulfil political goals concerning economy and the environment.

Future demography, prognosis of living and travel patterns, the amount of traffic in the future road system, the impact on the environment, economy, etc., are analysed and documented for several alternative technical solutions. Making good assessments and prognosis for all these complex issues is a great challenge due to many aspects of uncertainty. In this field, planners and project professionals need to implement IE methods such as Environmental Impact Analysis (EIA). In our case, let us assume that planners have done all this, and done it well. This is when the real challenges start. So far, experts in each of the disciplines mentioned perform most of the analysis one-by-one. Now it becomes more of a multidisciplinary process. Some aspects will be clearly quantifiable, while others will be of a qualitative nature. How can we reach an overall conclusion to the question as to whether or not to build the road? We need to assess the problem from all these perspectives simultaneously. Further, there is the question of knowledge (i.e. the expert's ability to see through the complexity of the problem) and communication (i.e. methods used to analyse and communicate the results and the ability to spread this knowledge).

Then, there is the question of how to make the decision. This is defined by the political system. Rules and regulations tell how, who, what, and when public and other stakeholders can influence the decision (and decision makers), who is making the final decision in the end, and how power is divided between the involved parties. This is an important part of the decision making system. A more direct question concerns priority. Which are the most important issues? What are the ultimate goals for the investment project? How much weight should be put on environment, how much on economy, and how much on the effect on social development? These are questions of politics, and the answers are dependant on how the power is divided between different parties and values of individuals among the decision makers. Thus, decision makers do not have an easy task, and hopefully professional planners and experts are available and able to help.

There are many possible cross-disciplinary approaches to such multidisciplinary decisions and management issues, and Figure 2 shows some important alternative approaches. The existing Quality-at-Entry regime is based on quality management, project management and applied economics. The investigation in this study includes using the perspective of industrial ecology and systems engineering to redesign the decision making system and the Quality-at-Entry regime.

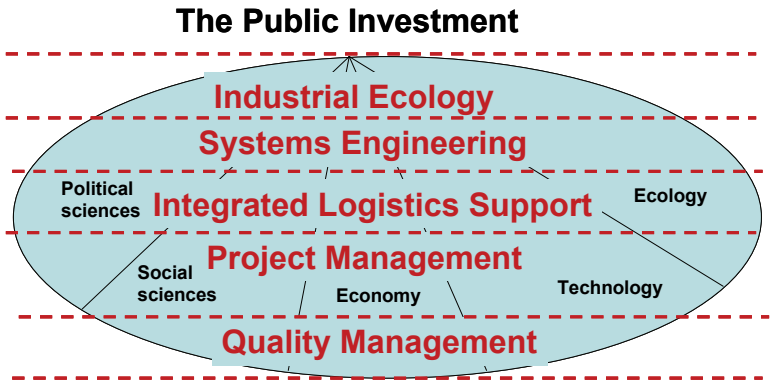

Figure 2 Some important multidisciplinary approaches to decision making and management.

Professionals and researchers have developed different approaches to handle different aspects of management issues in a best possible way, taking into account the complexity and multidisciplinary nature: examples include the following:

- Systems engineering (SE) to improve control and management of complex technical (and social) systems
- Industrial ecology (IE) to improve the environmental performance of technical and social systems
- Applied economics (AE) to improve the economic performance of technical and social systems
- Project management (PM) to improve performance in the execution of investments and other projects
- Integrated logistics support (ILS) to improve flow of materials and goods
- Quality management (TQM) to improve the quality of goods and services from industry to customer.

Other approaches could be included in the list, but these are not required here. As illustrated in Figure 2, the approaches all have aspects of the basic disciplines within them, but in different amounts and with different angles. There are several connections between these approaches or disciplines. For instance, the conclusions from applied economics and logistical decisions should be consistent with the constraints suggested by industrial ecology. During the following discussion, more connections involving several other disciplines will become evident.

Supporters of these different approaches tend to describe their preferred approach as the one that solves every question. They inherently indicate the ability to grasp every side of a decision problem. From my point of view as a researcher, the approaches all have their strong sides, but it would not be difficult to find weaker sides to each of them either. They supplement each other, but none of them is perfect. There is no 'one size fits all' solution here. One interesting observation is that each of them includes elements that represent the other perspectives. For example, if one takes quality assurance for example, this is the main issue in quality management of course, but it is also an element of all of the other approaches (at least, implicitly).

Returning to the case example, regardless of which multidisciplinary approaches are used to analyse the project and support the decision, it will be a decisive moment when the decision makers reach their decision to proceed with one alternative over the others. In reality, making the wrong decision destroys the probability for the project to succeed. The hope for success will only be kept alive by making the right decision. The right decision will mean choosing a relevant alternative that is possible to execute efficiently and that delivers a sustainable effect. Often none of the alternatives is perfect, and several alternatives may be close to equivalent. Later stages of development include more focus on execution and thus increasing importance of disciplines such as management and law. As pointed out above, no matter how well executed, there is no way to compensate for a wrong decision in the early phases.

The Norwegian Quality-at-Entry regime

The Norwegian Ministry of Finance established the Quality assurance scheme in the year 2000 and extended it in 2005. This Quality-at-Entry regime has three basic elements:

1. The quality assurance scheme (QA scheme) (see description below)
2. The arenas for exchange of experience (meetings where government, consultants and researchers discuss the implications of the QA scheme and the ongoing research)
3. The Concept Research Programme (an independent research initiative following the QA scheme).

All of these elements are important, but this analysis focusses on the QA scheme. The Ministry of Finance established the QA scheme as a control instrument to make sure the bases for decisions are up to professional standards. The exchange arenas are the forum for discussion about principles, implementation and improvements between the involved parties. The research programme gathers data from each project, extracts new knowledge and feeds it back to the system and the parties involved. The discussion returns to the exchange arenas and research programme briefly in steps 5 and 6 of the analysis.

External consultants under a framework contract with the Ministry of Finance perform quality assurance on large public investment projects (larger than NOK 500 million/EUR 60 million). The goal is to ensure improved Quality-at-Entry in large public projects. The Norwegian Parliament expects public projects to be more successful because of this. The outcome is expected to be reduced cost for the state and better use of public funds.

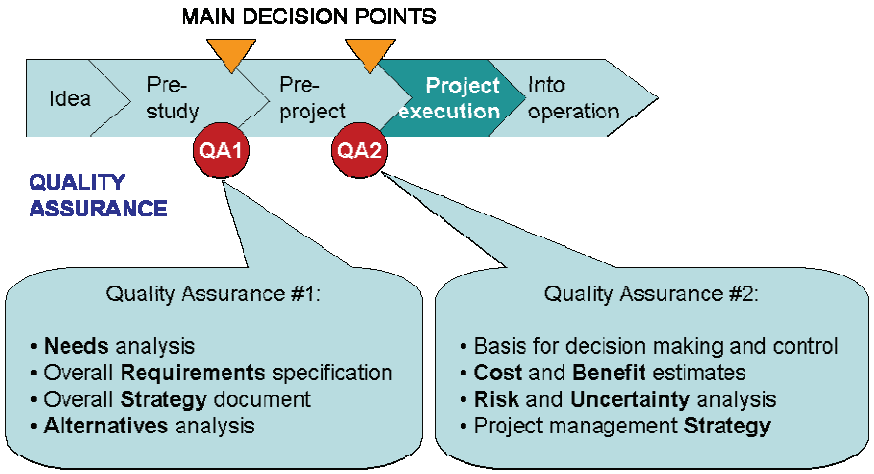

Figure 3 The Norwegian Quality Assurance scheme and the main decisions. Overview of documents evaluated during QA.

During the first period (2000–2004), central government allowed 60 projects to undergo quality assurance (QA2). In 2004, the Ministry of Finance announced a second invitation for tenders, and signed new contracts in June 2005. The new working period was through 2006, with options to prolong by 2 x 2 years. In this second period, the QA scheme included the following separate analyses:

- Quality assurance of the choice of concept (QA1)
- Quality assurance of the basis for control and management, including cost estimates and uncertainty analysis for the chosen project alternative (QA2)

The purpose of QA1 is to assist the Ministry in making sure that the choice of concept is subjected to a political process of fair and rational choice. Ultimately, of course, the choice of concept is a political process, in which the consultant has no role. The consultant's role is restricted to supporting the Ministry's need to control the professional quality of underlying documents constituting the basis for decision.

Consultants perform QA1 by the end of the pre-study phase, before central government (the Cabinet) takes the decision to start planning the project. The decision involves consideration of two main questions: Is the project worth planning? If not – stop it. If it is worth planning, which alternative concept should be chosen as basis for planning? To avoid wasting time and resources it is necessary to base the choice on thorough analysis. This decision is critical to ensure that the government uses public funds in an efficient way. QA1 includes quality assurance of the following documents (Ministry of Finance, 2004):

- A needs analysis
- An overall strategy document
- An overall requirements specification
- An analysis of alternatives

The second gateway that the project has to pass in order to be approved for execution is QA2. Consultants perform QA2 at the end of the pre-project phase, before Parliament decides whether to approve and finance the project. At this point only the chosen concept is analysed and the focus is on cost estimates, cost risk analysis, and the basis for managing the project through execution.

The Quality-at-Entry regime compared with characteristics of industrial ecology

Evidence of the fundament of industrial ecology is found in the two words constituting its name: industry (industrial systems) and ecology (nature systems). Industrial systems are composed by combining technical, economical and sociological knowledge in the development and production of services and products for consumers. Ecology includes respecting the limitations of nature with respect to depletion of nature resources and degradation of the environment. According to IE, industry should develop efficient operations and responsible environmental actions. Today, this is more or less common sense, a widespread understanding based on practical evidence and science. Many other cross-disciplinary approaches share the goals to avoid wasting resources and destroying nature. This is the case also for quality management and project management, and hence for the QAE regime. Ehrenfeld (1998) has asked the question whether IE represents a paradigm shift or a branch of normal science, and finds the answer is both. It could be argued that this is a new way of applying normal science and that the main idea is to obtain and maintain a balance between competition and cooperation, just as in nature systems. This makes IE an interesting reference for evaluating the QAE regime. The basis of sustainable development (see Figure 4) is one of the most important political issues of today. No one would challenge the basic notion of sustainable development. However, extensive discussions are ongoing as to how to follow it up in practical terms. This question will not be discussed here, though some issues will be highlighted further.

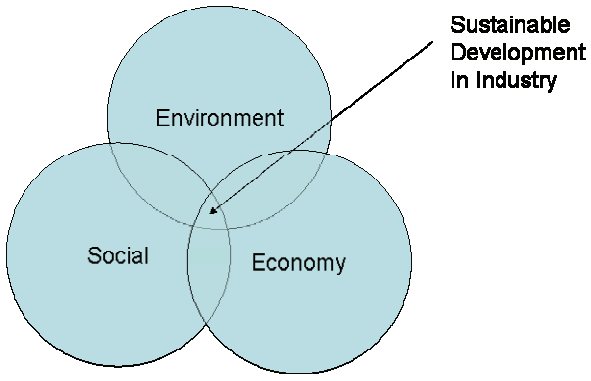

Figure 4 Basic model of sustainable development in industry.

The characteristics of the industrial ecology perspective are briefly as follows.

The environment:

- Sustainable development

- Respect the limitations of nature
- Technological scepticism – precautionary principle
- Expand from local to global scale
- Complete life cycle (cradle to cradle)

The social dimension:

- Industry responsibility for taking holistic considerations
- Obligation to help solve society's problems
- Ethic responsibility
- Participatory/communitarian

Economical dimension:

- Efficient processes
- Balance multiplicity of interests.

IE emphasizes Corporate Social Responsibility (CSR). One could say that the Industrial ecology perspective has reintroduced industry's responsibility to function constructively within society, as opposed to the 'egoistic' strive for increased profits. According to Midttun et al. (2006), this may be a sign of the corporate economy re-embedding in a wider societal context following a neo-liberal market exposure, deregulation, and separation of commercial and social concerns. The characteristics of IE are listed and compared directly to the Norwegian QAE regime in Table 1.

Comparison between IE and QAE shows many parallels but also some differences. The conclusions resulting from the comparison between the Norwegian Quality-at-Entry regime and the characteristics of industrial ecology from Table 1 are briefly as follows:

- The basis and many of the important goals of the two approaches are closely related. Therefore many elements are found in both (although details are not included in this article)
- The QAE regime should learn from IE and more explicitly address the issues of:
    - Respect for the nature's limitations and the precautionary principle
    - Complete cradle-to-grave life cycle
    - Ethical responsibility.

Table 1 Comparison between the characteristics of Industrial ecology (IE) and the Quality-at-Entry regime.

IE characteristic	QAE regime	Comments
Sustainable development	Implicit	The goals of society are a prerequisite for the QAE regime. As an explicit part of Norwegian politics, sustainability will also be an important part of the basis for the QAE regime; however, this is not clearly stated. The reason could be that the regime should not become political on its own terms, as this would obscure the roles. The QAE regime could be said to be taking a stand in a question that the politicians and decision makers should answer.
Respect the limitations of nature	Implicit	This element of IE is not explicitly stated in the QAE regime either. I believe the respect for nature's limitations should be non-controversial. It is a methodological element because it represents a concrete requirement as to the competence, methods and tools used. Respect for the limitations of nature should be explicitly stated in the QAE regime.
Technological scepticism – precautionary principle	Unclear	As an element of sustainable development, it could be argued that this principle is implicit in the QAE regime. However, the QAE regime does not seem to have 'technological scepticism' as part of its basis. On the contrary, it seems to build on a strong belief in the ability to develop sustainable technological and economical solutions based on established science.
Expand from local to global scale	Implicit	The global concerns are usually stated in international agreements and standards. The goals are prerequisite as part of Norwegian politics. This is implicit in the basis of the QAE regime, but would probably be controversial as an explicit statement. It could be appropriate to include the global scale as a methodological element or reference for performance requirements.
Complete life cycle (cradle to cradle)	Weak	The traditional project life cycle ends with the result being handed over to operations. Such a life cycle is still explicitly present in the QAE regime, even though several life cycle assessment tools have been introduced in the project toolbox. The traditional project phases should be replaced by the complete life cycle of the industrial ecology.
Industry responsibility to take holistic considerations	Evident	In the QAE regime, the object is not limited to industry but includes the whole society. In practical terms, we consider the planners and professionals designing the concepts that we ask politicians and decision makers to choose from. Taking holistic considerations into account is the core of their task. The QA scheme is developed to control and improve this.
Obligation to help solve society problems	Evident	This point is even more obvious than the previous one.
Ethical responsibility	Implicit	The QAE regime itself does not include any explicit statements of ethical responsibility. This element is a part of the rules and regulations which the regime is controlling against. Examples can be found in the public tendering processes and the quest for transparency in all levels of government. The regime should help to achieve this. This could have been clearer in the description of the regime.
Participatory/communitarian	Explicit	These principles are well anchored in Norwegian law and regulations as part of the decision making process. They are also an explicit part of the working principles established within the QA scheme.
Efficient processes	Explicit	The QA consultant is required to give advice on how to achieve efficient processes, as well as productivity and high quality results.
Balance multiplicity of interests	Explicit	The QA consultant is required to give advice on how to balance the multiplicity of interests. Several reports of the Concept research programme discuss methods and techniques for this. Examples are found in Næss (2004), Olsson (2004) and Klakegg (2004).

Reconstructing the Quality-at-Entry regime

System analysis is an essential part of IE methodology. In this case, the system consists of several interacting subsystems: one political and several administrative subsystems (one for each sector) with different roles and levels. One tool to introduce clear structure into the discussion is the 'Six-step model', introduced in systems engineering by Annik Magerholm Fet in her doctoral thesis (Fet, 1997)[19] (see Figure 5). In the following, a hypothetical development process using the Six-step model is developed. I will use this process to question the basics of the established regime in order to find weak points and suggest improvements. In this way, the Six-step model becomes a tool for system reengineering or redesign. The documentation of the actual reconstruction is shown in a series of tables according to each step in the Six-step model in the Appendix.

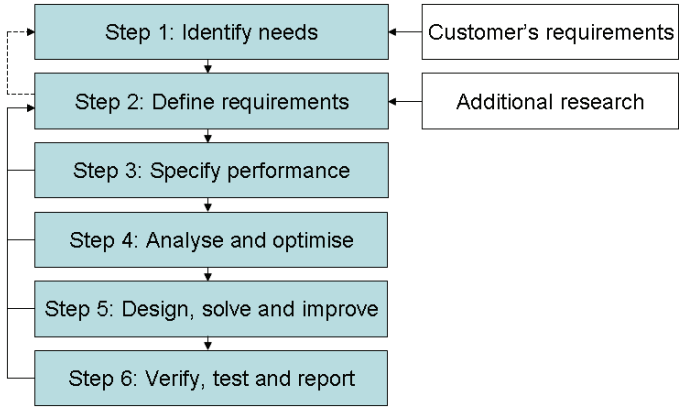

Figure 5 The Six-step model (Fet, 1997).

Step 1: Identify needs

The Quality-at-Entry regime is based on an initial analysis and report delivered by a committee appointed by the Norwegian Ministry of Finance (Berg et al., 1999). The committee concluded there was a need for improvement in major public projects. The findings in their report are similar to the introduction in this article, but with more details. The committee analysed 19 chosen cases from a spectre of important sectors in Norway. The deliberately chosen cases represented both good and bad examples in terms of performance. This was the original needs assessment behind the QAE regime. Later, the Concept research programme analysed and reported several needs for improvement, based on research into best practice and real life performance of actual projects in Norway over the previous eight years, following the Quality Assurance (QA) scheme. Findings from these sources, combined with experience over the working period of the QA scheme, give a picture of the needs of the most important stakeholders, as shown in the Appendix, Table A1.[20]

Tables A1a and A1b show some of the characteristic differences and similarities between the political and the administrative subsystem. An important underlying assumption is that there

[19] Other alternatives, considered but not chosen for the present study, are the soft systems methodology (Checkland, 1981) and the systems engineering concept map (Ring, 2002). These would have supplied different structures and elements to the discussion.

