



# **Feasibility analysis procedures for public projects in Iceland**

by

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## **Abstract**

Investment decisions for public projects in Iceland have often been controversial and it is not always clear how prioritization and selection of projects is evaluated. Icelandic law on public project arrangement, however, requires the opposite, whereas it requires that different solutions to achieve the defined need must be examined and compared internally before applying for funding. One of the few products of this work according to this law shall be a feasibility analysis used for comparison. Requirements for conducting feasibility analysis, however, are not further defined in this law or referred to for further definitions.

This thesis determines and defines what factors and/or attributes must be analysed in the feasibility analysis process as well as what procedures can be classified as best practises when performing feasibility analysis during the conception phase of public projects in Iceland. The main objective of this thesis is to benchmark current practises within the official sector in Iceland against best practises and recommend changes if necessary. This thesis includes a qualitative case study of initial reports on six construction projects in Iceland: Vaðlaheiði tunnel, Landeyjar port, Harpa Reykjavík concert hall and conference centre, Upper secondary school in Mosfellsbær, Avalanche protection in Bolungarvík and Snæfellsstofa visitor centre in Vatnajökull national park.

The result shows that the current methodology of performing feasibility analysis during the conception phase of public projects in Iceland varies considerably. There does not seem to be much consistency in procedures and there are only a few incidents that can be determined according to best practice.

*Keywords:* Project management; Cost engineering; Feasibility analysis; Cost-Benefit Analysis; Public Projects.

## Útdráttur

Fjárfestingarákvarðanir í tengslum við opinberar framkvæmdir á Íslandi hafa oft á tíðum verið umdeildar og ekki hefur alltaf verið ljóst hvernig forgangsörðun og val á verkefnum hefur farið fram. Lög um skipan opinberra framkvæmda krefjast þó hins gagnstæða, en þau fara fram á að framkvæmd sé könnun og samanburður þeirra kosta er til greina koma við lausn þeirra þarfa sem framkvæmdinni er ætlað að fullnægja áður en sótt er um fjárveitingu. Ein af afurðum þessarar vinnu samkvæmt fyrrgreindum lögum skal vera hagkvæmnireikningar sem notaðir eru við samanburði. Kröfur til hagkvæmnireikninga eru aftur á móti ekki skilgreindar í fyrrgreindum lögum né vísað til frekari leiðbeininga.

Ritgerð þessi skilgreinir og útskýrir hvaða þætti og/eða eigindir skal taka til skoðunar í hagkvæmnisreikningum ásamt því að skilgreina hvaða aðferðir geta fræðilega talist bestar í dag við vinnslu hagkvæmnireikninga á frumathugunarstigi opinberra verkefna á Íslandi. Meginmarkmið þessarar ritgerðar er að bera saman núverandi aðferðarfræði, vinnuferla og forsendur við það sem fræðilega getur talist best í dag og leggja til endurbætur ef þess gerist þörf. Í ritgerð þessari er eigindleg tilviksrannsókn á frumathugunarskýrslum sex opinberra framkvæmda á Íslandi: Vaðlaheiðagöng, Landeyjahöfn, HARPA, tónlistar- og ráðstefnuhúsið í Reykjavík, Framhaldsskólinn í Mosfellsbæ, Snjóflóðavarnir í Bolungarvík og Snæfellsstofa í Vatnajökulspjóðgarði.

Niðurstaðan sýnir að núverandi aðferðafræði við framkvæmd hagkvæmnireikninga á upphafsstigum opinberra verkefna á Íslandi er mjög mismunandi. Ekki virðist vera mikið samræmi í starfsháttum og aðeins í fáeinum tilvikum er hægt að sjá samræmi við aðferðir sem teljast fræðilega bestar í dag.

*Lykilorð:* Verkefnastjórnun; kostnaðarverkfræði; Hagkvæmnisathugun;  
Kostnaðar-/ábatagreining; Opinber framkvæmd.

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## **1. Introduction**

### **1.1. Background**

Investment decisions for public projects in Iceland have often been controversial and it is not always clear how prioritization and selection of projects is evaluated. This can cause problems and tensions when the order of priority is not clear and in recent years this has, for example reflected in the creation of organized interest group about localized road construction projects (Axel Hall & Sólveig Jóhannsdóttir, 2005). The difficulties of the government are that if general decision-making isn't based on approved methodology it can be difficult for them to kick their feet against such political pressure. The pressure would be less if it was clear how the individual project stood in comparison with other projects that the government stands for.

Public projects in Iceland must be prepared and executed in accordance to Icelandic law on public project arrangement (*Lög um skipan opinberra framkvæmda nr. 84/2001*, 2001). This law requires that different solutions to achieve the defined need must be examined and compared internally before applying for funding. One of the few products of this work according to this law shall be a feasibility analysis (Icel. hagkvæmnireikningar) used for comparison. Requirements for conducting feasibility analysis, however, are not further defined in this law or referred to for further definitions.

### **1.2. Aim and objectives**

To improve procedures and transparency in the decision-making process when public projects investment in Iceland are under consideration, this research will determine and define what factors and/or attributes must be analysed in the feasibility analysis process before deciding on implementing public projects in Iceland as well as to find what procedures can be classified as “best practises” when performing feasibility analysis during the early phase of public projects in Iceland.

The objective is to benchmark current practises and procedures within the official sector in Iceland against best practises and recommend changes.

### **1.3. Improvement of public project life cycle**

This research is a part of an established programme, at School of Science and Engineering, named “Improvement of public project life cycle”. The programme is carried out in cooperation with the Ministry of Finance and some public institutions. The overall objective is to benchmark current practises and procedures within the official sector in Iceland against best practises, and recommend changes.