[20] The needs identified for the administrative subsystem in this paper are based on research performed in Norway and other countries. Some of the findings are published and some are not. The research was originally performed at a much more detailed level than represented here. As a consequence, none of the sources refers to the same words used in the Appendix, Table A1. Many of the sources are cited earlier in this article.

is a genuine common desire to make the best out of the society's resources and that the goal is not to secure the well-being of only individuals or small groups. Without this assumption, the needs could appear very different.

Politicians want to stay in power to achieve their short-term and long-term goals of shaping their desired future. Hence, they make decisions based on more than facts alone. Values are important in prioritizing and in trade-offs between different alternatives. The decisions are a result of tug of war between different parties and coalitions concerning priorities. In addition, the short-term consideration of the probability for success in forthcoming elections leads politicians to make popular decisions to attract voters for their party. Political representatives on all levels in a democratic society clearly have re-election on their agenda. This is not mentioned in Table A1a, because it is a characteristic of individuals and political parties, not of their role as decision makers. This is, of course, important to understand as a part of the system. It partly explains why some decisions differ from the rational choice pointed out by experts. Some call this a 'hidden agenda', but it is so obvious that it is not really hidden at all.

The aforementioned are some of the features that make the political subsystem very interesting, but highly frustrating for the 'rational' expert. The political subsystem produces politically possible decisions, not necessarily rational ones. This informs about the shortcomings in any rational decision making system. The political subsystem is not studied further in this paper. With regard to the QAE regime, this research suggests an increased awareness and knowledge about the political processes among individuals and parties involved in the QA scheme and the research programme.

In real life, this kind of stakeholder needs assessment should never be constructed by one person alone. Obviously, the quality and credibility would be much higher coming from a participative process including the parties involved. The needs analysis shown in Table A1 could easily and usefully be expanded to include more stakeholders and needs at a more detailed level. For the purpose of this paper, however, it is sufficient to draw this possibility as an example. Many of the chosen instruments within the Quality-at-Entry regime are directed towards the needs mentioned in Table A1.

Similar methods, stakeholder analysis, etc., are important tools for increasing the quality in projects. Performing some kind of stakeholder analysis and needs assessment should be obligatory in every major investment project. Most government agencies do include this as one of their quality assurance means and document this as being part of the early phase planning. Still, this does not apply to all, although stressed through QA1. Thus, there is a potential for improvement in this field. Researchers should develop and make available improved methods and tools for this purpose, and agencies have to make sure they utilize them to their full potential. The flexibility to be able to adjust to the right level of detail will then become important.

A methodological critique seems appropriate at this point: systems engineering demands some kind of metrics to make measurement possible. In the present study, measurement is deliberately omitted at this step of the development process, as measurement in the SE meaning of the term would be controversial at the political level of the system. Measurement used in the political subsystem means polling, counting votes and support in favour or against. At this step, the needs approach is used to identify and show the connection between the political and administrative subsystems. This is evident from careful comparison of

Tables A1a and A1b. The further discussion goes only into the administrative subsystem, and in the following, metrics are introduced for measurement.

Step 2 Define requirements
The established management system of all government agencies includes many defined requirements. These requirements cover all kinds of aspects, such as technical requirements for new installations and constructions, requirements for communication, documentation and management, and requirements for environmental and economic performance. There is no coordination across sectors concerning these performance requirements. Therefore, they may point in many different directions within one government. Is this a problem? Lack of coordination is not a problem unless there is a real need for it. The subsystems of each sector deal with very different issues and their investment projects are also quite different. This calls for different requirements. Since all sectors provide some kind of infrastructure and are subject to the same overall demand to use society's resources in a best possible way, they should need coordination at this level. At this level, the research does not go into detail about technical, economical, environmental, or other requirements. The overall requirements for a quality system based on the needs listed in Tables A1a and A1b are shown in Table A2.

The QA scheme includes several requirements with respect to the performance of quality control. The Ministry of Finance has specified these requirements in the framework contract for the external consultants. These requirements include what documents have to be controlled, what kinds of analysis they should perform and what the consultant should give advice on, how and when to document it, etc. The common documents from the arena of exchange of experience include requirements that are more basic: the use of terms and definitions, what should be included in specific documents, etc. These requirements form a definition of the professional standard to which the projects should be benchmarked. They also give instructions for researchers participating in quality assurance (requirements for information handling, etc.). The Concept research programme publishes such requirements on its website (Concept, 2008) – the documents are in Norwegian.

In this study, the system for improving performance in public investment projects is studied, not the decision making process itself. The QAE regime does not introduce quality assurance to the decisions in the political subsystem. Quality assurance is a matter for the administrative subsystem, but has to take into consideration the needs of the political subsystem and society as a whole. Table A2 includes requirements on different levels, which respond to the needs identified in Tables A1a and A1b. To ensure perfection, it could be good to start by introducing consistent levels.

So far, the requirements in Table A2 are only developed into qualitative statements. Measurement is possible by introducing metrics for each indicator. The literature gives a lot of examples and inspiration as to how this can be done; examples include works by Rodman and Lenssen (1995), Wernick and Ausubel (1997), Azapagic and Perdan (2000), IWW (2000), UNDP (2004), Winnes (2005), and Lowe et al. (undated). Measuring performance is one way to enhance performance. I have chosen not to focus on this side of the systems engineering methods in this article, but utilization of this consciousness is one way to improve the QAE regime.

Requirements for quality systems and quality control measures should be as follows (Klakegg, 2006):

- Cost-effective – represent value for money
- Boosting transparency – in order to reduce the possibility to use tactics, hidden agendas and corruption
- Based on facts – not on power distribution, loose assumptions or beliefs
- Open – able to include knowledge from all basic sciences such as politics, social, economics, technology, and ecology
- Holistic – perceiving the whole situation with all its aspects and the whole life cycle
- Realistic – acceptable and coherent with previous decisions
- Systematic – include defined methods and tools improving performance without systematic faults
- Driving improvement – stimulating to continuously look for better processes and solutions.

All of these requirements underpin the control aspect. They help assure the quality of the basis for decision-making and management of the investment projects. Securing this quality will in turn improve the probability of success in public investment projects.

Step 3: Specify performances
The scope of this paper does not allow performance specifications to be developed in full detail. However, some illustrations of the principles are given. The aim is to specify not only *what* to achieve, but also *how well* to achieve it. Table A3 gives examples and discussion according to each requirement covered in step 2.

The seemingly ideal situation would be if we could define precise limits, put numbers on it and follow up with performance measurements. The way forward is to develop criteria from the indicators listed in Table A2. However, the complexity of the problems discussed in this article denies this possibility. It will be possible to develop quantitative measures for performance criterions at a later stage. So far, quantitative minimum or maximum criteria are not defined. Some criteria are defined and the desired direction of development is stated.

Discussing performance criteria is not logical without also addressing the question of measurement. A criterion has no value unless something is measured and evaluated against it. Performance measurement is not included in the Quality-at-Entry regime. Actually, this may prove to be one of the most important means of improvement still open and unused. Her Majesty's Treasury (the UK equivalent to the Norwegian Ministry of Finance) underlines the importance of performance measurement for the quality of public services (HM Treasury, 2003). This is similarly the case also in the USA, Canada, Australia, and New Zealand.

Step 4: Analyse and optimize
The basic question to be asked at this step is how to accomplish the requirements stipulated in step 3. The present situation is that there is an established but still fresh Quality-at-Entry regime, as shown in Figure 3. QA1 has only been executed for a few projects to date. The established second gateway (QA2) has already proven to have a positive influence on the way government plans and manages public investment projects in Norway. The main elements of the regime are listed in Table A4 together with comments on improvements. The details of the established quality system elements are not included.[21]

[21] This may seem inadequate to those with little knowledge of the established QA scheme in Norway. However, it is not possible to include all information here due to limited space. For more information see Concept (2008), Samset et al. (2006) and Magnussen and Samset (2005).

The suggestions for improvements are a summary of findings from previous steps 1–3. Not all of the suggestions in Table A4 are new. Improvements already decided on are not included here, but are seen as a part of the established system. Some well-known suggested improvements are also included. There has already been a recommendation from the Concept programme that the decision process should take form of some kind of decision-gate model (Holte et al., 2004). This kind of model is widely used in the industry. The role as gate-keeper is not properly defined yet. Defining this role may be a next step.

On this level, with no details, there might be several alternatives to choose from within each suggestion in Table A4. Further optimization should include adding details to a level where the concrete alternatives appear. Only on a more detailed level will a more conclusive analysis be possible.

Step 5: Design, solve and improve

Step 5 in the Six-step model includes the implementation of the system. As described above, the current QAE regime has been working for a short time. The main impression is that the QAE regime works as intended. Quality assurance is still not conclusively proven effective according to the requirements, but represents noticeable changes. Implementation of the first generation of the Quality assurance scheme (QA2) took approximately two years, from 2000 to 2002. Several improvements and changes have been registered (Klakegg, 2004; Magnussen and Samset, 2005; Torp et al., 2007), indicating positive improvements. The implementation of the second generation of the regime also stretched over a period of approximately two years. It should have been realistic to carry out the implementation faster the second time, because of the previous experience gained from introducing QA2, improved preparations, and improved arenas for exchange of experience. The new QA1 was much more complex, though. It represented a more radical element and needed more negotiations and development work in the introduction process.

In step 4, a number of possible improvements are identified and summed up. In order to evaluate which measures should be given highest priority, the effect and importance of the suggested measures are evaluated and shown in Table A5. The evaluation is based on the requirements for QA systems and control measures presented in step 2. The requirements are relevant to the prioritizing of suggested improvements from step 4. The level of abstraction is too high and the question of choosing proper improvement measures for this particular decision making system is too complex to define quantitative criteria for choosing. A simple model could have been created, but it would not have been very credible on this basis. Therefore, a qualitative evaluation based on Table A5 has been chosen. The individual importance of each measure is evaluated as high, medium or low, based on an assessment of the current state of the QA scheme and the potential for improvement for each measure.

Improving the basis of the quality system seems to be very important. The importance of the requirements from step 2 and their performance criteria from step 3 is different depending on which requirement we are looking at, but all measures are important to some of them. Further development includes the following:

- Definition of the decision process
- (Re)definition of roles
- Definition of project model/explicit project life cycle
- Expanding key terms and definitions to include SE/IE concepts.

Improving the ability to deliver high quality documents and basis for decisions seems to be the second most important issue. This will underpin the ability to meet almost all requirements on the list and with medium to high importance. Further development includes:

- Improved procedures for self-assessment
- Expanded toolbox (for experts and planners), including improved methods for realistic planning/reducing optimism bias
- Improved overview of previous decisions to ensure consistency.

Improving the ability to follow up on performance in general and to find out which actions have to be taken to improve performance in the system as a whole is obviously interesting. Further development includes:

- Performance measurement.

Improving the quality assurance scheme itself seems secondary to the previous but still important. Further development includes:

- Improved framework and instructions for researcher participation
- Defined quality assurance scope
- Expanded reporting formats
- Expanded toolbox (for reviewers).

Step 6: Verify, test and report
The plan for implementation of the QAE regime includes continuous research, follow-up discussions and exchanges of experience. This is where the importance of the three elements of the QAE regime works together. Verification, testing and reporting is an integral part of this quality assurance process. Verification has more than one meaning here. Firstly, it is the purpose of the whole QA scheme. The external consultant (reviewer) verifies the basis for decision once for each decision point in Figure 3, for each project. The reviewer reports to the Ministry, and gives a copy to the Concept programme as input to research. Secondly, one of the tasks of the research programme is to verify the effect of the QA scheme. This is a continuous effort and includes additional separate evaluation tasks during the period of the framework contracts. The Concept programme reports the results to the steering committee primarily, and communicates new knowledge to all interested parties. All research reports are open for downloading from the Internet (Concept, 2008).

Returning to the systems engineering process, verification has a third meaning: the verification of improvement when implementing the improvement measures from step 5. It seems to be an integral part of its purpose and existence that the QAE regime is good at verification and reporting. From Table A6 it appears that testing could be a weak point in the QA scheme. It is not a problem; it is merely a direct consequence of the definition of the tasks between the QA scheme and the research programme.

Conclusions

There is a close relation between the basis of the Quality-at-Entry regime and the basis of systems engineering and industrial ecology. The basis and many of the important goals of the two approaches are closely related. Consequently, this study has not identified results pointing to a revolution in the regime but has given quite a lot of reassurance. There seems to be a solid platform for improvement established in the Norwegian QAE regime, regardless of the perspective from which it is viewed. By comparing the QAE regime with industrial ecology, I find that,

- The QAE regime should learn from industrial ecology and more explicitly address the following issues:

    - Respect for nature's limitations and the precautionary principle
    - Introducing a complete cradle-to-grave life cycle
    - Ethical responsibility.

The discussion in this article has further led to the following suggestions for improvement.

Interface with the political subsystem:

- The individuals and parties involved in the QA scheme and the research programme need high awareness and knowledge about the political processes.

Administrative:

- Each government agency/sector has its own performance requirements used within its own area of responsibility. There could be a need for coordination across sectors concerning these performance requirements.
- Defining the role as 'gate-keeper' may be a next step ahead.

Basis of the quality system:

- Expanding the key terms and definitions (to include systems engineering/industrial ecology concepts)
- Improved definition of the decision process
- Redefinition of roles (i.e. reviewer and technical expert)
- Definition of project model/improved explicit project life cycle.

Ability to deliver high quality documents and basis for decisions:

- Improved procedures for self-assessment (to include systems engineering/industrial ecology methods)
- Expanded toolbox for experts and planners (to include systems engineering/industrial ecology methods)
- Incitements for realistic planning, reduction of optimism bias

The quality assurance scheme:

- Improved framework and instructions for researcher participation
- Define quality assurance scope
- Expanded reporting formats to include new topics (environment and ethics)
- Expanded toolbox for reviewers (to include systems engineering/industrial ecology methods).

Follow up on performance:

- Introduce performance measurement
- Establish awareness that measuring performance enhances performance.

None of these suggestions is revolutionary, and some of them are not even new. Still, the value of introducing industrial ecology and systems thinking to the basis of the Quality-at-Entry regime is evident. There are important elements highlighted through this perspective, which alters the substance of the suggestions and introduces new sets of methods and tools, as shown in the discussion.

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Appendix to Paper 9: Tables
reconstructing the QAE regime by the Six-step model.

Step 1 Identify needs

Table A1a Summary of identified needs on an overall level (details not included): Political subsystem.

Party / System level	Needs	Why
Parliament	Effective use of State funds (society's resources)	Avoid spoiling future opportunities
	Relevant (and popular) measures	To prove their reliability
	Fair and rational distribution of resources between groups	To secure stability/standard of living
	Fulfil international treaties and agreements	Not to be exposed as 'liars'
Ministries (political level)	Achieve defined political goals	To substantiate desired development
	Realistic (within acceptable frames)	To avoid unwanted effects
	Implement decisions made by Parliament	To stay in office/maintain power
	See the relevant consequences of actual alternatives	To avoid unwanted effects
Regional/Local government	Understand and act on real needs of the local area stakeholders	To substantiate desired development
	Obtain channelling State funds to their area	More resources for good purposes
	Fair and rational distribution of resources between local groups	To prove their reliability

Table A1b Summary of identified needs on an overall level (details not included): Administrative subsystem.

Party / System level	Needs	Why
The Ministry (administrative level)	Follow up on policies	To substantiate desired development
	Choose most effective means	To be able to show positive results
	Establish steady-state conditions for the enterprises in the sector	To make long time planning possible
	Avoid cost and time overrun, function failure, unexpected negative effects	To avoid criticism from the political subsystem and media/public
Government agency	Identify and plan for most effective means	To secure wanted effects
	Achieve high productivity in the sector (within area of responsibility)	To make sure there is no spilling of resources
	Perform effective cost control and progress assessments	To avoid criticism and media attention
	Document best practice and state-of-the-art competence	High and even level of performance
Regional/Local authority	Identify and document real needs	To secure the right choices are made
	Systematic and thorough stakeholder involvement	To know the real needs and priorities
	Quality in planning and analysis	To prepare for effective execution
	Efficiency in execution	To avoid spilling resources

Step 2 Define requirements

Table A2 Requirements to improve the system's ability to achieve success in public investment projects.

Needs	Requirements	Indicators
Effective use of funds/plan for and choose most effective means	Cost effective measures (benefit greater than cost)	Benefit/Cost
	Identify and document the most effective measures available	Effect, Impact
Relevant measures	Able to identify the relevant measures	Effect, Impact
	Holistic measures – take account of the whole situation	Use of different perspectives
	Based on facts, not power distribution, assumptions or beliefs	Scientific basis
Fair and rational distribution of resources	Transparency – public, open for all to see	Openness
	Systematic, rational, documented methods	Conformity with methods
	Open, including all aspects (economy, technology, ecology, etc.)	Use of different approaches
	Holistic measures – take account of the whole situation	Use of different perspectives
	Based on facts, not power distribution, assumptions or beliefs	Scientific basis
Fulfil treaties and agreements	Ensure the control aspect is covered	Use of third party assessments
Achieve political goals	Not relevant for the quality system	NA
Realistic	Within acceptable limits	Coherence with previous decisions[22]
	A real option for the decision makers	Political acceptance
Implement decisions/follow up on policies	Transparency	Openness
	Ensure the control aspect is covered	Use of third party assessments
See consequences of alternatives	Systematic, rational, documented methods	Conformity with methods
	Open, including all aspects (economy, technology, ecology, etc.)	Use of different approaches
	Holistic measures – take account of the whole situation and life cycle	Use of different perspectives
	Based on facts, not power distribution, assumptions or beliefs	Scientific basis
Understand real needs	Systematic, rational, documented methods	Conformity with methods
	Holistic measures – take account of the whole situation	Use of different perspectives
	Based on facts, not power distribution, assumptions or beliefs	Scientific basis
Obtain State funds to local area	Not relevant for the quality system	NA
Establish steady state conditions for enterprises	Not relevant for the quality system	NA
Avoid project performance failure/perform effective cost and progress control/efficiency in execution	Systematic, rational, documented methods	Conformity with methods
	Ensure the control aspect is covered	Use of third party assessments
	Driving improvement	Improvement measured

[22] An important observation: this applies as long as the new decision is not meant to replace the previous decision, in which case it would preserve the situation as-is and prohibit development and renewal.