This research will to some extent be related to the following work packages of the programme:

- D1.WP1 – Initial Decision
- D1.WP2 – Viability
- D1.WP3 – Objectives

See more closely the colour boxes in **Figure 1**:

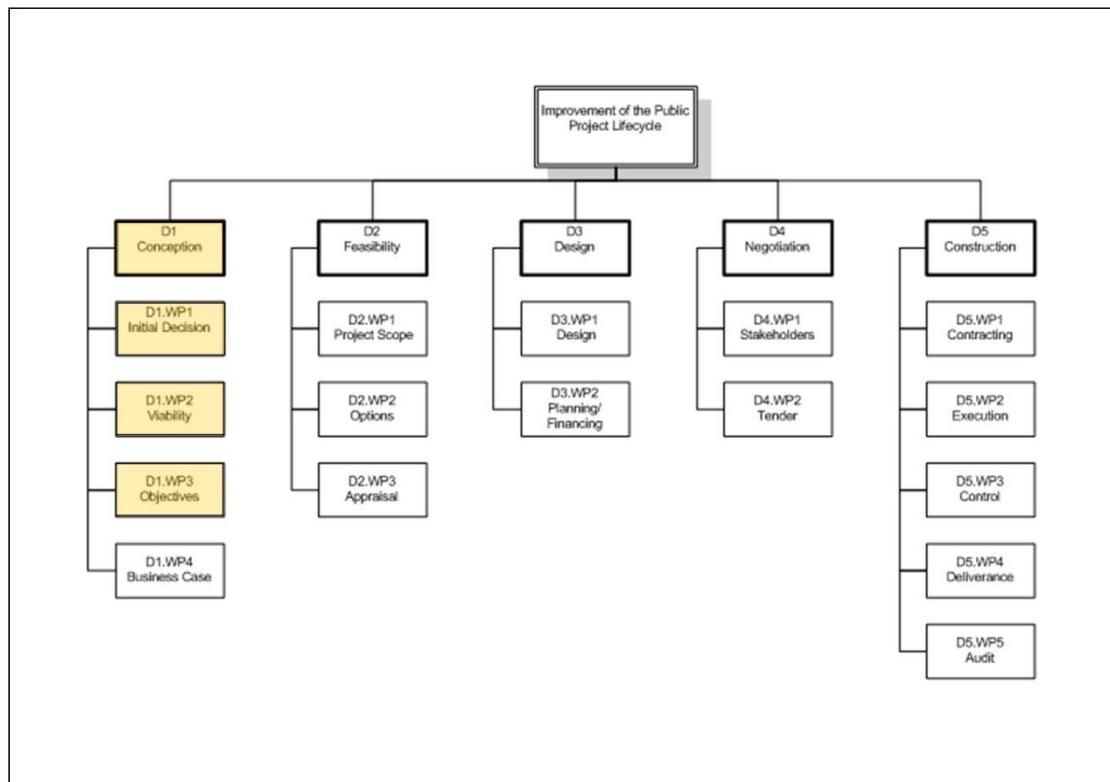


Figure 1 The general WBS for the larger project

### 1.4. Hypothesis

It is stated in the foreword of the programme “Improvement of public project life cycle” (Þórður Víkingur Friðgeirsson, 2010) that research indicates that a majority of publicly funded projects suffers from a cost overrun. In the foreword it is also noted that The Icelandic National Audit Office has officially stated that “the weakest link in public financial management is unprofessional decision-making”. In relation to this statement, the following hypothesis is put forward:

*Unprofessional decision-making in public financial management is partly the result of poor or no methodology for feasibility analysis to evaluate various options.*

### 1.5. Limitations

As noted in section 1.2 Aim and objectives, this research is limited to the early phase of public projects in Iceland, the “Conception phase” as defined in the programme “Improvement of public project life cycle”.

Limitation of this research is on the one hand dependent on academic approaches and on the other hand, specific authority area within the Icelandic regime.

In terms of academic approach this research will be limited to defined methodology for project management and cost engineering.

Concerning framing this research within specific authority area of the Icelandic regime, the process of applying for funding will be the main subject, i.e. preparing the national budget. Before the final research area is determined it is appropriate to view the authority areas within the Icelandic regime. On the whole the public project arrangement in Iceland is roughly associated with the following five areas within the regime:

1. The Icelandic constitution  
The constitution of the Republic of Iceland holds the principles of the government regime and the citizen's basic human rights. The constitution is above other laws and it ties the hands of the government conducting its public power, and defines the role of the three spheres of authority; legislative-, executive- and judiciary authorities. The Constitution is based on the key assumption that all power should be based on law, where it is prevented that those who have the state power temporarily, use it arbitrarily.
2. The government policy (the government cooperation statement)  
The government policy defines cooperation objectives along with outlining the future vision for defined sets of issues. The government policy contains a summary of selected issues and assignments which the government intends to carry out and a description of their objectives. The cooperation statement therefore provides a foundation for the issues and assignments which need to be tackled and can become projects in the election period, so it provides the basis for emphasis and prioritization of public projects.
3. The legislative authority  
The legislative authority is the authority to pass laws, which the public and the government should then follow. The name implies that the laws are given (to the nation) and the legislator is the one that gives the laws. The Icelandic legislative assembly (Alþingi) holds the legislative authority along with the Icelandic president according to the constitution of the Republic of Iceland.
4. The executive power  
The holders of the executive authority take care of carrying out the policies laid down by the legislative authority. The supreme holder of the executive power in Iceland is the Icelandic president according to the Constitution of the Republic of Iceland. The president endorses this authority to the Prime Minister which then divides it down to other ministers. Most of all public institutions in Iceland belong to the executive authority.

5. The judiciary authority

The Judiciary authority is the judicial arrangement that is responsible for enforcing justice to settle disputes in the name of the nation. According to the constitution of the Republic of Iceland and the three spheres of authority, the judiciary authority is the field of the government regime which is responsible for interpreting the law.

According to the above review of the authority areas within the Icelandic regime, the legislative authority is responsible for the national budget and the executive power is responsible for the implementation of the budget. In addition, the executive power is also responsible for proposing a budget for individual projects when preparing the national budget according to Icelandic law on public project arrangement (*Lög um skipan opinberra framkvæmda nr. 84/2001*, 2001).

This research will therefore consequently be limited to the role of the executive power, namely concerned ministries or public institutions.

Overall, this research will be limited to the conception phase of public projects in Iceland, a preliminary study, carried out by concerned ministries or public institutions when preparing the national budget. The academic approach will be limited to defined methodology for project management and cost engineering.

### **1.6. Research question**

This research aims to determine and define what factors and/or attributes must be analysed in the feasibility analysis process as well as to find what procedures can be classified as best practises when performing feasibility analysis during the conception phase of public projects in Iceland. The research questions must therefore cover the above mentioned factors, attributes and procedures for the feasibility analysis during the conception phase of public projects in Iceland. In addition, research questions must be delimited to the research limitations related to defined methodology for project management and cost engineering as well as to direct special attention to the methodology used in preparing the national budget in Iceland.

The following research questions are presented to cover the above mentioned points:

- What factors and/or attributes and what project management and cost engineering procedures have been used in the process of feasibility analysis before it is proposed to implement public project in Iceland in connection with the discussion of the national budget?
- Are these factors and/or attributes and procedures proper or sufficient for implementing public projects in Iceland with respect to methodology that can be classified as best practises when performing feasibility analysis during the conception phase of public projects?

### **1.7. Research plan and method**

The research work will be carried out in four main phases, i.e. (1) preparations, (2) study (publications and reports along with experience from several public institutions in Iceland), (3) analysing and processing of findings, (4) writing-up of thesis.

The research study (phase 2) will be divided into three parts. First, previous literature in the field will be studied by going through publications and reports on the subject, i.e. textbooks, scientific papers, articles, laws and standards. Second, experience from several public institutions will be studied in order to find out what procedures have been used along with factors and/or attributes. Finally, current practises within the official sector in Iceland will be benchmarked against best practises and recommend changes.

The research methodology used in this study is described in detail in chapter 2 of this thesis.

### **1.8. Structure of the thesis**

This thesis is divided into seven chapters. It starts with the introduction of the thesis followed by research methodology and literature review. Thereafter it discusses the case study and the results along with discussion, and finally concludes the study with the conclusion chapter. A brief summary of these chapters are given below:

The first chapter gives an introduction to the thesis. It starts by introducing the background of the problem and the motive behind the research. Following, are discussions about the research aim and objectives along with the limitation of this research. The first chapter also introduces an established programme which this research is a part of, named “Improvement of public project life cycle”. The chapter also addresses the research questions that this research will answer. In the last section of the chapter, a discussion on the adoption of methodology for this research is presented along with compilation of the thesis structure.

The aim of the second chapter is to explain the research methodology and design that was used to carry out this research. The chapter starts with the discussion on research approach and strategy. Following, are argument for the selection of an appropriate methodology for this research.

In the third chapter of the thesis discusses the literature review. First, the phrase “feasibility analysis” is briefly explained. Secondly, approved methods of project management and cost engineering in the early stages of project are covered. Thirdly, the feasibility analysis methodology is discussed. Finally there is a summary of result.

The fourth chapter discusses the case study. It starts with the introduction of the case study used in this research followed by a discussion about the collection of data. It then goes on to discuss the analysis of data. Finally the case study results are summarized in the conclusion section.

The purpose of the fifth chapter is to summarize the results of the literature review and the case study. It begins with an introduction followed by the overall results of literature review where best practice for conducting feasibility analysis is presented. Thereafter it discusses the overall results of the case study where current methodology for conducting feasibility analysis before deciding on implementing public projects in Iceland is compiled. In the last section of the chapter there is a compilation of the overall results.

Chapter six begins with an introduction of the impetus, approach and objectives of this research. Thereafter it compares the best practise against current methodology for conducting feasibility analysis. Finally the results are summarized in the conclusion section.

The seventh chapter starts with a discussion about the findings of this research. The findings are discussed against the research questions at the start of the research. Thereafter, the chapter discusses the recommendations proposed by the research, followed by the contribution of knowledge and the limitations of the research. Lastly, the chapter proposes recommendations for future research.

## 2. Research methodology

### 2.1. Introduction

The main objective of this research is to benchmark current practises within the official sector in Iceland against best practises and recommend changes. The emphasis is to determine and define what factors and/or attributes in the feasibility analysis process during the conception phase of public projects in Iceland must be analysed and how.

The research study will be divided into three parts. First, previous literature in the field will be studied by going through publications and reports on the subject, i.e. textbooks, scientific papers, articles, laws and standards. Second, experience from several public institutions will be studied in order to find out what procedures have been used along with factors and/or attributes. Finally, current practises within the official sector in Iceland will be benchmarked against best practises and recommend changes.

The data collection from several public institutions in Iceland will be based on information collected from existing reports about the initial study (Icel. frumathugun) which has been prepared by concerned ministries, public institutions, communities, or other expected owners in accordance to Icelandic law on public project arrangement (*Lög um skipan opinberra framkvæmda nr. 84/2001*, 2001). The main purpose of this initial study report is to examine and compare different solutions to achieve the defined need that the proposed public project is supposed to fulfill.

The type of data which will be collected is almost entirely related to known methods of science and definitions, i.e. defined methodology. The research will be based on descriptions of specific prerequisites, methods, processes and procedures and interpretation on how these concepts form a holistic methodology for conducting feasibility analysis for public projects in Iceland.

### 2.2. Research methods

Classification of this research study is based on approach from two directions. At one end there is the question about the real intentions and meaning of the phrase "feasibility analysis" in the Icelandic law on public project arrangement (*Lög um skipan opinberra framkvæmda nr. 84/2001*, 2001), whilst at the other there is known method of science for conducting feasibility analysis. This research is therefore classified as applied research whereas available scientific knowledge is benchmarked against current practises and procedures (Richard Fellows & Anita Liu, 2003).

The type of data which will be collected is almost entirely related to defined methodology. The research will be based on descriptions of specific prerequisites, methods, processes and procedures and interpretation on how these concepts form a holistic methodology for conducting feasibility analysis. The other primary classification of this research study is therefore defined as a qualitative research, as opposed to quantitative research which is mainly based on objective measurements where scientific techniques are used to obtain quantified data (Richard Fellows & Anita Liu, 2003). Qualitative research, as in this case,



is, however, in principle based on investigation on individuals' or groups' beliefs, understanding, opinions, views etc. to facilitate appreciation and understanding of basic causes and principles, i.e. behaviours (Richard Fellows & Anita Liu, 2003).