Needs	Requirements	Indicators
Achieve high productivity in the sector	Able to identify the relevant measures	Productivity
	Systematic, rational, documented methods	Conformity with methods
	Driving improvement	Improvement measured
Systematic and thorough stakeholder involvement	Systematic, rational, documented methods	Conformity with methods
	Transparency	Openness
Documented best practice	Systematic, rational, documented methods	Conformity with methods
	Driving improvement	Improvement measured

Step 3 Specify performance

Table A3 Specifications of performance.

Requirement	Performance criteria	Comments
Cost-effective	Positive benefit/cost factor maximized	The basic criteria are given with the positive benefit/cost factor to secure cost-effective measures. It demands all aspects are measured in money. This is not always practical; it has to be supplemented with additional criteria.
Boosting transparency	Degree of simplicity maximized	Measures have to be simple enough for everyone to understand them. It is, of course, necessary to accept a certain degree of expertise exclusiveness, but the minimum criterion is that an independent expert should be able to understand and evaluate.
	Degree of available maximized	Measures have to include distribution of the instructions, knowledge, methods, and criteria to ensure it is possible to understand and evaluate how decisions are made.
Based on facts	Degree of support by research maximized	This criteria is not very precise because there will always be different views on what is fact and what are subjective opinions. The criterion is that main assumptions and methods are documented and supported by research, or what can be described as undisputed common knowledge.
Open to all aspects	Degree of open interface maximized	This criteria could prove to be a 'Yes' or 'No' question (either open or not). The important point is to handle the need for information transfer and interaction between economy, technology, sociology, ecology, etc.
Holistic	Degree of relevant situation parameters available maximized	The measures should perceive all aspects of the situation. This is. of course. an ideal target. In real life, it is not feasible to include all details and aspects. Therefore, we limit efforts to aspects relevant for the actual decision.
	Degree of covering the whole life cycle maximized	The measures should include the whole life cycle (from cradle to grave) to avoid sub-optimization.
Realistic	Maximum consistence with decided limits and given guidelines	In some cases a question of 'Yes' (consistent) or 'No' (not in compliance). In evaluating different measures, the degree of consistency will characterize the different options. This performance criterion should not be used to conserve a non-optimal situation with the argument that 'it is what they have decided'.
	Maximized degree of acceptance	Could also be a 'Yes' or 'No' question (acceptable or not), but is usually also a characteristic feature with each alternative. It is an evaluation of whether the measures are worth putting forward to the decision makers or not.
Systematic	Maximized degree of definition	Clear methodological steps, well-defined criteria, simple instructions, suitable tools available, demand for user competence defined
	Optimized degree of documentation	Everything from the basis of the method to the results of the intended use should be documented (presumptions, instructions, methodological steps, knowledge) as long as the cost involved does not succeed the benefit.
	Maximized degree of implementation	It should be well known and actually used in the relevant parts of government. The use should be more or less continuous, not only sporadic.
Driving improvement	Number of improvements maximized	Constantly challenging the established pattern in the search for better processes and solutions is important to make sure there is a culture of continuous improvement in the organization. This is vital to the ability to have systems, methods and criteria that are updated and reflect a living and changing society. Registration of improvements is usual according to international quality standards and should be implemented in government organizations.
	Age of existing instructions not more than 1 year	This criterion is a test of how dynamic the organization is and how often it chooses to question its existing routines.

Step 4 Analyse and optimize

Table A4 Quality system elements and suggestions for improvement based on systems engineering/industrial ecology perspectives.

Quality system elements	Possible improvements
Key terms and definitions	Expand to cover whole life cycle and alternative methods and tools from industrial ecology
Definition of roles in decision making	Rewrite to secure an updated understanding of current development in public decision processes including the ability to make sustainable decisions. Define the role as 'gate-keeper'.
Definition of decision process	Develop a common understanding of where in the process QA1 fits in (timing) and what to include in the decision basis at every step of the decision process (define decision gates)
Definition of project life cycle	Develop a common definition of project phases (a project model) which explicitly covers the whole life cycle
Follow up on performance	Performance measurement is not included in the established Quality-at-Entry regime. This would be an important supplement to the QA scheme
Requirements for economical solutions and methods	This is a core issue for the Ministry of Finance. Only strategic, high-level methods are included here. This area falls outside the scope of this article. Several new instructions have already been notified.
Requirements for technical solutions	This falls outside the scope of the QA system. Requirements for technical solutions are decided by Government agencies
Methods and tools for professional experts (expanded toolbox)	Only strategic, high-level methods and corresponding tools are subject to standardization within the QA system. Methods and tools on a detailed level fall outside the scope of the system and are decided by the Government agency. Within the relevant area, methods and tools for front-end decisions should have high priority. Look for new and improved tools for decision support. The toolboxes of systems engineering and industrial ecology might be a good place to start. Examples are stakeholder analysis, LCC, LCA, HAZOP, DIE, ILS, system dynamics, value chains, supply chain design, balanced scorecard, environmental accounts, EMS, EPE, EPI, material flow analysis, process analysis, and also how to choose the appropriate tool.
Quality assurance scope	Decide explicitly and in detail which questions have to be answered and which documents to include in the QA1 Explicitly state whether or not to control against IE principles, i.e. respect for nature's limitations, the precautionary principle and ethic responsibility
Requirements for decision-basis (documents to undergo quality control)	Requirements that are more concrete need to be defined for several documents and methods, especially those not included in previous QA schemes. The introduction of QA1 includes several new documents and issues
Procedures for self-assessment	Development of requirements and best practices in self-assessment and quality assurance in major public projects
Definition of roles in quality assurance	Explicitly describing and defining the roles of auditor and technical expert. Alternatively, explicitly using the terms and definitions defined in international standards.
Reporting formats and other QA requirements for auditor	Expand to cover whole life cycle. Complemented requirements for QA1. Completed list of elements (documents, methods) to include in quality control
Framework and instructions for researcher participation	To include a reinforced awareness of research methodology and to raise awareness of the political subsystem

Step 5 Design, solve and improve

Table A5 Expected effect and importance of improvement measures.

Requirement	Improvement measures effect	Importance of the measure
Cost-effective	This requirement applies to all suggested improvements. Each measure has to be analysed separately on a more detailed level to establish necessary data for evaluation.	NA
Boosting transparency	Expanded key terms and definitions	Medium
	Redefinition of roles	High
	Definition of decision process	High
	Definition of project model/explicit project life cycle	Medium
	Expanded reporting formats	Medium
Based on facts	Improved procedures for self-assessment	High
	Improved framework and instructions for researcher participation	Medium
Open	Redefinition of roles	Low
	Definition of decision process	Medium
	Improved procedures for self-assessment	High
Holistic	Definition of decision process	High
	Definition of project model/explicit project life cycle	High
	Improved procedures for self-assessment	High
Realistic	Improved methods for realistic planning (reduce optimism bias)	High
	Improved overview of previous decisions	Medium
Systematic	Expanded key terms and definitions	High
	Expanded toolbox	High
	Quality assurance scope	Medium
	Requirements for decision basis	Medium
	Improved procedures for self-assessment	Medium
Driving improvement	Performance measurement	High
	Improved procedures for self-assessment	Medium

Step 6 Verify, test and report

Table A6 QAE regime elements and their relevance to verification and reporting.

QAE regime element	Verification	Testing	Reporting
QA scheme	Basis for decision making Single case	Learning by doing	Primary: To Ministry (owner) Secondary: To agency (responsible for execution) To project management To research programme
Experience exchange arenas	Policy Principles and definitions	NA	By participation
Research programme	Effect of QA scheme Effect of methods Multi-case	Experiments/Pilot projects Verification of QA scheme elements and performance Evaluation of effects	To the steering committee To all stakeholders To research fellows

Paper 10

Pursuing Relevance and Sustainability: Improvement Strategies for Major Public Projects

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Abstract

***Purpose** of this paper*	To identify effective strategies to improve the governance of public projects. This paper investigates the challenges in the front-end of major public investment projects, identifies problems leading to lack of relevance and sustainability. It is argued that these are the most important problems from a strategic perspective. Effective improvement strategies are derived from this perspective.
Design/methodology/ approach	The results of a survey are presented, elaborating on the assessments of 80 international senior experts, supplemented with in-depth interviews. The results are analysed and compared with published literature.
Findings	Lack of relevance comes from projects not linking to users' needs and from unclear objectives. Lack of sustainability comes from unsolved conflict over objectives, lack of commitment and faulty economic assumptions. This knowledge leads to identification of effective improvement strategies for existing governance frameworks.
Research limitations/implications	The results can be generalized to cover Western, developed countries with an established governance framework for major public projects. Transfer to other regions of the world should only be done with careful consideration. The results cover public sector, but with some considerations can also be transferred to the private sector.
Practical implications	For those involved in improving existing governance frameworks for public projects the process should start with the causes indicated in this paper in order to be effective.
*What is **original/value** of paper*	Current literature on projects frequently discusses success and failure. It tends to identify the most common problems and success factors without being clear as to which problems are the most important in a strategic perspective. This paper contributes to such discussions.

Keywords: Project success; Relevance; Sustainability; Front-end phase; Decision making; Governance frameworks.
Paper type: Research paper

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1. Introduction

There are many ways for a project to fail. The most frequently reported are the failure to meet deadlines, deliver within budget and deliver the specified quality – the 'iron triangle' (Atkinson, 1999). These failures are generally linked to problems in planning or executing activities within the project. Another category of failure is the failure to deliver the functionality, benefit or contribution to business objectives that was intended at initiation of the project (Shenhar et al., 1997). This is a more serious category of faults and a more difficult set of problems to solve. These challenges are found on a higher level and earlier in the development process. The problems here are more complex, involve more difficult trade-offs and at the same time are less comprehensible.

Empirical evidence reported in project literature indicates that the most important problems may be found in the early stages of development leading up to the appraisal of the project. This is defined as the front-end in the present paper. The study looks at investment projects – not purely financial operations such as trading a large asset of shares, etc. Investment projects typically include construction of infrastructure projects (roads, railways, energy supply, buildings etc.) or acquisition of equipment and systems (defence, ICT etc.) or organisational development projects. Public projects are identified as being owned by a public entity, for example the state represented by a ministry, and financed (mainly) over public budgets. This is the conventional public ownership according to Flyvbjerg et al. (2004, p. 13). The term 'major' indicates large size (in monetary terms) and a substantial degree of complexity and criticality. It includes, but is not limited to, 'mega-projects' – a category of projects on a grand scale, of intangible complexity and with high political importance.

Current literature on projects frequently discusses success and failure. It tends to identify the most common problems and success factors without being clear as to which problems are the most important – which pitfalls are the most critical to avoid from a strategic perspective. This paper will contribute such a perspective. The most important problems leading to lack of relevance and sustainability together with their underlying reasons will be identified. This is basis for developing recommendations for how governance in the front-end of these projects can be improved.

The paper starts with presenting findings from literature on mega-projects illustrating the complexity of the challenges in major public projects. The methodology is presented thereafter and results of the survey is shown by presenting the respondents answers in tables and discussed. Towards the end there is a section focussing the validity and reliability of the findings as well as conclusions.

2. What goes wrong with projects?

Quite a few 'top-ten lists' exist, showing what goes wrong in projects (Rondinelli, 1976; Pinto and Slevin, 1992; Gioia, 1996; Standish Group, 2000; Cooke-Davies, 2002a; Delisle and Thomas, 2002; OGC, 2005; Schaeffer, 2006; Harpham and Williams, 2007; Hopkinson, 2007). These lists reveal bad performances of planning and execution activities as well as projects not handling external aspects well in the execution phase. They represent a useful compilation and transfer of experience from a large number of projects, but their methodological starting points are very different and they are often limited to the project perspective. In most of these sources the criteria for ranking the problems or factors are not clear. These contributions identify the most common problems, not necessarily the most important ones.

In this paper the perspective is open to the possibility that the problem may not lie in the project. Rather, it may be found long before the project even starts (Samset and Haavaldsen, 1999; Youker and Brown, 2001). Stahl-Le Cardinal and Marle (2006 p. 226) conclude that the decisions upstream in the planning phase have much bigger consequences in the downstream execution phase. *'Failing to plan is planning to fail*'. Hopkinson's (2007) conclusion is that '*Most of the causes of mega-project failure ... are concerned with what happens up to and including the project authorisation point.*' Dvir et al. (2003, p. 94-95) established the significant positive relationship between the amount of effort invested in defining the project on one hand and project success on the other, especially for the end user.

Several authors have pointed out that we need a shift in focus from 'doing it right' to 'getting it right' (Atkinson, 1999), and for portfolio-management predominantly to be about 'choosing the right project' and project management to be about 'doing the project right' (Cooke-Davies, 2002b). Shenhar et al. (1997) indicate the same when arguing that project managers need to '*see the big picture. ...be aware of the results expected ... and look for long term benefits*'. A rather authoritative contribution related to public projects is the list of common causes of project failure established by National Audit Office and Office of Governance Commerce in UK (OGC, 2005). Here it is pointed out that the link to the organizations key strategic priorities and lack of clear ownership are the two most common causes of project failure.

It is difficult to gain a simple and universal answer to what is project success and how to go about achieving it because of project complexity and uncertainty (Gioia, 1996; Miller and Lessard, 2000; Chapman et al., 2006) and the fact that the stakeholders may interpret success differently (Malgrati and Damiani, 2002). Besner and Hobbs (2006, p.3) concludes it is possible that past research has failed to identify the factors that truly determine project success.

In order to get closer to the focus of this paper, I will turn to the literature about mega-projects. Further studies include six excellent books by Hall (1981), Morris and Hough (1987), Collingridge (1992), Miller and Lessard (2000), Flyvbjerg, Bruzelius and Werner Rothengatter (2003), and Altschuler and Luberoff (2003). These authors have made remarkable contributions to the understanding of project success and failure. A summary of the relevant contributions from these books is given in Table 1. They point to serious problems and explain, in a wide sense, what goes wrong with projects. Their starting points and methodologies have given a valuable spectrum of different interpretations of common signs of success or failure found in all major projects. All six books analyse a set of empirical

cases and produce a complex picture of what goes wrong, covering all aspects of the projects included in the respective author's perspective, theoretical frame and chosen methodology. Each of the works presents a large number of reasons for why things go wrong, some of them pointing to similar causalities while others are specific to individual authors. There is certainly a lot to improve concerning major projects, but the question is where to start. An obvious suggestion would be to start with the problems that are most important, and this is what will be focussed in the remaining part of this paper.

Table 1 Summary of six important books on mega-projects: Main problems identified.

Author	Category	Focus	Most important problems/problem areas suggested
Peter Hall (1981)	Decision making	Decision making models. Roles/actors. Contradictions in decision making. Planning disasters.	- Forecasting the future - Trade-offs between groups
Morris and Hough (1987)	Project management	Different perspectives on project success.	- Human errors - Project objectives and their validity - Influence of politics - Government as sponsor, champion and owner - Financial matters - Implementation of results
David Collingridge (1992)	Decision making	Decision making processes in big organizations. Trial-and-error learning.	- Limitations in human capacity to control and understand complexity - The problem changes over time - Inflexibility in technologies (projects) - Changes are costly and painful – inhibiting critical scrutiny
Miller and Lessard (2000)	Governance of projects	Institutional frameworks, decision making and project sponsoring.	- Handling turbulence in project environments - Opportunism and omission - Decision making is not fully rational - Coordination and cooperation - Design of institutional frameworks
Flyvbjerg, Bruzelius and Rothengatter (2003)	Governance of projects	Better and more rational decision making and communication. Institutional arrangements, accountability and handling of risk.	- Applying the wrong method is a minor reason for forecasting failures. - Poor data is a more important reason for predicting failures than methodology. - Discontinuous behaviour and the influence of complementary factors not included in predictions. - Unexpected changes of exogenous factors. - Unexpected political activities or missing realization of complementary policies. - Appraisal bias of the consultant and the project promoter.
Altschuler and Luberoff (2003)	Politics and urban development	Theoretical analysis. National patterns over time. Intergovernmental aspects.	- Lack of competence and experience transfer - Handling complex networks of practices and roles - The public sector leadership role - Handling harmful side-effects - Conflict between local support and central financing - Project financing models - Cost escalation and underestimation

3. Methodological approach

In the front-end of every project the outputs and outcomes of the project has to be assessed in order to determine whether the project is a good initiative or not. The fundamental choice at the starting point of this research is using the OECD Integrated Evaluation Model based on OECD's draft standard on Development Evaluation Assessment (OECD, 2006). The criteria listed by the OECD have the status of international consensus. The criteria for evaluation of projects are:

Efficiency
Effectiveness
Impact
Relevance
Sustainability

The OECD model also comprises six cross-cutting issues: economic and financial issues, institutional aspects, socio-economic aspects, technological aspects, environmental aspects, and policy support measures. All of these cross-cutting issues have to be considered for each criterion.

Other frameworks for choice of projects could have been chosen (Cole, 1997; Archer and Ghasemzadeh, 1999; Shenhar and Dvir, 2004), but the OECD criteria seem to be the most relevant with regard to public projects and are appropriate for this line of inquiry.

This study looks at major public investment projects in the perspective of society (represented by the project owners and financing party). The term 'strategic perspective' is used. The most important challenges at the front-end of projects are to secure relevance and sustainability. These two criteria are critical in the sense that if a project ends up not fulfilling them it has failed, no matter how well it has performed with respect to the other three criteria. In contrast, if a project performs well with respect to relevance and sustainability this may compensate for lower performance with respect to the remaining three criteria, with the possible exception of some impacts.

Dinsmore and Ribeiro (2007, p. 1) reached a similar conclusion: '*While good project management cannot save an organization from a bad strategy, bad project management may harm a good strategy.*' Miller and Lessard (2000, p. 13) also put it like this: '*Once built, the project has little use beyond the original intended purpose. If it meets real needs, it might be useful for many years to come. But even so, such usefulness does not guarantee financial success.*' The whole basis for the project is whether there is a need for it and whether there is a long term benefit following the result. If this basis is not there, the project should never be allowed to start.

Hence, the focus in this work is on the two superior criteria, **relevance** and **sustainability**. This choice does not imply the three other criteria are unimportant, as they can certainly create failure as well. In this strategic perspective, 'unsuccessful' is the label used for projects that are not useful and/or not sustainable in the longer time perspective. Consequently, success is creating a relevant project with sustainable effect.

An exploratory, qualitative approach is chosen to find out what the people directly involved in public projects consider most important problems leading to lack of relevance or

sustainability based on their broad experience. Important means often occur and have a high probability of leading to the choice of a flawed concept. Besner and Hobbs (2006, p. 12) point out that the front end tasks dominantly involve senior personnel. Therefore a survey targeting senior experts was chosen as the method for data gathering. Each of the experts has experience from a wide range of projects within their expert role. There are three different angles to the projects represented in among the respondents: Decision makers represent the owner perspective; these are people who formally make decisions. The project perspective is represented by project managers. Project planners may hold either of these perspectives; these people work out the basis for decision making from an owner-, operational- or executing perspective. Both project evaluators and researchers have an independent perspective on the projects, but from a different basis; practice and theory. All these angles give interesting contributions to identifying what is most important. The respondents chose their own category – the one they perceive best fits the position represented by their responses.

Defining questions designed to identify the most important challenges in the front-end of public investment projects puts a lot of responsibility on the researcher. Hence, a strict systematic approach to constructing the questionnaire was called for:

1. Only the main criteria (relevance and sustainability) are covered.
2. All six cross-cutting issues were analysed and formed the basis for identifying 38 different possible indicators.
3. The validity and reliability of each of the 38 indicators was evaluated based on an assessment of how well they represent important problems identified in literature.
4. The best indicators for each cross-cutting issue were chosen and reformulated into one of the main alternatives in the questions of the survey. Tables 3 and 4 give examples. These alternatives expressed the main candidates for most important problems. An extra indicator was added to cover the economy for the sustainability criteria due to the complexity of this issue.
5. The remaining indicators were reformulated into possible root causes for each of the main problems. Examples are shown in Tables 3 and 4 marked A, B, etc. The root causes where available for the respondents as predefined answer alternatives.

The respondents were asked to rank the importance of the possible problems on a simple ordinal scale. For the most important problems, the respondents were asked to identify which of the root causes was most important. In order not to take too much of their time, the respondents were only asked to elaborate on the ones they considered to be the most important. In cases where the predefined alternatives did not fit with the respondent's opinion, they were given a chance to give open feedback. The risk of omitting important answer alternatives was reduced through this systematic development of alternatives within the framework of the OECD evaluation criteria. The responses showed very limited use of the open option.

The respondents where identified by several recruitment strategies: through personal networks established through 20 years of practice working with major public projects, through international contacts reaching out to other networks, through scientific publications on relevant topics, contacts at conferences and through identifying people in relevant formal positions. Some of these recruitment strategies obviously have inherent bias in possibly choosing people of a certain type, interest and attitude. By combining these recruitment

strategies the total panel of respondents covers a broad spectre of relevant interests and experiences.

The panel of respondents, shown in Table 2, comprised a group of senior experts with relevant high level experience: CEOs, top level civil servants, professors, and senior consultants. The response rate was 54.8% (80 out of 146 invitations by e-mail). The number of respondents is considered to be low, limiting the possibility for detailed analysis of subgroups and comparisons across geographical borders. The survey was executed using a professional web-survey system.

Table 2 Summary of respondents in the survey (N=80).

Gender:	male	91.3%	female	8.8%								
Age:	<35 years	2.5%	35-50 years	50.0%	>50 years	47.5%						
Country:	Anglo-American	29	Nordic	47	Others	4						
Sector:	Public	56.3%	Private	38.8%	NGOs	5%						
Expert role:	Project managers	38.8%	Project evaluators	22.5%	Project planners	6.3%	Decision makers	17.5%	Research-ers	15.0%		
Experience:	<5 years	3.8%	5-10 years	13.8%	>10 years	82.5%						
Type project:	Building and Construction	42	Organi-zational change and ICT	34	Procure-ment and Defence	24	Industry and Offshore	22	Internat-ional aid	6	Research	17

The group was dominated by men with considerable experience from all relevant types of projects in private and public sector. The geographical dimension was intended to cover two specific groups: Anglo-American countries (UK, USA, Canada and Australia) and Nordic countries (Norway, Sweden, Denmark, Finland, and Iceland). In these countries governance of projects has been in focus in recent years, and the available number of potential respondents is good. The Anglo-American group represents large, world dominating economies, whereas the Nordic group represents small rich countries. One theoretical argument for this geographical division is the connection between projects and corporate governance identified in literature (Turner, 1999; Winch, 2001). Corporate governance is characteristically different in these two groups of countries; classified as shareholder value systems in Anglo-American countries and communitarian systems in the Nordic countries (Clarke, 2004; Jacoby, 2005). Respondents from other countries were also invited, but as expected, the response rate was low outside the two focus areas.

The results are divided in two sections; relevance and sustainability. The respondents were asked to indicate which alternatives (problems) were the most important ones, leading to lack of relevance and sustainability in major public investment projects by indicating their opinion on the degree of importance. At least one alternative had to be rated as ‘most important’. ‘Most important’ indicates that this is a common problem and that it has a high probability of leading to the choice of a flawed concept. Respondents who indicated this problem was of high importance were asked to elaborate further on the root causes.

After the survey the analysis and conclusions were amended by conducting in-depth interviews with six experts in the same target group as the survey was directed at, five actual

respondents and one outside the respondent group. This contributed to assure the right interpretation of the answers, gave valuable precision to the analysis and added nuances to the result of the survey.

4. Why things often go wrong in the front-end of major projects

This section of the paper presents the results of the survey. The material is not suitable for quantitative analysis, neither would it be useful. The responses are presented just as they were given – giving the reader the opportunity to assess and interpret them. The results are shown in Tables 3 and 4. The numbers in the tables refer to the direct numbers of respondents who gave the specific answer, except the weighted score (WS) that expresses the relative importance. WS is calculated by taking the scores multiplied by the corresponding character, adding them and dividing by the number of respondents. This gives an expected value. No sub-division of respondents has been attempted.

Relevance
The following definition of 'relevance' has been given by the OECD (2002, p 32): '*The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donors' policies. Note: Retrospectively, the question of relevance often becomes a question as to whether the objectives of an intervention or its design are still appropriate given changed circumstances.*'

Relevance refers to whether the chosen public investment project is the most appropriate one judged from the owner's/financing party's viewpoint, given there are alternative projects and that no investment is included among the alternatives. Relevance refers to the objectives of the project, and is a matter of to what degree the objectives are in keeping with valid priorities and the users' needs. Relevance is a question of usefulness. Obviously, if the project's result is not useful it should be rejected or terminated.

Table 3 Pre-defined alternatives on relevance and the respondents' rating (N=80). The scale ranges from 1 (least important) to 4 (most important). Mode answers are shown marked. WS = Weighted Score.

#	Alternative	1	2	3	4	WS
2.1	The users' needs are unknown, misunderstood or ignored	6	18	21	35	3.06
2.2	The users' needs change before the project is executed	8	25	28	19	2.73
2.3	The society's priorities are unknown, misunderstood or ignored	18	25	23	14	2.41
2.4	The society's priorities change before the project is executed	15	30	22	13	2.41
2.5	The objectives of the project are unknown or misunderstood	5	25	18	32	2.96
2.6	The objectives of the project do not change according to changed needs/priorities over time	9	31	28	12	2.54

A	**Reasons for users' needs being unknown, misunderstood or ignored. (N = 35)**	Responses
2.1.1	The users have not been asked	15
2.1.2	The way the users are asked/participate in the planning process gives the wrong answers/does not unveil the needs	17
2.1.3	The users do not know/cannot express what they need	14
2.1.4	The planners are not competent enough in understanding the users' needs/answers	14
2.1.5	Users' needs are ignored by planners and decision makers due to political or personality reasons	25
2.1.6	Other: a) Users' needs presented in the form of definite solutions instead of functional requirements, and thus ignored because of conflicts with other issues. b) A powerful elite considers itself more knowledgeable and able to decide. Personal aspirations and visions replace objective assessments.	2
B	**Reasons for the project's objectives being unknown or misunderstood. (N = 32)**	Responses
2.5.1	The objectives of the project are not stated at all, or are expressed in a very unclear manner	26
2.5.2	The objectives of the project are not available to decision makers	4
2.5.3	The objectives of the project are deliberately formulated to mislead the decision makers	8
2.5.4	The decision makers do not understand the planners' formulation of goals and objectives	16
2.5.5	Other: c) The process to formulate the objectives is underestimated or even neglected.	1

Sustainability
The following definition of 'sustainability' has been given by the OECD (2002, p 36): *'The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time*'.

Sustainability refers to whether the positive effects of the chosen public investment project will be maintained after the project has been concluded. The definition of sustainability goes beyond the project itself. It is a matter of economic, institutional, social, and environmental effects in a longer term perspective. It depends on whether (to what degree) the positive impact justifies investment – whether future revenue exceeds costs, whether users' support and ability will continue the intended process after the investment, and whether authorities will provide policy support and resources to continue the process. If the project's effect is not viable – if it will not be supported by society and users in the future – it should be rejected or terminated.

Table 4 Pre-defined alternatives on sustainability and the answers given by the respondents (N=80). The scale ranges from 1 (least important) to 4 (most important). Mode answers are shown marked. WS = Weighted Score.

#	Alternative	1	2	3	4	WS
3.1	Lack of commitment to the project from key stakeholders	4	21	27	**28**	2.99
3.2	The chosen technological solution is not viable under the prevailing conditions	21	**31**	20	8	2.19
3.3	Conflict over objectives and/or strategies concerning the project	3	19	**30**	28	3.04
3.4	Economic and financial benefits are low, compared to investment and operational costs	6	**30**	16	28	2.83
3.5	Lack of conformity with prevailing policy or by legislation	27	**29**	20	4	2.01
3.6	There are negative ethical issues connected to the project	**40**	27	10	3	1.70
3.7	Business or other conditions change between concept stage and final delivery	8	23	**27**	22	2.79

A	**Reasons for conflict over objectives and/or strategies concerning the project. (N = 28)**	Responses
3.3.1	Neglecting/not solving conflict over priorities among key stakeholders	**23**
3.3.2	Neglecting powerful interacting organizations/individuals in opposition to the project	16
3.3.3	Objectives/strategies are too complex/unclear to avoid conflict	10
3.3.4	The project design lacks conformity with key stakeholders' interests and priorities	11
3.3.5	Other: a) Hostile stakeholders will never agree - will be bypassed at great cost and delay. b) Clear responsibility and organizing for solid execution towards the purpose.	2
B	**Reasons for lack of commitment to the project from key stakeholders. (N = 28)**	Responses
3.1.1	Neglecting that users do not approve/do not like the outcome of the project	14
3.1.2	Not identifying that the project outcome has weak support in its owner- and financing organizations	**18**
3.1.3	Neglecting that the project outcome has weak support in management or accepting weak leadership	15
3.1.4	Neglecting weak support in interacting institutions, or opposition by other institutions	10
3.1.5	Other: c) Big prestigious projects - important to be 'seen to be onboard'. d) Support wavers as the difficulties become apparent - important to get commitment from stakeholders at the political level.	2
C	**Reasons for economic and financial benefits are low, compared to investment and operational costs. (N = 28)**	Responses
3.4.1	Planning optimism (overestimated benefits) misleads the decision makers, deliberately or not	**24**
3.4.2	Bad cost effectiveness is accepted	15
3.4.3	There is no (not sufficient) market or willingness to pay for the use/outcome	10
3.4.4	Alternative use of the money is not analysed	14
3.4.5	Other: e) Difficulty of factoring in all economic, socio-economic, environmental and societal factors. f) Public sector investment includes a notion of fairness and equality and to placate local aspirations.	2
D	**Reasons for business or other conditions changing between concept stage and final delivery. (N = 22)**	Responses
3.7.1	Planning optimism (underestimated costs) misleads the decision makers, deliberately or not	**18**
3.7.2	Business changes very fast by nature	7
3.7.3	The political and administrative setting is changing regularly	13
3.7.4	Learning occurs, new possibilities arise – changing the priorities of decision makers and users	10

5. Discussion – the most important problems at the front-end

Relevance

The most important problem leading to lack of relevance is that the *users' needs are unknown, misunderstood or ignored*. The most important underlying reason indicated is that *users' needs are ignored by planners and decision makers due to political or personality reasons*. This indicates that the planners and decision makers,

i) consider themselves better able to assess the needs than the users and thus override users' stated preferences
ii) consider political goals and priorities more important than users' needs
iii) consider own goals and priorities more important than users' needs

Point i) can be seen as a legitimate reason for planners (i.e. professionals) to use professional judgement over users (laymen) when there is a real difference in level of expertise, but in many cases the users are the experts on the business they are running. Decision makers fall into two categories: one professional, to which the same caution should be exercised, and one political, which basically are laymen in judgements concerning the business and needs and thus should be even more careful. Point ii) can be seen as legitimate when there are prevailing political decisions and regulations for which the consequence of identified needs (the solutions) are found to be in conflict. In this situation planners and decision makers should not define a project that is not in keeping with the users' needs. They should not start an irrelevant project, but reject the whole initiative. Point iii) can never be seen as legitimate, whether their personal ambitions are hidden or not. The role of planners and decision makers in public projects is not to pursue their personal goals and priorities but those of society.

The interviewees pointed out that what local politicians (who by definition represent the users) think, is not always in accordance with what the users really want. They also pointed out that the users not having their will is not the same as ignoring their needs. There is a need for a corrective force in the process, taking affordability into consideration and setting ambitions at the right level early in the process.

The objectives of the project are unknown or misunderstood is indicated as being the second most important problem leading to lack of relevance. The most important reason given for project objectives being unknown or misunderstood was *The objectives of the project are not stated at all, or are expressed in a very unclear manner*. This indicates that the project planners and promoters

iv) do not want to formulate the objectives for some reason
v) are not able to formulate the objectives.

Neither iv) nor v) is found to be legitimate in any situation. Planners and promoters are supposed to be professionals. Formulating objectives is undoubtedly difficult, but one should expect there to be a clear requirement in all public projects to formulate objectives and for professional project planners to be qualified to do this job.

An instrumental interpretation looking for the advantage of having no or unclear objectives could point out that this gives room for adjustments and alternative actions. Knowing that the situation changes regularly and rapidly, this might seem like a rational line of thought, but it

is not a good idea. The objectives are vital in explaining the purpose and intended effect of the project. Not having a good explanation for the purpose and intended effect should be an obvious reason for rejecting the whole project. Following the decision to start a project without clear objectives, the resources would be open for any use and this could also cover up deeper conflicts over objectives. It would represent the complete absence of governance. Expectations have to be clarified early.

The survey also clearly indicates that '*The decision makers do not understand the planners' formulation of goals and objectives*'. This may be interpreted at least two ways:

vi) the decision makers do not have relevant competence
vii) the planners are not able to formulate well because they lack competence.

There is no evidence from the survey to determine which direction this criticism should go. In combination with the previous and most important reason, it is reasonable to direct attention to project planners preparing documents for the decision makers. They are the professional element and should have the necessary competence to formulate clear objectives. This does not set the decision makers free of responsibility, even though they (at least the political decision makers) are considered laymen in this field. The decision makers have a job to do, and they should be expected to take the necessary actions to qualify themselves for the job. This is not an argument for letting the planners and project promoters make the real decisions. The decisions should be made by the appropriate decision makers. They should be free to conclude on a wide set of information sources, values and convictions (rational and intuitive). The point made here is that they need to understand the consequences of their decisions before making them.

Society's priorities do not seem to be the problem, regardless of whether they come from government officials or politicians. Decisions made at a high level are not the most important problems for projects, which is good news for the decision makers. The locking of objectives that over time become irrelevant does not seem to be a big problem either, which is good news for those responsible for developing the project.

Sustainability

The respondents pointed out four problems as being more important than the others:

- Conflict over objectives and/or strategies concerning the project
- Lack of commitment to the project from key stakeholders
- Economic and financial benefits are low, compared to investment and operational costs
- Business or other conditions change between concept stage and final delivery.

Conflict over objectives and/or strategies concerning the project is the most important problem leading to lack of sustainability. The most important underlying reason was *Neglecting/not solving conflict over priorities among key stakeholders*. This indicates that it is easier to neglect a problem and continue without facing it, than it is to resolve it before continuing. This is human nature – avoiding conflict, hoping it will go away or that someone else will deal with it. This is not a good strategy at the front-end of a project. In the short-term, facing conflict over priorities may pose a risk to the project, but the risk of ending up with a non-sustainable project has far worse consequences than having to spend more time

and resources in the front-end to find a better platform for the project. The second most important reason was *Neglecting powerful interacting organizations/ individuals in opposition to the project*. Whereas the previous reason concerns stakeholders who are positive to and part of the initiative, this reason concerns stakeholders who are in opposition to and not part of the initiative. The nature of the problem is still much the same: facing conflict and opposition. In this case the balance of power is also highly relevant.

Lack of commitment to the project from key stakeholders is the second most important problem leading to lack of sustainability. On this question all identified reasons had quite a few supporters, which indicate that any of the key stakeholders may be the one which lacks commitment. The most important underlying reason for lack of commitment was indicated to be *Not identifying that the project outcome has weak support in its owner- and financing organizations*. If the owner/financing party, i.e. the one putting money into the project in the first place, has no commitment, who should be expected to be committed? Combined with the results of the previous question we see an even clearer picture: when conflicts are not resolved, the platform for long-term support and commitment ends up being too weak. When the conflict finally comes to the surface, the commitment breaks down or slowly fades away. This combined effect is one of the most important reasons for failure. This also indicates a causal chain putting up relevance as an important prerequisite for sustainability.

The third most important problem leading to lack of sustainability is *Economic and financial benefits are low, compared to investment and operational costs.* The most important reason identified was *Planning optimism (overestimated benefits) misleads the decision makers, deliberately or not*. The answers to question 3.4 about economic and financial benefits in Table 4 section C reveal an interesting polarity: The mode answer is '2', meaning 'less important'. Still, there were many respondents who highlighted it as the 'most important', indicated by answering '4'. The weighted score puts it in the 'most important' group of problems. A detailed analysis of the responses revealed that the Nordic group, and within it especially the project managers, dominantly rated their response as '2'. The Anglo-American group tended to respond '4', and within it especially the evaluators and researchers. Project managers in the Anglo-American group generally followed the Nordic group. This can be a result of the project perspective – the problems indicated in this answer are not a threat to the project managers' success, it is not their problem.