The approach of data analysis aims to develop a coherent and comprehensive view of specific prerequisites, methods, processes and procedures for conducting feasibility analysis for public projects in Iceland from the perspective of public institutions. The approach of data analysis is consequently classified as descriptive data analysis (Richard Fellows & Anita Liu, 2003). The data will be collected from existing reports about the initial study which have been prepared by concerned ministries, public institutions, communities, or other expected owners in Iceland.

The data collection from several public institutions in Iceland will be based on studying what methods, processes and procedures for conducting feasibility analysis were applied and what factors and/or attributes were used, i.e. collection of documentary data. The unit of analysis will be based on the following questions:

- What was done? (feasibility analysis method)
- How was it done? (processes and procedures)
- What sort of prerequisites were used? (factors and/or attributes)

The collection of documentary data will be based on information from existing reports about initial study which have been prepared by concerned ministries, public institutions, communities, or other expected owners. Each individual report reflects the results of one single public project and by investigating the results from a certain number of reports, a holistic view of current feasibility analysis methodology is obtained.

Overall, this research involves an in-depth investigation of the concept "feasibility analysis" using multiple sources of evidence from existing reports about initial study for proposed public projects. The research method therefore falls within the term "case study" – namely, descriptive case study. Theoretical definition of descriptive case study is that it is aimed at systematically identifying and recording a certain phenomenon or process and it attempts to find new theoretical interpretations or gain more in-depth knowledge pertaining to existing theoretical insight (Richard Fellows & Anita Liu, 2003).

### **2.3. Conclusions**

This research is aimed at determining and defining what factors and/or attributes in the feasibility analysis process during the conception phase of public projects in Iceland must be analysed and how. To provide a coherent and comprehensive view of the methodology used for conducting feasibility analysis for public projects in Iceland, a descriptive case study approach is adopted in this research. This research is on the one hand classified as applied research whereas available scientific knowledge is benchmarked against current practises and procedures, and on the other hand classified as qualitative research whereas it is based on investigation on groups' understanding and actions to facilitate appreciation and understanding of basic causes and principles.



### 3. Literature review

#### 3.1. Introduction

Public projects in Iceland must be prepared and executed in accordance with Icelandic law on public project arrangement (*Lög um skipan opinberra framkvæmda nr. 84/2001*, 2001). The third and fourth article of the aforementioned law requires that different solutions to achieve the defined need must be examined and compared internally before applying for funding. One of few products of this work according to this law shall be a feasibility analysis (Icel. hagkvæmnireikningar) used for comparison. Requirements for conducting feasibility analysis is, however, not further defined in this law or referred for further definitions. The objective of this literature review is therefore aimed to discovering the real meaning of the phrase “feasibility analysis” in the aforementioned law as well as to find out the theoretically best practice for conducting feasibility analysis for public projects.

The literature review is divided into four sections. First, the phrase “feasibility analysis” is briefly explained and second, approved methods of project management and cost engineering in the early stages of project are considered. Third, the feasibility analysis methodology is examined and finally there is a discussion on finding and summary of result.

#### 3.2. The phrase “feasibility analysis”

According to the Merriam-Webster online dictionary (“Dictionary and Thesaurus - Merriam-Webster Online,” 2011), the word “feasible” means “capable of being done or carried out”. For the conception stage of a project, a feasibility study or analysis may therefore be understood as an investigation into something which is capable (or not) of being successful, such as the initiation and continuation of a new project.

According to White (2011): “A feasibility study isn't magic, although it can have a magical effect on the profitability of an FEC<sup>1</sup>. Rather, a feasibility study provides you with data that replace wishful thinking. The study gives you a rich, detailed and accurate picture that includes information you really need to know, rather than information that's just easily available”.

To gain a deeper understanding of the phrase “feasibility analysis” in the Icelandic law on public project arrangement (*Lög um skipan opinberra framkvæmda nr. 84/2001*, 2001) it is appropriate to review the main objective of imposing this law. The Minister of Finance, said in his first speech when he recommended the bill for this legislation, that the main objective was primarily to ensure professional procedures adopted by the government as well as to ensure optimal use of capital devoted to public projects (Geir H. Haarde, 2001).

This shows that feasibility analysis is the principal methodology to gain comprehensive and transparent information and results to determine the viability of an investment proposal.

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<sup>1</sup> Family Entertainment Centers

### 3.3. Project management

The essence of project management is a methodology of planning, organizing and controlling events to achieve defined quality within acceptable schedules and budgets when emphasis and special attention are given to the conduct of non-repetitive activities for the purpose of meeting a single set of goals (Avraham Shtub, Jonathan F. Bard, & Shlomo Globerson, 2005).

Moreover, a project is a temporary endeavour undertaken to create a unique product or service. The term temporary means that the project has a defined beginning and end, and unique means that the project involves doing something which has not been done before. Since a project is a unique undertaking, it involves a degree of uncertainty. In order to reduce the uncertainty and to provide better management control, projects are usually divided into several stages, usually defined as project life-cycle (Duncan, 1996).

The purpose of the project life-cycle is to define the beginning and the end of a project and it generally defines.