Reasons for *Business or other conditions change between concept stage and final delivery* are the fourth most important problem leading to lack of sustainability. Here too, the message concerning *Planning optimism* is very clear – this time focussing on the cost side. In addition there is substantial focus on the changing political and administrative setting, as well as the changing priorities of decision makers and users.

The answers to the survey supports what several researchers have pointed out; planning optimism is a serious problem. The alternative answers in this survey are formulated to include both deliberate optimism (strategic misrepresentation) and non-deliberate optimism (mistakes). Proving the problem to be deliberate or not should be studied in another way to this survey approach. The general uncertainty in naturally fast changing business does not seem to be an important problem in this perspective, which may come as a surprise.

Choosing technological solutions viable under the prevailing conditions is not a problem – this seems reasonable taking the geographical distribution of the respondents into account. In some geographical areas this could be expected to be challenging. Lack of conformity with

the prevailing policy relating to legislation does not seem to be a problem, nor do negative ethical issues (corruption, etc.), and this corresponds well with the findings of Transparency International (TI, 2007) as almost all respondents in this survey were from countries where corruption was found to be low.

6. Improvement strategies

One assumption behind this research is that from a strategic perspective, some problems are more important than others. The answers to the survey indicates this is correct, and the most important problems leading to lack of relevance and sustainability and their dominant root causes have now been identified. These are the problems which should be resolved first to improve front-end governance of public projects. Focussing too strongly on other problems before having a solution to these will be a less effective strategy. Another assumption is that there is already a governance framework in place defining a decision making process, roles and responsibilities and how projects are to be monitored. Improvement strategies should be seen in the context of improvement to existing frameworks. Transfer to situations where no governance framework is established is not valid.

The answers in section 4 show clear indications to causes of lack of relevance. When it comes to sustainability, the answers spread out to many different answers. This leaves us with less clear indication of direction. This may indicate that sustainability is a more complex issue and that the experts are not able to be specific in their advice in this matter. Complexity includes the long term evaluation of effects and unclear causality between causes and effects. Adding to this complexity is the fact that many of these problems and causes will be present simultaneously and will interact. In addition, making changes to handle one cause will change the dominance among other causes. The problems will also change over time. The respondents were given the opportunity to give open text feedback on what we should do to improve on the problems they identified as the most important ones. These answers, together with systematically linking to the problems and their root causes from Section 4 gives input to the induction of effective improvement strategies.

Relevance is identified as a prerequisite for sustainability and thus has to be obtained first. Having improved the basis for relevance, it will be realistic to achieve improvement in the probability for sustainable effects.

Improving the basis for relevant projects:

- Design a systematic planning and decision making process based on participation and involvement of relevant stakeholders. Prepare stakeholders for taking actively part in such a process.
- Define a fundamental logical basis for the project and formulate the objectives and goals clearly. Ensure all parties have a common understanding of the objectives and project goals.

Improving the basis for projects with sustainable effect:

- Explicitly express sustainability as an evaluation criterion.
- Make sure all relevant consequences of the decision are made clear in the basis for decision. Inform decision makers about long term effects; benefits and costs.
- Require contextually holistic planning where sustainability's bearing on the bottom line is explicitly weighted against other criteria.
- Require an independent assessment of sustainability before major key decisions.

- Continuously review expected benefits in the planning stage and beyond decision, considering all relevant stakeholders' concerns, looking to increase value of the investment.
- Ensure the flexibility built into the project process and the outcome is maintained and utilized to increase the value of investment when possible.

Transparency is a fundamental prerequisite for all these strategies to work efficiently. As far as possible transparency has to be achieved in the decision making process, the documents used as basis for decisions, in reviews and monitoring.

7. How much can be generalized from these findings?

As shown in Section 2 (Table 1); mega-project literature has already indicated all the problems ranked as most important in the survey. However, none of the authors of these excellent books indicated all the most important problems and none of them indicated which ones where the most important ones for the process of developing governance frameworks. This survey has confirmed the importance of the problems identified, and has added clarity to the explanation of why these problems are important.

The many connections between the survey and the literature on mega-projects also seem to indicate that the answers in the survey are credible and viable. We do know a lot about the real problems in major public investment projects, but we still have not found the perfect recipe to handle them. The survey gathered data supporting the choice of effective improvement strategies in situations where a governance framework is established. Assumed effective improvement strategies are identified and also the most important prerequisites for the effect to be achieved. As a general impression the findings would fit a 'typical' or 'average' governance framework in the geographical area covered by the respondents. Each framework is obviously different so the relevance of these general improvement strategies has to be considered in each case.

The data from the survey include information which can be used to assess to what degree these conclusions have important limitations. Almost all of the respondents represented either Anglo-American countries or Nordic countries. Thus, while these two geographical areas are well represented, the rest of the world is not. This means only highly developed, politically stable, rich, Western, democratic, Christian dominated countries are covered. Answers to some questions are expected to be different from respondents in other parts of the world. Anyone trying to transfer the conclusions to other regions of the world should give careful consideration as to what interpretation the findings should have in the specific setting in each case.

The responses presented in Section 4 of this paper have been systematically compared between the two groups in order to identify any significant differences between the two geographical groups represented. No significant indications were found that the assessment of the survey questions differed according to which area the respondents came from. The two groups are considered to be adequately homogeneous. Both groups cover public and private sector well.

Some individual expert roles were represented by too few respondents to give clear indications on how these groups think. Especially, project planners and, in the Anglo-American group, decision makers were too scarce. The Nordic group was balanced between

respondents directly involved in the front-end of projects (decision makers and project planners), in executing projects (project managers) and respondents assessing projects from the outside (evaluators and researchers). The balance in the Anglo-American group was skewed towards project managers. This tendency is not strong enough to obstruct the comparison between the groups but is an indication that further sub-division would not lead to strong conclusions.

Dividing the answers into sub-groups according to expert role gives indications that the decision makers tend to see things quite differently to the experts directly involved in projects (project managers and planners). The respondents who looked at projects from the outside (researchers and evaluators) gave answers somewhere in between the two other groups. This is in accordance with intuitive expectation, but the data is not sufficient for strong conclusions.

The conclusions cover major public investment projects and focus on front-end challenges expected to be important across all kinds of projects. The private sector is strongly represented in the response group, and all respondents were asked to draw on their experience when answering in the context of public projects. Consequently there is no reason to believe the conclusions cannot also be transferred, to a large extent, to the private sector. The special organizational and governmental arrangements in the public sector differ from the private sector, and hence some caution should be taken when interpreting the results into a private sector context.

8. Concluding remarks

In the strategic perspective achieving relevance and sustainability is considered to be more important than any other criteria of the OECD Integrated evaluation model (other include impact, effectiveness, efficiency). Success is understood as developing relevant public projects with sustainable effect. In order to have successful investment projects, western governments have introduced governance frameworks which regulate how decisions about these projects are made and upon what basis. The governance framework has to include instruments to make sure the following problems are handled well in the front-end of projects:

Relevance:
- The users' needs are unknown, misunderstood or ignored
- The objectives of the project are unknown or misunderstood

Sustainability:
- Conflict over objectives and/or strategies concerning the project
- Lack of commitment to the project from key stakeholders
- Economic and financial benefits are low, compared to investment and operational costs
- Business or other conditions change between concept stage and final delivery

When these matters are attended to, other matters will deserve top priority. International experts used as respondents in this survey are able to give specific answers to what causes lack of relevance, but they are not able to give equally clear indications when it comes to sustainability. The latter question is obviously more complex and involves difficult long term assessments.

Improvement strategies are deducted based on the identified most important problems at the front-end and their root causes,. First priority should be ensuring relevant concepts are chosen. Only then will a sustainable effect be possible.

Strategies to improve the basis for relevant projects include design of a decision making process based on participation and involvement of relevant stakeholders. These stakeholders then have to be prepared for actively taking part in such a process. Then a logical fundament for the project must be defined and the objectives and goals clearly formulated. This will help ensure that all parties have a common understanding of the objectives and project goals.

Strategies to improve the basis for projects with sustainable effect include a wide range of items. The most obvious one is actually using sustainability as an evaluation criterion. Further, it is necessary to make sure that all relevant consequences of the decision are made clear before making the decision, including long term effects; benefits and costs. Planning has to be contextually holistic where sustainability's bearing on the bottom line is explicitly weighted against other criteria. Independent assessment of sustainability is recommended before major key decisions are taken. All relevant stakeholders' concerns should always be considered and opportunities looked for to increase value of the investment. It is vital to ensure that flexibility is built into the project process.

These improvements will eliminate room for ignoring or misunderstanding users' needs. The participative process will also clarify the objectives for the parties involved. Systematic considerations, clarity and transparency on all levels and in all aspects are crucial for achieving successful public projects. Focussing the benefits from the start through to the end of a project and maintaining flexibility to utilize emerging opportunities to increase the value builds even more potential. This improvement strategy may be implemented by having clear requirements in the governance framework and by establishing appropriate control measures to ensure the quality of the documents on which the decision is based.

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Paper 11

An investigation into the fundamental design of Norwegian public investment projects

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Abstract

Public investment projects need a clear logic; to have well-defined objectives and a fundamentally solid project design. This paper investigates the design of 51 major Norwegian investment projects financed by the state, and analysed under the Ministry of Finance quality assurance scheme. A number of problems are identified. Less than one-third of the projects have a logically consistent structure. Strategic objectives are often too ambitious, and there is a clear tendency to define too many tactical objectives. Too many goals are not verifiable, and less than two-thirds of the operational goals are well specified. All together this makes it difficult to verify the degree of fulfilment of goals. The projects are compared to a set of five design criteria associated with the Logical Framework Approach. Not one of the projects meets all 5 criteria. Even after moderating the analysis for current practice, only 6 projects meet the best practice criteria. The findings presented in this paper are confined, due to the selection of a few and quite diverse public projects in one country. However, the results may be relevant also to projects in the private sector, in other countries, and also in international development projects. The paper points to the importance of persistent continuing work to secure good quality in front-end planning.

Keywords: front-end planning, goal formulation, Logical Framework Approach, project definition, project design, best practice.

1. Introduction

Any large projects, and particularly major public investment projects, are initiated in order to produce benefits for the users and owners. However, in many cases the intended benefits are fewer than predicted, come later than planned, and at a higher prize – or not at all. Many authors have studied success factors and predictors of failure, notably Morris and Hough (1987), Pinto and Slevin (1992), Atkinson (1999), Miller and Lessard (2000); Delisle and Thomas (2002); Flyvbjerg et al. (2003), and Hopkinson (2007). The available literature provides several different answers to why things go wrong and what could bring success in projects. Earlier literature tended to focus narrowly on cost, time and quality aspects, whereas more recent literature may offer a wider perspective. A common feature is that the problem possibly lies in the early phases of the project (the front-end) (Downey 1969; Gibson et al.

2006; Hopkinson 2007; Stahl-Le Cardinal and Merle 2006) and at the governance level (owner perspective) (Crawford, et al. 2008; Dinsmore and Cooke-Davies 2007; Shannon 2007).

When defining processes in the early development of projects a distinction is made between the terms define and design. The term 'define' means the process of defining the objectives of the project, whereas 'design' means the process of defining the means of obtaining the objectives (Turner 2006, p. 93). By 'fundamental design' is meant the basic logical structure defining the project by following the causal link from the basic need of users and society, through defined goals and designed project structure to the delivery of project results (outputs), their outcome (effects) and long-term benefits after the project is terminated (purpose). This may also be recognized as the fundamental logic in the management-by-objectives tradition. If a project is going to produce results that actually deliver the intended benefits, they need to have a good fundamental design. Some authors have provided insight in this area:

Samset and Haavaldsen (1999) analysed a large sample of development projects using the Logical Framework Approach, and concluded that most of the uncertainties affecting these projects were internal and not contextual, for a large part associated with aspects of management and the fundamental project design. Consequently, their suggestion was that most of the problems ought to be met with countermeasures early, i.e. in the pre-study phase.

Youker (1999) concluded that the lack of shared objectives and agreement on the objectives of a project was one of the biggest problems facing international development projects. This was followed up by Youker and Brown (2001), emphasizing the importance of levels of objectives, the why-how framework (referring back to March and Simon's (1958) 'Means-End Chain'), and the importance of systematic use of strategic alternatives and evaluation criteria when choosing projects. Youker and Brown concluded that '*clear and concise objectives early in the life cycle are critical to project success because they help ensure that project stakeholders will develop a common understanding of what the project is attempting to do, and commitment to the same objectives.*' (p. 1). We should expect the process of developing objectives and commitment to them to start well before the execution of the project.

Stahl-Le Cardinal and Marle (2006) proposed a definition process for the project structure that should be constructed in order to reach the objectives and to deliver final results. Also, they conclude (p. 226), '*the decisions made upstream in [the] planning phase have much bigger consequences in the downstream execution phase; failing to plan is planning to fail*'. They look at projects as transformation processes from an initial to an expected final situation, evolving in an often complex and changing environment. They point to the fundamental requirement that the project should correspond with the customer's (user, owner) needs and expectations, and the SMART criterion (referring to Drucker's (1954) *The Practice of Management*) as a tool for revealing dysfunctions in goals.

A study of the fundamental design of development projects performed by Samset (2006), based on a sample of 30 international aid projects, concluded that most of the projects examined had design faults at all levels, and no projects were without faults. Typical problems identified were insufficient resources, and too many and unrealistic goals. The starting point of the paper was that international development projects were frequently considered too ambitious, both in terms of formal objectives and because of extreme external

uncertainties. As a whole, the problem identified was not that the projects were more ambitious than reasonable, but the lack of ability to define clear, consistent and verifiable goals and strategies in development projects. The weakest part of project design in international development projects seemed to be lack of identification of external uncertainties that might affect the project.

This paper similarly investigates to what degree the fundamental design for public investment projects follows best practice for project design. Following analysis of a sample of 51 major public projects in Norway, this paper looks closely at the reality of the fundamental logic, goal formulations and ambition levels defined in these projects. Accordingly, the research questions are: 1. Is the basic causal logic of these projects valid? 2. Are the objectives in these projects verifiable and well specified? 3. Are the objectives defined in these projects generally too ambitious? 4. Do these projects meet the design requirements of the Logical Framework Approach? The answers to these questions should improve our understanding and basis for improving the methods for front-end planning of projects.

2. Best practice standard for project design

Youker and Brown (2001) suggest the Logical Framework Approach (LFA) as the tool for understanding the measures of success in projects. Samset (2006) also used LFA in his study of development projects. In this investigation we have chosen LFA as a best practice standard for front-end planning. This paper evaluates the work project organizations do to express the needs–goals–means–effect causality logic through their defined objectives.

Three perspectives are fundamental (Samset 2003):

- *The strategic perspective*: The perspective of the owner and/or financing party. In public projects this perspective expresses the value of the project for society, i.e. its purpose. The focus is typically on long-term benefits from the project for society as a whole.
- *The tactical perspective*: The perspective of the users and other target groups. The focus is on the effects or the outcomes, typically expressed in terms of capacities and functions delivered by using the outputs of the project.
- *The operational perspective*: The perspective of the executing party, the ones responsible for implementing the project and thereby creating project outputs. The focus is essentially on the quality, cost and progress in project execution.

The levels and concepts described above are elements of the Logical Framework Approach (LFA-method). The LFA was developed for USAID by Leon J. Rosenberg in 1969. This method is described in more detail in several sources, among them Samset (1996; 2003), NORAD (1999), Örtengren (2004), and AusGuideline (2005). The LFA-method is used as a standard method in development projects for agencies such as the UNDP, USAID, GTZ, NORAD, SIDA, JICA, AusAid, and is widely used by NGOs. It is also used as a standard development tool in investment projects in the UK, Canada, Germany, and Sweden, and by the EC (European Commission). In the LFA-method a goal is expressed in terms of a positive, expected outcome. Other outcomes (unexpected or unwanted) that are attributed to the project are termed ‘impact’. According to this methodology, the following best practice requirements for project design would apply:

1. All operational objectives should be fully achievable.

2. Resources should be sufficient to support the fulfilment of operational objectives.
3. There should be one tactical objective to determine the level of achievement, which should be realistically achievable once the operational objectives have been produced.
4. The strategic objective should be realistically achievable within a wider time perspective provided that the tactical objective has been achieved.
5. All major uncertainty factors should be identified and considered in the design of the strategy, and there should be no fatal risk factors in the project.

These five criteria were applied as reference or a standard in the analysis reported in this paper. All projects in the sample were checked individually against these criteria, as will be shown summarized in the following sections. It should be noted that none of the projects in the sample were actually designed or analysed with the LFA-method, and the LFA-approach is not mentioned in any of the available project documents. However, all projects have been subjected to a comprehensive quality assurance procedure that should guarantee a certain level of quality of design of these large and prestigious projects. The procedure is described below.

3. Method

In Norway all major investment projects financed by the State (exceeding approximately USD 80 million, and excluding the oil and gas sector) have to pass a gateway termed Quality Assurance 2 (QA2) before the project can be presented to Parliament for approval (Ministry of Finance 2004; Samset et al. 2006; Klakegg et al. 2008). This will allow the Ministry of Finance to review the quality of decision documents produced by the responsible Ministry at an appropriate stage. Two documents are produced for each project as the result of this formal arrangement:

- *The project management plan* (PM Plan) is presented by the responsible Government Agency, often prepared by the pre-project organization. This document includes descriptions of the project's purpose, objectives, budgets, schedules, and deliverables (outputs), how the project will be organized, and the intended contract strategy for the project. The PM Plan is subject to scrutiny by a quality assurance consultant appointed by the Ministry of Finance.
- *The QA2 report* documents the independent assessment of the project carried out by the consultant. The so-called QA consultant is mandated to perform an independent analysis of the project with focus on cost estimation and uncertainties, and he or she will also give advice regarding the organization and management of the project.

These two documents were the main source of project information used in the research which forms the basis of this paper. Other sources included public documents concerning the decision making process and information on the websites of the governance agencies responsible for the projects. It should be noted that all projects are scrutinized by the same procedures and similar methodology. Hence, the results documented in the QA2 reports are to a large extent comparable. The two main source documents view the project from two different perspectives; the project organisation and the independent, external QA consultant. This makes up a well documented basis for the study. Projects that did not allow insight in these documents where excluded in the sample.

For the present study, the authors performed a thorough analysis of the material according to the following procedures:

1. Goals formulated in the PM Plan were registered and checked for quality flaws in definition. What is here termed confounded goals typically consists of statements that represent descriptions of the project, its deliverables, activities or requirements. Some goals may not be linked to the project at all. Such confounded goals have been excluded from the material. Another common problem is that the goal formulation might be a complex statement that includes several goals. These were split into individual goals. This is essential in order to test the logic of the project, which makes this first step a fundamental one.
2. Each accepted goal was then analysed and categorized with regard to the level they belong to, the degree to which they are well specified, whether they are individually in conflict with each other, and how ambitious they are. This part of the analysis tests the quality aspects of formulation of individual goals..
3. For each project the result of the independent uncertainty analysis, as well as the accepted goals, were then put together in a table in accordance with the structure of the LFA-method, in order to identify to what extent the results were in accordance with the best practice standard explained above.

One of the strengths of this study is that it is based on first-hand information about the projects through PM Plans and systematic independent assessments from the QA2 reports. The authors' have considerable first hand knowledge of the Norwegian QA scheme and procedures. On the other hand, since the assessments in the QA2 reports do not apply the same methodology as this study, quite a lot is left to be interpreted by the authors. This may represent a potential source of error.

The information used in this study is restricted to the stage where the project is prepared for Parliamentary approval. Most of the projects had been approved, and some of them were also being implemented at the time of writing. Naturally, there are relevant considerations done at earlier phases, but these are not considered here. The authors have deliberately chosen not to include any consideration of whether the analysis at the QA2-stage conforms to actual results.

Consistency in assessments was obtained by the same researcher going through all steps of analysis for all projects and goals twice. We obtained reliability by using the original source; no information was filtered away or processed by others between the source and the researcher. In addition, reliability was ensured by using standardized methods and concepts that have been implemented in the Norwegian QA scheme. Validity was obtained by systematically applying well-defined concepts and definitions. Also, in the source documents the terms used are highly standardized and had been established during the course of the period studied here.

4. The sample

The sample represents different sectors and types of projects. The largest group is construction projects in the transport sector. Building projects in 'other' sectors form the second largest subgroup, followed by military procurement projects. The 'other' sectors include two civil ICT projects. There are also three ICT projects and two building and construction projects in the defence sector. Some of the building projects and ICT projects, regardless of sector, are part of an organization change programme. The programme

perspective is not represented in this analysis. Facts relating to the sample are shown in Table 1. In this analysis no attempt has been made to analyse subgroups of projects according to sector, type or other characteristics.

The projects included in this study were subjected to external quality assurance in the period 2001–2007. In this period a total of 88 projects were included in the quality assurance scheme, which means that the 51 projects in the sample represent 58% of the total population of major Norwegian public investment projects in the period. Defence projects and projects in the period 2006-2007 are underrepresented in the material.

Table 1 Overview of the project sample. Number of projects: N = 51.

Sector			**Type of project**		
	N_s (number of projects in sector)	Share of total		N_t (number of specific type)	Share of total
Defence	10	19.6%	Acquisition (military equipment, ICT systems, etc.)	8	15.7%
Transport	29	56.9%	Construction (road, railway, tram, tunnel, bridge, etc.)	30	58.8%
Other (Culture, Education, etc.)	12	23.5%	Building (university, hospital, offices, museum, opera, etc.)	13	25.5%
Sum	51	100.0%	Sum	51	100.0%

The projects were not randomly chosen – all reports that provided the information needed for this analysis were included. Additional information was collected from some more projects to balance the sample on the timeline and across sectors. In this process, priority was given to projects from which information could be easily obtained. Compared to the total population, most of the projects that were not included were defence projects, for which information is less easy to obtain due to the sensitive nature of some of them.

5. Project definition – the fundamental logic

Testing the fundamental logic of major public investment projects is not a simple undertaking and is prone to subjective judgment. The procedure is described above. Three levels of perspectives were involved, checking the causal linkages between described purpose, goals and future effects. The first step of analysis was removing the interference from confounded goals. In this process, 228 goal formulations were removed from 44 projects. Then, formulations with multiple goals included, i.e. 'complex goals', were decomposed into single goals. This can be explained by the following example from one project where a goal was expressed as (author's translation):

'Solutions for energy and environment shall have a positive effect on operation, energy consumption, perceived indoor environment and influence on the outer environment through the whole lifetime of the building.'

For our analysis, the goal formulation had to be split into several separate goals. Without reformulating them as goals, we split the formulation into four parts:

1. operation of the building through the whole lifetime of the building
2. energy consumption through lifetime
3. perceived indoor environment through lifetime
4. influence on the outer environment through lifetime.

What was originally presented as one goal was really four different goals, of which three were connected by the causal relation to the first goal; whatever the project is supposed to produce (here expressed very vaguely as 'solutions for energy and environment'). In the analysis this type of goals are handled as four separate goals. This made the logic of each project much clearer and in itself improved the quality of the project definitions. After removing confounded goals and sorting out complex goals, the remaining 541 goals were accepted as real project goals and included in the analysis.

There is commonly a degree of conflict between goals because they depend on the same resources to varying degrees. Consequently, the project has to make trade-offs between goals in situations with resource limitations. This is why having a defined priority between goals at different ambition levels is so important. These trade-offs are important in developing projects but but considered a problem in this analysis. In addition, some goals have inherent conflicts built into them, as the following example shows (author's translation and emphasis of two excerpts from the project owner's document):

The project shall *'double the number of visitors'* and at the same time *'develop a building adapted to today's needs.'*

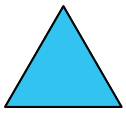
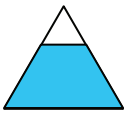
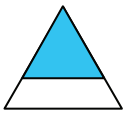
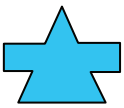
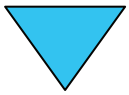
Obviously, it is not possible to develop a building based on today's needs while at the same time pursue the goal of doubling the number of visitors in the future. Thus, the goal formulation is unclear and seems to indicate a conflict. The project organization in question chose not to include any of these goals in their project management plan. They interpreted the goals as building 'for the future', 'a flexible solution' and 'with good capacity'. When the conflicting goals were identified and counted, there were no more than five cases of conflicting goals, which represented a small problem in the sample of projects.

In an assessment of the logical structure, after 'cleaning it up', the projects were categorized according to one of the following:

A. Well defined – all levels represented and balanced, causal logic intact.
B. 'No purpose' – strategic objective missing, the rest OK.
C. 'No effect' – tactical objective missing, the rest OK.
D. 'No content' – operational goals missing.
E. 'Parallel effects' – many tactical objectives, the rest OK.
F. 'Top heavy' – many strategic objectives, little focus on operational goals.

The results of this analysis are shown in Table 2.

Table 2 Fundamental logic in defining project objectives. N = 51 projects.

Category	A	B	C	D	E	F
Characteri-zation	Well defined	No purpose	No effect	No content	Parallel effects	Top heavy
Symbolic representation						
Number of projects	16	7	3	2	21	2
Share of projects	31.4%	13.7%	5.9%	3.9%	41.2%	3.9%

The conclusion reached is that only about one-third of the projects have a well-defined fundamental logic after interference and obviously confounded goals have been removed. This is not too promising, but many of the problems represented in categories B – F are easy to correct. There is obviously potential for improvement.

In category B the strategic objective is missing. Sometimes the purpose of the project may seem 'too obvious to be worth mentioning' for the parties involved. This could be corrected with increased awareness. In categories C and D the projects have chosen not to express tactical goals (effects to be obtained by the use of the project's results) or operational goals (goals concerning the deliverables of the project). Such errors should not be acceptable in any project, and definitely not in major public projects. Realistic tactical goals are essential for making the right decisions regarding the choice of project in the front-end and subsequently assessing its success. Well-defined operational goals are essential for the design and subsequent assessment of the project's performance. Without clear goals the project organization will be less accountable, which in many cases could explain this type of design flaw. These categories represent approximately 20% of the projects in the sample.

Categories E and F are of a different kind. In these projects it seems there has been a rush to identify as many good intentions and purposes as possible. The explanation could be an urge among the project promoters to give the project priority. The goals expressed in category E projects represent a wide range of anticipated positive effects. Some, but not all of them, may be relevant to the project, but in either case they leave a confusing and unclear impression of what the project is meant to achieve. This is the largest category and includes 41% of the projects in the sample. In category F projects, the good purposes are expressed at the higher level, suggesting a wide range of positive benefits for society. In many of the projects in this category, imagination has been stretched beyond what could reasonably be expected, and it is unlikely that the benefits can be attributed to the project. Although this category includes just under 4% of the projects cases, the problem of overbidding seems to be an anomaly of a more general nature.

6. Verifiability of and ambitions in objectives

We use the following classification of objectives: Verifiable; you know whether you have reached it or not when you get there. Well specified; you may assess to what degree it is reached, preferably during the process of execution.

Objectives need to be verifiable. This is a minim requirement, and allows managers to assess achievements in hindsight. The extent to which an objective is verifiable is essentially a question of whether it is unambiguously defined. To be able to monitor performance and achievements during execution, the objectives should be well specified. This can be illustrated by what is commonly understood by the acronym SMART, i.e. the objective needs to be specific, measurable, attainable, realistic, and timely (Stahl-Le Cardinal and Marle 2006). We have chosen not to use the SMART criteria in this study, but in stead the criteria following LFA.

An example of a unverifiable goal would be the following project taken from a building project: '*to increase the efficiency of the central administration*'. In order to be verifiable, it would be necessary to be specific about what is meant by efficiency. Efficiency in administrative processes and organizations can be interpreted in different ways, but most of them would not be directly attributed to the building. What this suggests is that efficiency might not be a relevant objective, since the validity is too restricted. Also, it would be necessary to specify what is meant by 'increase', preferably in quantitative terms. An example of a verifiable objective could be: '*Sales figures of product X to exceed USD 100 million by 2012*'. Here, there is no doubt about what to measure and the level to be achieved. The objective is thus not only verifiable, but also well specified.

In the present study, all individual goals were reviewed and classified as either unverifiable, verifiable or well specified. The results are shown in Table 3.

Table 3 Degree of specification in defined objectives. N = 541 goals.

Level		Number of goals	Verifiable goals	Well-specified goals
Strategic level	N_3	63	38	5
	%	100%	60%	8%
Tactical level	N_2	211	176	59
	%	100%	83%	28%
Operational level	N_1	267	250	152
	%	100%	94%	57%

A graphic presentation of the trend when introducing more demanding requirements for the quality of goal formulations is shown in Figure 1.

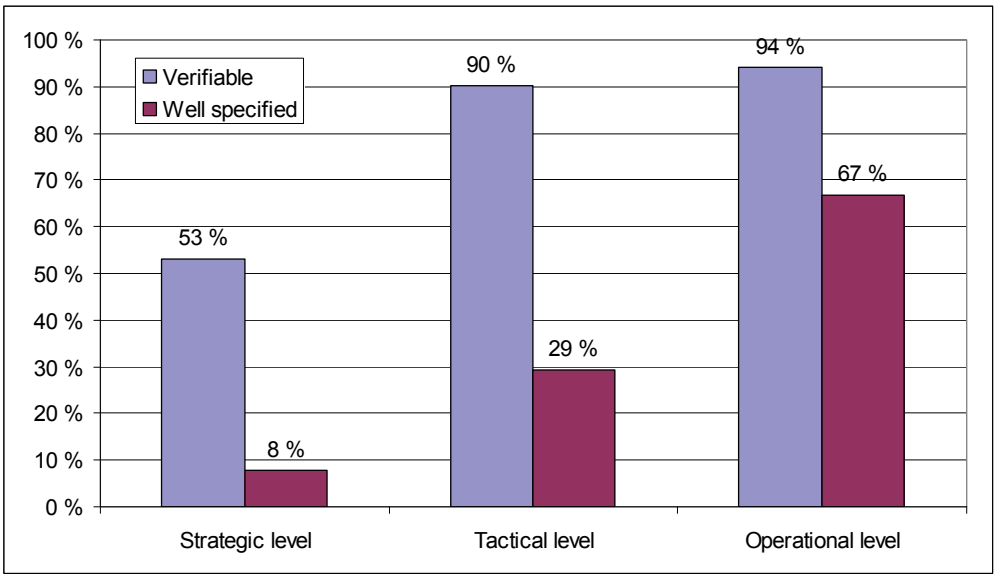


Figure 1 Share of formulated goals on different levels being verifiable and well specified. N = 541 goals.

As might be expected, strategic level objectives are generally less verifiable than objectives at the tactical and operational levels. Only in rare cases are they well specified. These are expressions of the anticipated long-term effect of the project and may be difficult to specify since their achievement would typically depend also on other factors than the project, and which are beyond the project's mandate and control. Hence, some might question the usefulness of well-specified and quantified objectives at this level, due to the problem of attribution.

Tactical level objectives are supposed to stipulate the project's benefits for users. These ought to be well specified to enable effective monitoring and management. In the present study, however, only 29% of the objectives were well specified.

Objectives at the operational level express the expected outputs of the project when it is terminated. These are supposed to be well specified, and this is confirmed by the present study. Defining measurable operational goals is essential in all projects and some argue that it is easy to do, even in complex projects such as ICT projects (Gilb 2008). Still, only 57% of the operational goals in this study were well specified. It should be noted that all confounded goals describing the results, requirements or means were at the operative level and would have reduced the score even more had they not been removed from the sample in advance. The study indicates that the quality of goal formulation in major investment projects is far from desirable.

Objectives need to be realistic, i.e. not too ambitious and not too limited. Operational goals are realistic if obtainable within the project organization's control span and possible to achieve with the available resources. Given that the outputs are delivered, tactical goals are realistic if the use of the output is likely to have the intended effect. Given the effect of the use is as intended, the strategic objective is realistic if the anticipated wider benefit for society can be achieved within the lifetime of the outcome. In this step of the analysis all the individual objectives are assessed against these criteria. The results are shown in Table 4.

Table 4 Level of ambitions in defined individual objectives, expressed through the number/share of goals with too high, realistic and too low ambitions. N = 541 goals.

Level		# of goals	Overly ambitious	Realistic	Low ambitions
Strategic level	N_3	63	17	41	5
	%	100%	27%	65%	8%
Tactical level	N_2	211	37	165	9
	%	100%	18%	78%	4%
Operational level	N_1	267	14	251	2
	%	100%	5%	94%	1%

The tendency is towards high ambitions on strategic level objectives. 27% of the defined goals have ambitions that are unobtainable within the lifetime of the project results. On the other hand, 8% of the goals have low ambitions – often formulated as 'contribution to' a development powered by other means than the actual project. It is expected that high ambitions are indications of the kind of arguments used to trigger state financing for the initiative. On the tactical level, the tendency is the same, but weaker. Realistic level of ambition is expressed in 78% of the individual tactical goals. On the operational level, realistic ambitions dominate the goals. A total of 94% of individual goals at this level are found to be realistic, 5% represent high ambitions (unrealistic within the limitations of resources or control span), and only 1% represent low ambitions.

This analysis of individual goal formulations gives a more positive result than the analysis of fundamental logic. The majority of goals are classified as realistic. However, the analysis indicates that highly ambitious objectives are being used as arguments to convince decision makers that the project in question should be given priority. The results of this analysis are somewhat uncertain due to the authors' limited insight into the reality behind the objectives, but the QA2 reports made by QA consultants support the analysis with relevant and independent reviews based on a thorough analysis process. In the next section this analysis is elevated to the project level.

7. Ambitions expressed in the project strategy

Project owners and the project organization express their ambitions through their formulation of objectives. The present study is based on the information available in PM Plans and QA reports. The findings are largely affected by the researcher's interpretation and processing of this information. An analysis of project strategy requires a review of the logical sequence of events as described in the documents. Assessing which ambition level they should be associated with, requires the researcher to make a number of probabilistic assumptions. This is also the case when the significance of uncertainty factors is reviewed. There can be little doubt that the judgmental element in these types of analyses is substantial, and the analyses are therefore susceptible to the researcher's judgmental biases and misinterpretations. In the present study it was not possible to test the effect of or correct for such biases. The results of the analysis are presented in Table 5.

Table 5 Ambitions in projects expressed through objectives on different levels. N = 51 projects.

Level		Number of projects	Projects with too ambitious objectives	Projects with realistic objectives	Projects with too limited objectives
Strategic level	N_3	40	11	28	1
	%	78%	22%	55%	2%
Tactical level	N_2	49	6	40	3
	%	96%	12%	78%	6%
Operational level	N_1	49	1	47	1
	%	96%	2%	92%	2%

The selection of the higher level objectives has been found to be the weakest part of the design. Strategic goals have been established in only 78% of the projects, and in 22% of the cases these are too ambitious. Only 55% of the strategic goals are verifiable and realistic. On the tactical level the result is better in the sense that almost all projects have explicitly defined objectives and as much as 78% of these are realistic. At the operational level most of the objectives are considered to be at a realistic ambition level. The ambitions expressed in these projects are shown in Figure 2. There is asymmetry, although it is only strong on the strategic level.

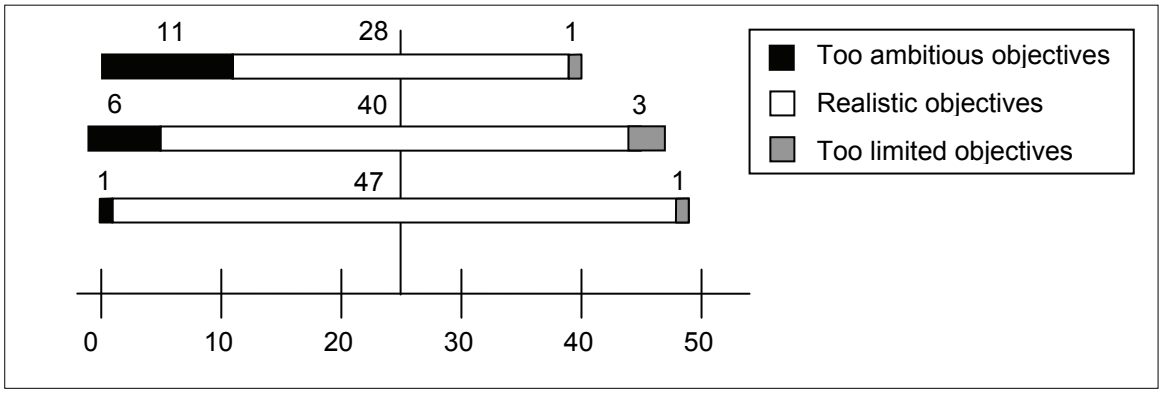


Figure 2 Asymmetry of objectives in 51 projects at three ambition levels.