- what technical work should be done in each stage
- who should be involved at each stage

(Duncan, 1996)

There are a number of different life-cycle models in project management literature, but most of them typically pass sequentially through four stages; feasibility, planning and design, production and finally turnover and start-up as illustrated in *Figure 2*

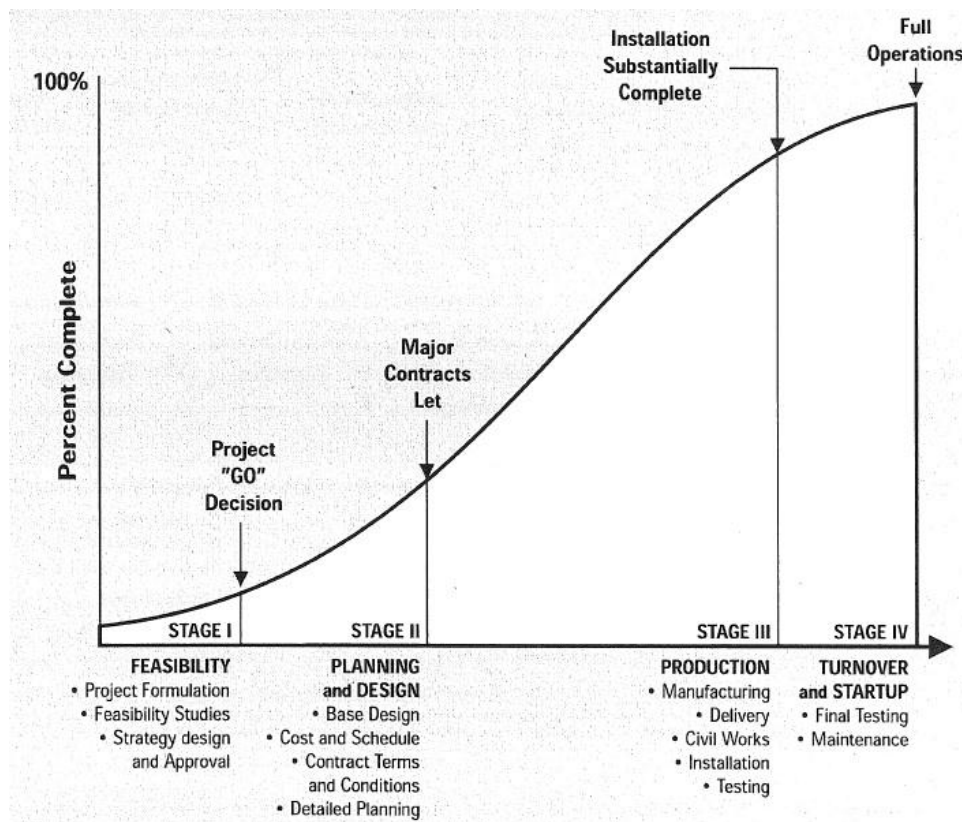


Figure 2 Construction project life-cycle (Duncan, 1996)

Whereas this literature review is limited to project management in the early stages of project, special emphasis will be on the abovementioned feasibility stage.

The quality of the execution of the early project phases may dramatically influence the project performance. Two factors of key importance which have the greatest impact are uncertainty and the influence of project stakeholders (Kolltveit & Grønhaug, 2004). Kolltveit & Grønhaug, (2004) imply “that effective development of the technical concept during the early phase and the quality of the conceptual decisions have a significant impact on future value generation and that effective strategic choices are required in order to exploit this potential for value generation”.

Avraham Shtub et al., (2005) found out that despite “each project has a unique set of goals, there is enough commonality at a generic level to permit the development of a unified framework for planning and control”. Avraham Shtub et al., (2005) define the following main tasks in the initiation phase of a “typical” project:

- identification of needs
- development of alternatives
- evaluation of alternatives
- selection of the “most promising” alternatives
- estimation of the life-cycle cost of the promising alternatives
- assessment of risk
- development of a configuration baseline
- “Selling” the configuration and getting approval

The above discussion of the various aspects of project management in the initiation phase of project is definitely not exhaustive, but nevertheless shows the importance of starting the project with approved procedures to ensure that the project is achievable and likely to deliver what is required. What remains is to define what exactly approved procedures include. In order to move forwards in this field it is appropriate to examine the current procedures applied in different countries. In this context it was decided to examine approved procedures in both Norway and the United Kingdom as set out in the following two sections.

### **3.3.1. Norwegian quality-at-entry regime**

In Norway, a quality-at-entry regime has been developed to improve governance of mega-projects. This regime consists of two gateways, QA1 and QA2. The focus on the QA1 gateway is the rationale for the project. It covers the early choice of the concept / project where the objective is to ensure that the chosen project is appropriate and viable, particularly regarding cost-benefit and social terms (Christensen, 2009). The QA2 gateway, however, is “aimed to providing 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” (Samset, Berg, & Klakegg, 2006). In this regime decisions and analysis are conducted in a logical and chronological

The diagram illustrates the project lifecycle across four phases: Pre-feasibility phase, Pre-project phase, Planning and implementation, and Operational phase. It tracks two parallel processes: the Decision process (top) and the Analytic process (bottom). The Decision process includes milestones for Government approval and Parliament approval. The Analytic process includes Quality Assurance points QA1 and QA2. The Project itself is represented by a large arrow pointing right, with a box labeled 'Project' indicating the start of the Planning and implementation phase.

According to Samset et al., (2006), “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 a decision basis, the responsible ministries are now required to explore at least two alternative concepts in addition to a zero alternative (doing nothing)”.

1. **needs analysis** that would map all stakeholders and affected parties and assess 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.

The Office of Government Commerce (OGC) in the United Kingdom (UK) has developed the OGC Gateway™ Process which examines programmes and projects at key decision points in their life-cycle to provide assurance for successful progress to the next stage (*OGC Gateway™ Process Review 1: Business justification*, 2007).

The OGC Gateway Process provides support to Senior Responsible Owners (SROs) in the discharge of their responsibilities to achieve their business aims, by helping the SRO to ensure:

- the best available skills and experience are deployed on the programme / project
- all the stakeholders covered by the programme / project fully understand the programme / project status and the issues involved
- there is assurance that the programme / project can progress to the next stage of development or implementation and that any procurement is well managed in order to provide value for money on a whole life basis
- achievement of more realistic time and cost targets for programmes / projects
- improvement of knowledge and skills among government staff through participation in reviews
- provision of advice and guidance to programme / project teams by fellow practitioners

*(OGC Gateway<sup>TM</sup> Process Review 1: Business justification, 2007)*

A crucial element of the OGC Gateway<sup>TM</sup> Process is an evaluation from independent practitioners from outside the programme / project. These practitioners use their experience and expertise to examine the progress and likelihood of successful delivery of the programme / project. Their role is to provide a valuable additional perspective on the issues facing the internal team, and an external challenge to the robustness of plans and processes (*OGC Gateway<sup>TM</sup> Process Review 1: Business justification, 2007*).

The OGC Gateway<sup>TM</sup> Process contains six defined, standardized and documented gateways. Gateway review 0 examines strategic management at the programme level, and gateways 1–5 at the project level, covering different stages of the project life-cycle. The first three gateways before commitment to invest, and the last two looking at service implementation and confirmation of the operational benefits (*OGC Gateway<sup>TM</sup> Process Review 1: Business justification, 2007*). See the OGC Gateway<sup>TM</sup> Process more closely in **Figure 4**.

The first project review, gateway 1, investigates the strategic business case and proposed way forward to confirm that the project is achievable and likely to deliver what is required. The review checks that:

- stakeholders approve the intended benefits from the project
- linkage with programme and organisational objectives is clear
- the optimum balance of cost, benefits and risk has been identified

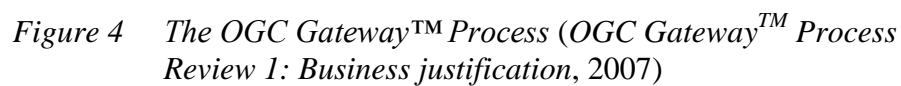
*(OGC Gateway<sup>TM</sup> Process Review 1: Business justification, 2007)*

The second project review, gateway 2, investigates the assumptions in the outline business case and proposed approach for delivering the project. If there is procurement, the delivery strategy will include details of the sourcing options, proposed procurement route and supporting information. The review will also check that plans for implementation are in place (*OGC Gateway<sup>TM</sup> Process Review 2: Delivery strategy, 2007*).

The third project review, gateway 3, investigates the full business case and the governance arrangements for the investment decision to confirm that the project is still required, affordable and achievable. The review also checks that implementation plans are robust (*OGC Gateway<sup>TM</sup> Process Review 3: Investment decision*, 2007).

As previously stated, the fourth and fifth reviews investigate the service implementation and confirmation of the operational benefits. These factors are outside the limits of this study.





### **3.4. Cost engineering**

The essence of cost engineering is where engineering judgement and experience are utilized in the application of scientific principles and techniques to problems of cost estimation, cost control, business planning and management science, profitability analysis and project management along with planning and scheduling (Kenneth K. Humphreys, 2005).

The cost engineering association to the objective of this literature review is mainly ascertaining project profitability during the early phase. The purpose of profitability analysis is to determine whether any project or investment is financially desirable. According to Kenneth K. Humphreys, (2005), the six most common criteria for profitability are:

1. pay-out time  
The time required to recover the original investment in depreciable facilities from profit and depreciation.
2. pay-out time with interest  
The time required to recover the varying investment in depreciable facilities from profit, depreciation and interest charge. The interest charge is on the fixed investment remaining only.
3. return on original investment (ROI)  
The benefit of an investment is divided by the cost of the investment and the result is interpreted as a percentage or a ratio.  
The return on original investment formula:

$$ROI = \frac{(\text{Benefit from investment} - \text{Cost of investment})}{\text{Cost of investment}}$$

4. return on average investment (RAI)  
The benefit of an investment is divided by average outstanding investment and the result is interpreted as a percentage or a ratio.  
The return on average investment formula:

$$RAI = \frac{(\text{Benefit from investment} - \text{Cost of investment})}{\text{Average outstanding investment}}$$

5. discounted cash flow rate of return (DCFRR)  
This method finds the rate of return that makes the present value of all of the receipts equal to the present value of all of the expenses.  
The discounted cash flow rate of return formula:

$$0 = CF_0 + \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \dots$$

Where the  $CF_1$  is the cash flow the investment receives in the first year,  $CF_2$  the cash flow the investment receives in the second year etc. and  $r$  is DCFRR.



6. net present value (NPV)

The NPV is calculated on the basis of chosen rate of return, ordinarily the minimum acceptable rate of return (MARR). This method finds the NPV by calculating the difference between the present value of all of the receipts and the present value of all of the expenses.

The net present value formula:

$$NPV = CF_0 + \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \dots$$

Where the  $CF_1$  is the cash flow the investment receives in the first year,  $CF_2$  the cash flow the investment receives in the second year etc. and  $r$  is the discount rate.

All of the above methods may well apply to projects or investments in the private sector whereas the firm usually pays all costs and receives all the benefits. However, the same does not apply to public projects. The main characteristics of public projects are that their funding is received through various forms of taxation and this funding is supposed to be spent in the public interest, i.e. the government pays all costs but receives very few, if any, benefits. In public projects it may therefore be considerably more difficult than for private projects to classify the various consequences (Avraham Shtub et al., 2005). This concerns generally the defining and measurement of benefits and especially the selection of an interest rate. Interest rates are most often applied in private-sector decisions but are generally excluded in the public sector where tangible financial return is not the sole criterion for public funding (Avraham Shtub et al., 2005). For this reason there is rarely a consensus on which interest rates should be used. Some economists argue for the social rate of time preference, while others recommend the prevailing interest rate (Avraham Shtub et al., 2005). It is however clear that most public project sets in motion impacts that extend over many years, which forces the feasibility analyst to compare projects with benefits and cost that arise at different time periods, i.e. by using the NPV method (Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, & David L. Weimer, 2011). To approach the underlying uncertainty in the NPV analysis and the effect of different interest rates, the calculation should be repeated using several interest rates to ascertain sensitivity affects (Avraham Shtub et al., 2005).

### **3.5. Methodology of feasibility analysis**

In order to achieve success when investing in infrastructure projects it is important to have clear objectives and goals which includes; achieving greater social justice, developing the economy and sustainable employment, developing financially responsible programs and protecting the environment. It is therefore important to conduct comprehensive feasibility analysis of projects in order to maximize these objectives and goals (Yun & Caldas, 2009).

According to Yun & Caldas, (2009) the feasibility analysis includes four processes to analyse an infrastructure project; project overview, economic feasibility, political viability and total viability.