8. Project analysis – resources and uncertainties

The QA2 reports used in this study provide information on resources required and uncertainty that might affect the implementation of the projects. As part of the study a review was made of uncertainties specified in the documents as seen in relation to the three ambition levels. In an ideal case all major uncertainties would be identified, and linked logically to the respective ambition levels. Tables 6 and 7 present the most important findings.

Table 6 Resource situation in projects according to QA2 analysis. N = 51 projects.

Number of projects	Resource problems identified in the projects
1	Lack of top-management attention
2	Management not in place
8	People (capacity and skills) not available (due to market or local conditions)
21	Lack of money/Low budget
5	Too high budgets
1	Time too short for execution
21	No resource problem indicated

As shown in Table 6, there are considerable weaknesses in the specification of resources. In a total of 26 projects (50%) there were some sort of problem associated with the budget. Clearly, if the budget is too low it might cause problems for the project organization in producing agreed outputs – or for the owner in terms of either having to deal with cost overrun, or to observe a reduced effect of the project. Also the opposite situation, i.e. specifying too high budgets, is a problem for the owner, since it could result in overspending and wasting funds that could have been used more effectively for other purposes.

It should be noted that the QA2 reports are made to support the Parliaments decision whether or not to appropriate fund for the project. Consequently, the decision may be to adjust the budget according to the advice from the QA consultant, which is done quite frequently (Magnussen and Olsson 2006). This would then remove the resource problem in the project. Most of the projects studied had not been finished at the time of analysis. As a consequence, we do not know if the identified uncertainties or resource problems eventually caused the projects any problems in the execution phase.

Table 7 Important uncertainties not included in QA2 analysis. N = 51 projects.

Level	Number of projects where uncertainties are not included	Examples, types of uncertainties not included
Strategic level	30	Large societal development trends, economic, environmental, and technological development, future decisions,
Tactical level	43	Future user needs, user response, approvals, financing, local stakeholders involvement
Operational level	17	Contracts, progress, organization, management, interface with other projects, technical complexity
All uncertainties included	6	All uncertainties included in QA2 analysis

Uncertainties associated with projects can be categorized in many ways. For this simple analysis the following categories were used: at strategic level: a) large development trends, b) future decisions; at tactical level: c) real needs, d) utilization by users, e) acceptance by other stakeholders; at operational level: f) market, g) organization, h) method, i) technical solution, j) initial state. The categories e) to j) are obligatory parts of the uncertainty analysis in QA2 and thus expected to be included in all analyses. Categories a) to d) are not normally assessed in QA2 and thus not expected to be part of the analysis.

As one should expect, the limited scope of the QA2 analysis is mirrored in the results, largely excluding uncertainties on strategic and tactical levels. The uncertainty analysis is performed with an operational focus and includes uncertainties at the tactical and strategic levels only to the extent that they are identified to have major impact on the project execution and investment costs. This is according to the mandate given by the Ministry of Finance. A surprisingly high number of analyses did not include all operational categories of uncertainties. There may be good reasons for this, but the reports did not refer to such reasons. On a few occasions the mandate given is wider and includes the higher level aspects of effects and long-term benefits. The projects in these cases represent either projects that are less developed and less mature, or projects that are organized differently from standard projects (i.e. Public Private Partnerships). A total of six project analyses were found to have included all categories of uncertainties.

9. Compliance to best practice standard

The elements of analysis reported in previous sections points towards the test against the best practice standard for project design applied in the Logical Framework approach. The fundamental logic in the project design, the formulation of goals and the presumptions inherently present in the source documents have all been tested. Some of the assessments are based on subjective judgement. In general, a conservative consideration is used, tending to put the project in the best category of alternatives when in doubt. The final analysis of this material tests the projects against the LFA best practice standard for project design. Figure 3 shows the result of testing compliance to the five criteria of the best practice standard described in Section 2.

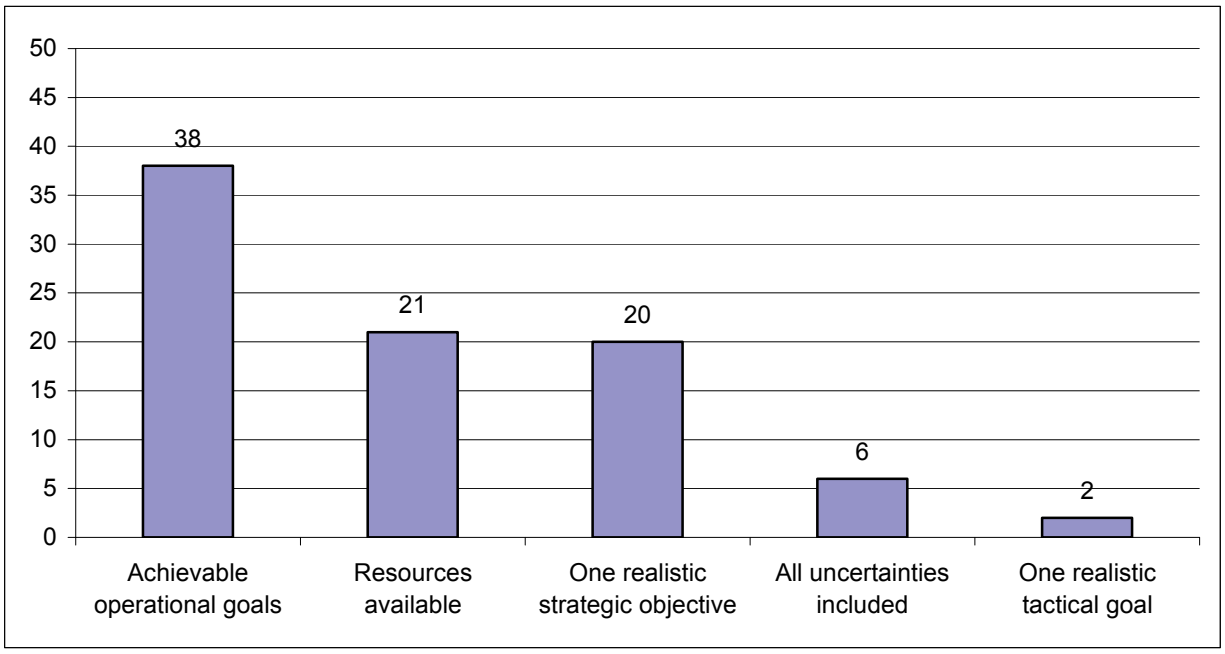


Figure 3 The number of projects meeting the best practice criteria of the Logical Framework Approach. Total of 51 projects evaluated.

As might be expected from the results described above, the number of projects meeting each of the definition criteria is quite small. In total, 38 projects have all operational objectives realistically achievable with the anticipated resources. 21 projects seem to have all important resources available. 20 projects have only one strategic objective, and realistically achievable within a wider time perspective once the effects are achieved. 6 projects have identified all important uncertainties and have no fatal risk factors attached. Only 2 projects have only one tactical objective, realistically achievable once the results of the projects have been produced. Not one project meets all five criteria. All projects except one fail to meet two or more of the definition criteria, and 7 projects do not meet any of the five criteria.

Comments on each separate criteria of the LFA best practice standard:

Criterion 1, achievable operational goals, is generally accepted as a guideline for projects and, as we have shown, most projects do have mostly realistic operational goals. The criterion is strict and does not allow any operational goals to be unrealistic. A few projects have at least one of the latter.

Criterion 2, resources available, is also generally accepted as a guideline for projects. The final budget for the project is not set at the point in time when the source documents were made. The decision makers may have granted the project an adequate budget. This is an expected outcome in some cases and will improve the result for this criterion.

Criterion 3, one, and only one realistic tactical goal, calls for a few comments: There is no general acceptance of this criterion in Norway, neither among project owners nor among project managers. The results of most projects have many positive effects once they are delivered. The largest group of projects in this sample is road projects. For road projects, the project owner requires effects to be assessed for transport economy, traffic safety and environmental effects. The project organizations systematically transform these requirements into at least three tactical objectives. This group of projects will systematically fail to meet criterion 3. However, accepting 3 tactical goals as meeting criterion 3 would not make any more projects meet all criteria, indicating that this alone does not explain bad performance. As indicated in Section 5 this might be a result of the decision making process.

Criterion 4, one realistic strategic objective, is generally accepted as a guideline for projects. Still, many projects end up pursuing two or more strategic goals or unrealistic strategic goals. Probably, this is a result of the decision making process and the hunt for good arguments to help trigger public funding.

Criterion 5, all uncertainties included, also calls for some special attention. This is generally accepted as a guideline for projects. As already mentioned, the mandate of the QA consultants performing the uncertainty analysis used as a reference for this assessment is limited to the investment cost in the execution phase. If they had a wider mandate; to look at the whole life cycle and including the wider benefit of the project to society, there is reason to believe the result of this analysis would look different for this criterion. If we exclude this criterion, one project would meet all four remaining criteria.

This analysis shows that current project practice does not live up to expectations, as expressed through the chosen best practice standard. Even if criteria 3 and 5 where modified to fit current practice, only few major projects in Norway would meet these criteria. The analysis is very rigid and probably paints a pessimistic picture of current practice, but it is a

strong indication that the problems indicated in the introduction still lives on. It points to the importance of persistent continuing work to secure good quality in front-end planning and may indicate potential for improvement both to the Norwegian QA scheme and major public investment projects.

10. Generalization of findings

This study reveals several aspects of fundamental design flaws. The size of the sample is not large. Still, representing 58% of the total population of major Norwegian public investment projects financed by the state in the period 2001-2007 it might give a good representation of this population, although some categories of projects are slightly under-represented. The question is whether the conclusions drawn here are valid and can be generalized to a different population of projects.

Since the number of projects is small, the study can only provide some indications, which will have to be studied further. Some of the issues might be:

- Are practices in the public sector entirely different from those in the private sector, or could the same problems be found there? The problems are caused, partly by low performance, tactical dispositions and from not following guidelines. This happens in all sectors. The tendency to introduce biases that can provide reasons to finance and execute the projects has its parallels in private sector and market-driven businesses as well.
- Is the situation in Norway different from other industrialized countries, or could the same problems be found elsewhere? Project management is developing into a profession with international standards and norms. What is specific in this case is that Norway has introduced a QA scheme that makes this information available. The intention is to improve the processes leading up to the final decision whether or not to finance major public investment projects. Other countries' governments have established governance frameworks with similar aims and similar or other control measures (Klakegg et al. 2008). There is no reason to believe similar problems do not occur in other developed countries
- Is then the situation in Norway different from other settings, for example developing countries, so that the problems identified here are irrelevant there? A similar analysis has been performed for international development projects (Samset 2006). It documented many of the same problems in this setting. These projects were planned and executed locally, in cooperation with international aid agencies. There is no evidence to suggest that the situation is different when it comes to projects initiated and financed in developing countries either..

We believe this investigation gives indications of problems that should be focused in any country and setting to make sure projects are well planned and money well spent.

11. Conclusions

The analysis of 51 projects presented in this paper covers more than half of all major public investment projects in Norway in the period 2000–2007 (excluding the oil and gas sector). There is reason to believe the results are representative for the population of investment projects with an investment cost exceeding approximately USD 80 million, financed by the State and under scrutiny of the Quality Assurance Scheme established by the Ministry of

Finance in Norway. The dominating sectors are transport and defence, the typical project types are building, construction and acquisition of defence equipment and ICT systems. The conclusions to the research questions in this investigation are as follows:

1. Only 30% of the projects are defined with a basically logical structure. More than 40% of the projects are found to have many tactical objectives, indicating that the projects do not have a focussed approach. The remaining less than 30% have a mix of logical errors including missing strategic or tactical goals, some even missing operational goals. From this we conclude that there is a need to systematically check the causal logic of major projects, it is often not consistent.

2. Each project has on average defined approximately one strategic goal, four tactical goals and six operational goals. A total of 541 goals are analysed, after confounded goals have been excluded. Most of these objectives are verifiable, ranging from 60% at the strategic level to 94% at the operational level. In total, 8%, 28% and 58% of the individual goals are well specified on strategic, tactical and operational levels respectively. The answer to research question 2 is that the objectives to a large degree are verifiable, but in general they are not well specified.

3. The objectives are largely realistic, but there are indications of too high ambitions on strategic level. In all, 55% of the projects have strategic objectives which are found to be realistic, similarly 78% of the tactical goals and 92% of operational goals. Some projects have defined too ambitious goals, especially on a strategic level (22%) and tactical level (12%), probably indicating the effect of looking for breakthrough arguments to trigger public funding. A few projects also define too limited goals. Most of the projects have realistic objectives and level of ambitions.

4. Not one of the projects meets all the five defined best practice criteria for project definition in the Logical Framework Approach. Even after moderating the criterion that is not generally accepted as a guideline in Norway and excluding the criterion not met due to limited mandate in uncertainty analyses performed in these projects, only six projects meet all the remaining criteria.

The over all conclusion is that the major investment projects in this study only partly build on a valid fundamental logic. Most of the projects have serious flaws in their project design. It might be expected that professional project owners and project managers would do better.

The number of projects in this study is obviously too small to allow for strong general conclusions, but gives indications that might be relevant also to the private sector, other developed countries and international development projects.

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14/09/2007

Appendix: A survey

Challenges in the Front-end of Major Public Projects

This survey is a part of a PhD research project which includes examining problems in the front-end planning of major public projects. Creating maximum value from the available resources and funds is an important but difficult task. What can be done to achieve this, and avoid or counteract common problems?

This PhD project is supported by the Concept Research Programme at NTNU (Trondheim, Norway). The Concept Research Programme is initiated and financed by the Norwegian Ministry of Finance.

The results of this survey will be used in several studies and published internationally. By answering these questions, you also accept that I may use your answers in the scientific analyses and that I also reserve the right to publish the findings. All respondents will be kept anonymous.

The survey will take approximately 20–30 minutes to answer.

Thank you for your time

Ole Jonny Klakegg

Introductory texts and questions follow on the next pages.

Printed version:
Printed on both sides of the paper

Please return completed questionnaire to:

Ole Jonny Klakegg
School of Management
University of Southampton, Highfield
Southampton
SO17 1BJ
UK

General information

Information about the respondent (Tick the relevant box – only one in each category, except 1.6):

1.1	Gender	Male:	
		Female:	

1.2	Age	Below 35:	
		35 – 55:	
		Over 55:	

1.3	Main sector of experience	Public:	
		Private:	
		Non-governmental organizations	

1.4	Your expert profession/role	Programme - /Project manager:	
		Project evaluator:	
		Project planner:	
		Decision maker:	
		Researcher:	

1.5	Number of years experience in your expert profession/role	Below 5:	
		5 – 10:	
		More than 10:	

1.6	Main experience from what type of projects	Building and construction, physical infrastructure	
		Organizational change and ICT projects	
		Procurement and military equipment	
		Industry, offshore and shipping	
		International aid projects	
		Research	

1.7	Country (fill in)	

Part 1: What are the most important problems that occur when a major public investment project is defined and designed?[23]

Major public investment projects are often large and complex compared to other projects. This survey covers the early (front-end) planning and decision making. By focusing on the most important problems in the front-end phase, it is hoped that we will be able to identify the most important reasons behind unsuccessful projects.

From the start, every public project should be based on the needs of the users and the society at large, and should aim at gaining intended benefits or effects after completion. In order to cast light on this, the present survey is investigating important aspects of the decision making process. The survey is not aimed at management issues in the operational phase. This survey focuses on two key issues: relevance and sustainability. Definitions/explanations of terms used are found in Appendix A: Definitions.

Relevance

Relevance refers to whether the chosen public investment project is the most appropriate one judged from the owner/financing party's viewpoint, given there are alternative projects and that no investment is included among the alternatives.

Relevance refers to the objectives of the project, and is a matter of to what degree the objectives are in keeping with valid priorities and the users' needs. Relevance is a question of usefulness. Obviously, if the project is not useful it should be rejected or terminated.

Please indicate which alternatives are, in your opinion, the <u>most important</u> problems leading to <u>lack of relevance</u> in major public investment projects.
Tick in the appropriate boxes and indicate your opinion on degree of importance. The scale ranges from 1 (least important) to 4 (most important). Please indicate importance for all alternatives. At least one alternative should be 'most important'.

#	Alternative	1	2	3	4
2.1	The users' needs are unknown, misunderstood or ignored				
2.2	The users' needs change before the project is executed				
2.3	The society's priorities are unknown, misunderstood or ignored				
2.4	The society's priorities change before the project is executed				
2.5	The objectives of the project are unknown or misunderstood				
2.6	The objectives of the project do not change according to changed needs/priorities over time				

In the next section you will be asked to elaborate more on the alternative(s) you have pointed out to be most important ones, i.e. <u>only</u> those you rated as 4 on the scale.

[23] See more information to this question on page 16 if you find it unclear.