More closely, the project overview explains the origin of the project, i.e. its background and objectives along with procedures to be used to achieve the defined objectives. The economic feasibility study determines the project's investment suitability along with its effects on national economy. It is done by estimating the demand and calculating the economic and financial indices such as benefit–cost ratio (B/C), net present value (NPV) and internal rate of return (IRR). The political viability study is intended to determine the importance of the project for all members of society. It is done by evaluating factors such as regional level of development, regional economic impact, attitudes toward the project, compliance with relevant governmental policies and environmental impact. The total viability study finally evaluates project viability based on the results of both economic and a political evaluation. This procedure helps participants making a “Go/No Go” decision, determining investment priority between infrastructure projects, and providing the optimal alternative (Yun & Caldas, 2009).

As shown in the above summary of the four processes to analyse an infrastructure project, Yun & Caldas, (2009) arrange the evaluations on project environmental impact under the political viability processes. Shen, V. W. Y. Tam, L. Tam, & Ji, (2010) however, specifically emphasize the environmental impact, whereas they broadly divide the feasibility analysis into three major processes, i.e.; economic-, social- and environmental processes.

The existing practise of conducting feasibility analysis is very different depending on the type of projects. The difference can be found in what factors and/or attributes are considered when conducting feasibility analysis. Shen et. al., (2010) found out that feasibility analysis includes overall eighteen economical, nine social and eight environmental performance attributes, where some performance attributes are common to all projects and other performance attributes apply only to individual projects. Summary of these 36 performance attributes are in **Figure 5**.

Shen et. al., (2010) conclusion is largely consistent with Yun & Caldas, (2009) definitions, but there is one thing that draws attention. Shen et. al., (2010) do not specify especially benefit-cost ratio as one of the performance attributes for conducting feasibility analysis and they do not specify the reason why. The reason may, however, be found in the statement that benefit-cost ratio can sometimes confuse the choice process when the projects under consideration are of a different scale (Anthony E. Boardman et al., 2011). Furthermore, the benefit-cost ratio is sensitive to whether negative amounts are subtracted from benefits or added to cost. For these reason, Anthony E. Boardman et al., (2011) recommend that analysts avoid using benefit cost ratios and rely instead on net benefits to rank policies. In this context it is appropriate to consider a method called cost-benefit analysis (CBA). This method is further outlined in the following section.

Economic performance attributes	
EPA <sub>1</sub> : Governmental strategic development policy	EPA <sub>10</sub> : Financing channels
EPA <sub>2</sub> : Tax policy	EPA <sub>11</sub> : Investment plan
EPA <sub>3</sub> : Demand and supply analysis	EPA <sub>12</sub> : Life cycle cost
EPA <sub>4</sub> : Market forecast	EPA <sub>13</sub> : Life cycle profit
EPA <sub>5</sub> : Project function and size	EPA <sub>14</sub> : Finance risk assessment
EPA <sub>6</sub> : Market competition	EPA <sub>15</sub> : Return of investment (ROI)
EPA <sub>7</sub> : Location advantage	EPA <sub>16</sub> : Net present value (NPV)
EPA <sub>8</sub> : Technology advantage	EPA <sub>17</sub> : Pay-back period
EPA <sub>9</sub> : Budget estimate	EPA <sub>18</sub> : Internal rate of return (IRR)
Social performance attributes	
SPA <sub>1</sub> : Influence to the local social development	SPA <sub>6</sub> : Safety standards
SPA <sub>2</sub> : Provision capacity of employment	SPA <sub>7</sub> : Improvement to the public health
SPA <sub>3</sub> : Provision capacity of public services	SPA <sub>8</sub> : Cultural and heritage conservation
SPA <sub>4</sub> : Provision capacity of public infrastructure facilities	SPA <sub>9</sub> : Development of new settlement and local communities
SPA <sub>5</sub> : Provision of the infrastructures for other economic activities	
Environmental performance attributes	
EnPA <sub>1</sub> : Eco-environmental sensitivity of the project location	EnPA <sub>5</sub> : Waste assessment
EnPA <sub>2</sub> : Air impacts	EnPA <sub>6</sub> : Environmental friendly design
EnPA <sub>3</sub> : Water impacts	EnPA <sub>7</sub> : Energy consumption performance
EnPA <sub>4</sub> : Noise assessment	EnPA <sub>8</sub> : Land consumption

*Figure 5 Attributes in project feasibility study (Shen et al., 2010)*

### **3.5.1. Cost-benefit analysis (CBA)**

Method has been developed within economics called cost-benefit analysis (CBA) and it is often used as a decision-making tool when deciding on investment or implementation by the authorities. According to Anthony E. Boardman et al., (2011) “Cost-benefit analysis is a policy assessment method that quantifies in monetary terms the value of all policy consequences to all members of society. The net social benefits measure the value of the policy. Social benefits (B) minus social costs (C) equal net social benefits (NSB):  $NSB = B - C$ ”.

Anthony E. Boardman et al., (2011) define the following major steps of CBA:

1. specify the set of alternative projects
2. decide whose benefits and cost count (standing)
3. catalogue the impacts and select measurement indicators (unit)
4. predict the impacts quantitatively over the life of the project
5. monetize (attach dollar values to) all impacts
6. discount benefits and cost to obtain present values
7. compute the net present value (NPV) of each alternative

8. perform sensitivity analysis
9. recommendations based on the NPV and sensitivity analysis

Step 1 requires the analyst to evaluate different sets of solutions to achieve the defined need. However, it can be difficult in practice to choose alternatives, where the number of potential alternatives can be huge (Anthony E. Boardman et al., 2011). It is therefore important to limit the number of potential alternatives whereas neither decision-makers nor analysts can cognitively handle comparisons among large number of alternatives. Anthony E. Boardman et al., (2011) recommend limiting to less than six alternatives.

In step 2 the analyst must decide whose benefits and cost should be counted, i.e. the analyst must decide who has standing. The issue of standing is however sometimes contentious. For example local governments typically want to consider only benefits and cost to local residents and ignore benefits and costs that occur in adjacent municipalities or are born by higher levels of government (Anthony E. Boardman et al., 2011).