2.1 You indicated the users' needs are unknown, misunderstood or ignored. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

2.1.1	The users have not been asked	
2.1.2	The way the users are asked/participate in the planning process gives the wrong answers/does not unveil the needs	
2.1.3	The users do not know/can not express what they need	
2.1.4	The planners are not competent enough in understanding the users' needs/answers	
2.1.5	Users' needs are ignored by planners and decision makers due to political or personality reasons	
2.1.6	Other (please indicate the reason in your own words): _____	

2.2 You indicated the users' needs change before the project is executed. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

2.2.1	The users' needs change very fast by nature	
2.2.2	The users change their minds due to changes in society or other external influence	
2.2.3	The users change their minds because the decision to execute the project opens for new possibilities	
2.2.4	The users learn more about their needs as time passes	
2.2.5	Other (please indicate the reason in your own words): _____	

2.3 You indicated the society's priorities are unknown, misunderstood or ignored. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

2.3.1	The society's priorities have not been investigated	
2.3.2	The society's priorities are very complex – it is impossible for planners to grasp/get the whole picture	
2.3.3	The society's priorities are deliberately formulated unclearly by decision makers/politicians to give room for alternative courses of action	
2.3.4	Society's priorities are ignored by planners and decision makers due to political or personality reasons	
2.3.5	The society's priorities are impossible to express clearly	
2.3.6	Other (please indicate the reason in your own words): _____	

2.4 You indicated the society's priorities change before the project is executed. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

2.4.1	The society's priorities change very fast by nature/because of the dynamics of politics	
2.4.2	The society's priorities are very complex – different aspects dominate at different points in time	
2.4.3	The society's priorities are often/regularly changed to give room for alternative causes of action	
2.4.4	The society's perception of priority changes over time according to who is in power	
2.4.5	Other (please indicate the reason in your own words): _____	

2.5 You indicated the objectives of the project are unknown or misunderstood. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

2.5.1	The objectives of the project are not stated at all, or are expressed in a very unclear manner	
2.5.2	The objectives of the project are not available to decision makers	
2.5.3	The objectives of the project are deliberately formulated to mislead the decision makers	
2.5.4	The decision makers do not understand the planners' formulation of goals and objectives	
2.5.5	Other (please indicate the reason in your own words): _____	

2.6 You indicated the objectives of the project do not change according to changed needs/priorities over time. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

2.6.1	The objectives of the project are perceived as a locked position/should not be changed	
2.6.2	The priorities of the decision makers are not known/available to the project management/planners	
2.6.3	The needs of the users are not known/available to the project management/planners	
2.6.4	The project management is not allowed to change the objectives of the project	
2.6.5	Other (please indicate the reason in your own words): _____	

Sustainability

Sustainability refers to whether the positive effects of the chosen public investment project will be maintained after the project has been concluded.

The definition of sustainability goes beyond the project itself. It is a matter of economic, institutional, social, and environmental effects in a longer term perspective. It depends on whether (to what degree) the positive impact justifies investment – whether future revenue exceeds costs, whether users' support and ability will continue the intended process after the investment, and whether authorities provide policy support and resources to continue the process. If the project is not viable – if it is not supported by society and users in the future – it should be rejected or terminated.

Please indicate which alternatives are, in your opinion, the most important problems leading to lack of sustainability in major public investment projects.
Tick in the appropriate boxes and indicate your opinion on degree of importance. The scale ranges from 1 (least important) to 4 (most important). Please indicate importance for all alternatives. At least one alternative should be 'most important'.

#	Alternative	1	2	3	4
3.1	Lack of commitment to the project from key stakeholders				
3.2	The chosen technological solution is not viable under the prevailing conditions				
3.3	Conflict over objectives and/or strategies concerning the project				
3.4	Economic and financial benefits are low, compared to investment and operational costs				
3.5	Lack of conformity with prevailing policy or by legislation				
3.6	There are negative ethical issues connected to the project				
3.7	Business or other conditions change between concept stage and final delivery				

In the next section you will be asked to elaborate more on the alternative(s) you have pointed out to be most important ones, i.e. only those you rated as 4 on the scale.

3.1 You indicated lack of commitment to the project from key stakeholders is an important problem. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

3.1.1	Neglecting that users do not approve/do not like the outcome of the project	
3.1.2	Not identifying that the project outcome has weak support in its owner- and financing organizations	
3.1.3	Neglecting that the project outcome has weak support in management or accepting weak leadership	
3.1.4	Neglecting weak support in interacting institutions, or opposition by other institutions	
3.1.5	Other (please indicate the reason in your own words): _____	

3.2 You indicated that the chosen technological solution is not viable under the prevailing conditions is an important problem. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

3.2.1	Not identifying that the chosen technology is more expensive to maintain than the value of benefits gained	
3.2.2	Neglecting that the chosen technology is not able to produce within satisfactory health, safety and environmental standards	
3.2.3	Not identifying that the chosen technology will not work under the prevailing physical conditions, climate, etc.	
3.2.4	Neglecting that the users do not have the competence/experience to operate the outcome of the project	
3.2.5	Other (please indicate the reason in your own words): _____	

3.3 You indicated conflict over objectives and/or strategies concerning the project is an important problem. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

3.3.1	Neglecting/not solving conflict over priorities among key stakeholders	
3.3.2	Neglecting powerful interacting organizations/individuals in opposition to the project	
3.3.3	Objectives/strategies are too complex/unclear to avoid conflict	
3.3.4	The project design lacks conformity with key stakeholders interests and priorities	
3.3.5	Other (please indicate the reason in your own words): _____	

3.4 You indicated economic and financial benefits are low, compared to investment and operational costs is an important problem. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

3.4.1	Planning optimism (overestimated benefits) misleads the decision makers, deliberately or not	
3.4.2	Bad cost effectiveness is accepted	
3.4.3	There is no (not sufficient) market or willingness to pay for the use/outcome	
3.4.4	Alternative use of the money is not analysed	
3.4.5	Other (please indicate the reason in your own words): _____	

3.5 You indicated that lack of conformity with prevailing policy or by legislation is an important problem. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

3.5.1	Policy on important issues (environmental, economic, social, etc.) is not known to project planners/project management	
3.5.2	Incentives and regulatory measures concerning environmental effects are too complex (and thus misunderstood)	
3.5.3	Laws and regulations not respected by project planners/project management	
3.5.4	Policy and legislation changes between the concept stage and final delivery	
3.5.5	Pressure groups and/or coalitions influencing single decisions (on investment projects)	
3.5.6	Other (please indicate the reason in your own words): _____	

3.6 You indicated that negative ethical issues connected to the project are an important problem. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

3.6.1	Negative social impact on individuals, groups or society are not taken into account	
3.6.2	Future possibilities for employment and income for certain groups is not taken into account	
3.6.3	The rights and benefits of certain groups are not represented in the planning process	
3.6.4	Corruption or other forms of hidden and/or unethical practices influence decisions	
3.6.5	Planners and project promoters deliberately misguide the decision makers	
3.6.6	Other (please indicate the reason in your own words): _____	

3.7 You indicated that business or other conditions change between concept stage and final delivery is an important problem. Please elaborate on the most important reasons why this happens.
(Tick in the appropriate boxes – you can indicate as many alternatives as you find appropriate. Remember that 'important' implies occurs often and leads to wrong choice of project.)

3.7.1	Planning optimism (underestimated costs) mislead the decision makers, deliberately or not	
3.7.2	Business changes very fast by nature	
3.7.3	The political and administrative setting is changing regularly	
3.7.4	Learning occurs, new possibilities arise – changing the priorities of decision makers and users	
3.7.5	Other (please indicate the reason in your own words): _____	

Part 2: What can we do to avoid or counteract problems when a major public investment project is defined and designed?

Corrective actions

In your opinion, what is the best way to improve the planning and decision making process in the front-end phase of major public investment projects? Elaborate in your own words (optional).

4.1	Suggestions for improvements to achieve relevance	
4.2	Suggestions for improvements to achieve sustainability	
4.3	Suggestions for other important ways to improve front-end planning and decision making	

Part 3: How to direct the project?

By 'directing the project' I mean giving it the ***appropriate direction*** and ***the right level of ambition.*** I have chosen to focus on objectives (the use of goals and target formulations) as a tool for directing the project. Objectives are relevant to both the direction of the development and the level of ambitions.

In this part of the survey I ask questions aimed at controlling and testing the results of analyses of empirical data gathered from Norwegian investment projects. The questions are formulated from an owner's/financing party's point of view. Experience from private sector projects is highly relevant as well. Please keep the differences between public and private sector in mind when answering the questions. When in doubt about the meaning of words – check the definitions in Appendix to survey questionnaire: Definitions.

Objectives: What are they? How do they work?

Please answer the questions below, indicating your opinion on the matters in question. The term 'levels of objectives' used in some of the questions refer to objectives on strategic level (owner perspective), tactical level (user perspective) and operational level (project perspective).

Tick in the appropriate boxes – indicating your opinion on degree of importance. The scale ranges from 1 (least important) to 4 (most important). Please indicate the degree of importance for all alternatives in question 5.1.

5.1	What is the most important function of the objectives?	1	2	3	4
	Contribute to secure financing for a good purpose				
	Defining the ambitions of the owners				
	Explaining the decision makers' intended effect from the initiative				
	Clarify the needs of the users				
	Communicate the priorities of the corporation/agency				
	Describing clearly the direction of the project given by project management				
	Give orders to workers/task force				

Tick in the appropriate boxes – indicating your experience. You may indicate as many alternatives as you find appropriate to each question 5.2. (*overrides all other answers)

5.2	What levels of objectives are most important for the 'value for money' of investment projects?	All (they are equally important)*	
		Intentions/visions (intended future situation)	
		Strategic goals (ultimate purpose)	
		Tactical goals (outcome/effects)	
		Operational targets (outputs/results)	
		None (objectives are not that important)*	
		Other (indicate which in your own words): _____	

In this sequence I want you to indicate to what extent you agree or disagree to the statements below. Read carefully before you answer. Tick in the appropriate boxes – indicating your opinion. The scale is defined as follows: -2 (fully disagree), -1 (partly disagree), +1 (partly agree), +2 (fully agree). There is no neutral alternative. Please indicate your opinion on all alternatives in question 5.3.

5.3	Statements	-2	-1	+1	+2
	The formulation (choice of words, precision, clarity, etc.) of objectives is important				
	Being able to verify goal achievement is always necessary for the project's success				
	Performance measurement is very important in public investment projects				
	Ambitious objectives contribute to convince the decision makers				
	It is important to communicate the intention behind the objectives to task force members				
	Ambitious operative targets makes people stretch their performance				
	Measuring the effect of public investment projects is impossible				

Objectives: How they are actually designed

In this sequence I want to know your experience on major public investment projects in general.

Tick in the appropriate boxes – indicating your experience. You may indicate as many alternatives as you find appropriate in question 6.1.

6.1	Indicate which of the mentioned aspects of objectives are normally considered/assessed when defining the objectives of major public projects.	Causality – logical consistency	
		Resources – vital assumptions	
		Realism – being achievable	
		Uncertainty – opportunities and risks	
		Efficiency – utilization of resources	
		Effectiveness – goal achievement	
		Impacts – positive and negative long-term effects	
		Relevance – usefulness, in keeping with needs and priorities	
		Sustainability – viability, support and resources to continue	
		Level of ambitions – probability for success	
		Other (indicate which in your own words): _____	

In the following sequence I want you to indicate to what extent you agree or disagree to the statements below. Read carefully before you answer. Tick in the appropriate boxes – indicating your opinion. The scale is defined as follows: -2 (fully disagree), -1 (partly disagree), +1 (partly agree), +2 (fully agree). There is no neutral alternative. Please indicate your opinion on all alternatives in question 6.2.

6.2	Statements	-2	-1	+1	+2
	The objectives are always based on a structured process including stakeholders				
	Strategic goals are normally deliberately set to represent unrealistically high ambitions				
	Planning assumptions are often accepted as a basis for decisions without acknowledging the uncertainty attached				
	There are usually too many goals defined in the project				
	Goal achievement is never verified				
	Goal formulations are often flawed (unclear, contradictory, confused with means, etc.)				
	The defined objectives are well communicated internally in the project organization				
	The defined objectives are well communicated externally (to stakeholders outside the project)				
	Budgets are often deliberately set too low				
	There is always feedback to the project team members on goal achievement				
	Conflicting goals are not a common problem				
	Important relevant uncertainties are deliberately excluded from uncertainty and risk analysis in the early phases of project development				

Objectives: How project design ideally should be

Your opinion matters. In this section I want you to give your advice on a set of chosen issues to do with defining objectives.

Tick in the appropriate boxes – indicating your opinion on degree of importance. The scale ranges from 1 (least important) to 4 (most important). Please indicate importance for all alternatives in question 7.1.

7.1	In public investment projects, success is often referred to as maximizing value for money. How important are these stakeholders in defining the objectives in public investment projects?	1	2	3	4
	The owner (government officials)				
	The decision makers (politicians)				
	The end users (users of the result)				
	Project promoters/Project vendors				
	Management (corporate/agency)				
	Project management				
	Task leaders				

Tick in the appropriate box – indicating your opinion. Choose only one alternative.

7.2	How ambitious should the objectives in public projects be?	High (to make the project organization stretch for higher performance)	
		Moderate (according to normal performance level)	
		Low (to ensure the probability for success is high)	

7.3	Please feel free to elaborate on the answer given in question 7.2 in your own words (optional)	

Tick in the appropriate boxes – indicating your opinion on what is the most important in question 7.4. The scale ranges from 1 (least important) to 4 (most important). Please indicate level of importance for all alternatives.

7.4	Question	Alternatives	1	2	3	4
	Which of these aspects are the most important to assess when formulating goals for public projects?	Causality – logical consistency				
		Resources – vital assumptions				
		Realism – being achievable				
		Uncertainty – opportunities and risks				
		Efficiency – utilization of resources				
		Effectiveness – goal achievement				
		Impacts – positive and negative long-term effects				
		Relevance – usefulness, in keeping with needs and priorities				
		Sustainability – viability, support and resources to continue				
		Level of ambitions – probability for success				

In this sequence I want you to indicate to what extent you agree or disagree to the statements below. Read carefully before you answer. Tick in the appropriate boxes – indicating your

opinion. The scale is defined as follows: -2 (fully disagree), -1 (partly disagree), +1 (partly agree), +2 (fully agree). There is no neutral alternative. Please indicate your opinion on all alternatives in question 7.5.

7.5	Statements	-2	-1	+1	+2
	Objectives should always address users' needs				
	It is vital to be able to verify that each and every objective is achieved				
	The objectives should be revisited/reformulated during the planning and execution phases				
	Goals should be specified in a way that makes measuring the degree of goal achievement possible				
	All objectives should be realistically achieved within the time perspective of the project				
	Communicating the objectives internally in the project organization is more important than communicating them externally				
	After the project is approved, the objectives should never be changed.				

End text:

Thank you for your time and cooperation!
Please find references to the results as soon as they are published on Concept's homepages on the Internet: www.concept.ntnu.no.

Ole Jonny Klakegg
Concept Research Programme

Appendix to survey questionnaire: Definitions

The following definitions are from: OECD. 2002. Glossary of Key Terms in Evaluation and Results Based Management. Development Assistance Committee.

Purpose
The publicly stated objectives of the development program or project.

Goal
The higher-order objective to which a development intervention is intended to contribute. Related term: development objective.

Development objective
Intended impact contributing to physical, financial, institutional, social, environmental, or other benefits to a society, community, or group of people via one or more development interventions.

Outputs
The products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.

Outcome
The likely or achieved short-term and medium-term effects of an intervention's outputs. Related terms: result, outputs, impacts, effect.

Impacts
Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.

Effect
Intended or unintended change due directly or indirectly to an intervention. Related terms: results, outcome.

Effectiveness
The extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance.

Efficiency
A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.

Relevance
The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donors' policies. Note: Retrospectively, the question of relevance often becomes a question as to whether the objectives of an intervention or its design are still appropriate given changed circumstances.

Sustainability
The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time.

The following explains the use of different perspectives and terms for stakeholders/roles used in the survey.

Perspective	Stakeholder	Time frame	Focus
Strategic perspective	Owner	Long term	Project purpose – the outcome
Tactical perspective	Users	Medium - Long term	Project goals – the effect
Operational perspective	Operator	Short term	Project output – the result

Figure 1 Different perspectives

Owner
This is a term for the organization which owns and administers the results of the project. Being an owner includes many different roles. Initiating the project and being the financing party are two of the important roles in the perspective of this survey. This survey focuses on major public investment projects in which the owner is the state. Government officials administer the results of the project. The decision makers (often politicians) make decisions on behalf of the owner.

User
This is the term for the primary user of the product or services produced/delivered by the project. Users are often defined as the target group of the project. Examples are drivers, pedestrians and cyclists in a road project, teachers in a new school project.

Users may be represented indirectly by a governance agency on behalf of the society. This is usual in major public investment projects. In this role the governance agency is often responsible for operation of the result. In this role the governance agency is responsible for the realization of benefits from the project.

Operator
This term means the government agency or corporation responsible for implementing the project, either on their own behalf or under contract. The management of the government agency or corporation is an important stakeholder on behalf of the organization.

The operational perspective includes also the project organization. The stakeholders mentioned in the survey are project management and task leaders. Project management is used to denote the person responsible for delivery of the result (often called programme manager, project director or project manager). The task leader is an operative leader, responsible for a task within the project.

Other roles

Project promoter/Project vendor. This term denotes the role of promoting the project to the decision makers. The project promoter(s)/vendor(s) can representatives for any of the above-mentioned stakeholders (or any others). The task performed is convincing the decision makers to acknowledge the project or the purpose.

Project planner. This refers to the planners preparing information/documents/plans, on the basis of which the decision makers are invited to make their decision.

Part 1 Precise definition of the initial question (page 3)

What are the most important problems that occur when a major public investment project is defined and designed?

The term ‘major’ imply that these projects are big (costly) and complex. In Norway the lower cost limit is set to NOK 500 million / GBP 41 million / EUR 60 million. The category includes, but are not limited to, ‘mega-projects’. Mega projects tend to be even bigger and more complex, more unique and with high level of public attention or political interest because of substantial direct and indirect impacts on the community, environment, and budgets. The cost limit between ‘other projects’, major projects’ and ‘mega projects’ depends on the context.

The term ‘investment’ should not be confused with operations of a purely financial character (trading a large asset of shares, etc.).

Public projects are identified by being owned and financed (mainly) by a public entity, typically the state.

The term ‘define’ means the process of defining the objectives of the project.

The term ‘design’ means the process of defining the means of obtaining the objectives.

These processes (definition and design) include development and selection of the best alternative concept for the project in a strategic perspective.

The word ‘important’ implies that a particular reason commonly, and with high probability, may lead to selection of a flawed concept. In this strategic perspective, ‘unsuccessful’ is used for projects that are not useful and/or not viable in the longer time perspective.