Step 3 requires the analyst to identify project impact categories of all alternatives, arrange them in defined groups of benefits and cost, and specify the measurement indicator of each impact category. When identifying project impacts issues that affect the utility of individuals with standing are considered and stated impact must have a cause-and-effect relationship between some physical outcomes of the project. The specification of measurement indicator of each impact category depends on available data and ease of analyse (Anthony E. Boardman et al., 2011).

The 4<sup>th</sup> step is to quantify all impacts in each time period whereas the analyst must make predictions for all alternatives, for each year, and for each impact category (Anthony E. Boardman et al., 2011).

In step 5 the analyst must put a price on each of the impacts. The value of an impact is typically measured in terms of “willingness-to-pay” in CBA which can be determined from the appropriate market demand curve where markets exist and work well. But problems arise where markets do not exist or do not work well. Consequently, most CBA analysis relies mostly on previous research, i.e. they use “plug in” values whenever possible. Although these “plug in” values are not comprehensive, considerable progress has been made in this regard in continuously revised versions of impact values catalogues (Anthony E. Boardman et al., 2011).

The 6<sup>th</sup> step is only applicable for projects that have impacts that occur over years. For those projects the analyst needs a way to aggregate the benefits and cost that arise in different years. Future benefits and cost in CBA are discounted relative to present benefit and cost in order to obtain their present value (PV) (Anthony E. Boardman et al., 2011).

The 7<sup>th</sup> step is to compute the net present value (NPV) of each alternative whereas NPV of an alternative equals the difference between the PV of the benefits and the PV of the cost. The basic decision rule is that the analyst should recommend proceeding with the proposed project if its benefits exceed its cost and select the alternative with the largest NPV. However, it is important to bear in mind that NPVs are estimates and the final

recommendation should also be based on sensitivity analysis (step 8) (Anthony E. Boardman et al., 2011).

In step 8 the analyst must perform sensitivity analysis which attempts to deal with uncertainty about both the predicted impacts and the appropriate pricing valuation of each unit of the impact (Anthony E. Boardman et al., 2011).

Finally, in step 9 analysts make a recommendation based on the NPV and sensitivity analysis.

It is important to remember that CBA is only one input to decision-making process, one that attempts to ensure optimal use of resource devoted to public investment (Anthony E. Boardman et al., 2011).

It is also important to bear in mind that independent, unbiased assessments are needed if the CBA analysis is to work correctly and produce believable results, i.e. to avoid “judge and jury” characteristics (Avraham Shtub et al., 2005).

### **3.6. Discussion**

Feasibility analysis on the conception stages of a public projects is the principal methodology to gain comprehensive and transparent information and results to determine the viability of an investment proposal. This methodology must be structured so that it minimizes the uncertainty and the influence of project stakeholders and it must also include detailed definition of the investment strategy. Based on the literature review, the theoretically best practice for conducting feasibility analysis for public projects includes the following six phases:

1. project overview
2. alternatives
3. benefits and cost
4. net present value (NPV)
5. sensitivity analysis
6. making a recommendation

The first phase of the feasibility analysis methodology is the identification of needs which forms the project frame and the basis for further analysis. The main goal of this phase is to ensure a mutual understanding of all stakeholders and affected parties on the objectives of the project along with checking the actual need for the project. More closely, it is a project overview which explains the origin of the project, i.e. its background and objectives, along with procedures to be used to achieve the defined objectives. This phase should at least include the following four activities; explaining the origin of the project, project background, project objectives and needs analysis.

The next phase is the alternatives analysis which defines at least two alternative concepts and a maximum of six in addition to the zero-option. The main goal of this phase is to specify operational objectives for variable alternative along with essential uncertainties, and cost estimates. The alternatives should be subjected to a full socio-economic analysis.

The third phrase involves a summary of all benefits and costs. At this stage it is important to bear in mind that independent, unbiased assessments are needed if the feasibility analysis is to work correctly and produce believable results. This phase should at least include the following four activities:

1. decide whose benefits and cost count
2. catalogue the impacts and select measurement indicators (unit)
3. predict the impacts quantitatively over the life of the project
4. monetize (put a price on) all impacts

Despite the fact that the benefits and cost factors and/or attributes are very different depending on the type of projects there is enough commonality at a generic level to request that at least the following factors and/or attributes are considered. Some factors and/or attributes are common to all public projects and other factors and/or attributes apply only to individual public projects:

- economic
  - budget estimate
  - demand and supply analysis
  - finance risk assessment
  - financing channels
  - governmental strategic development policy
  - investment plan
  - life cycle-cost
  - location advantage
  - market competition
  - market forecast
  - project function and size
  - regional economic impact
  - tax policy
  - technology advantage
- social
  - attitudes toward the project
  - compliance with relevant governmental policies
  - cultural and heritage conservation
  - development of new settlement and local communities
  - improvement to public health
  - influence to local social development
  - provision capacity of employment
  - provision capacity of public infrastructure facilities
  - provision capacity of public services
  - provision of infrastructures for other economic activities
  - safety standards
- environmental
  - air impacts
  - energy consumption performance
  - environmental friendly design
  - environmental sensitivity of the project location
  - land consumption



- noise assessment
- waste assessment
- water impacts

The fourth phase involves calculating the net present value (NPV) of each alternative whereas NPV of an alternative equals the difference between the PV of the benefits and the PV of the cost. The basic decision rule is that the analyst should recommend proceeding with the proposed project if its benefits exceed its cost and select the alternative with the largest NPV. However, it is important to bear in mind that NPVs are estimates and the final recommendation should also be based on sensitivity analysis (phase five).

In the fifth phase the analyst must perform a sensitivity analysis which attempts to deal with uncertainty about both the predicted impacts and the appropriate pricing valuation of each unit of the impact.

Finally, in the sixth phase the analysts must evaluate all alternatives and make a recommendation based on the NPV and sensitivity analysis.

### 3.7. Conclusion

The purpose of this literature review was aimed to discover the real meaning of the phrase “feasibility analysis” in Icelandic law on public project arrangement as well as to find out the theoretically best practice for conducting feasibility analysis for public projects.

The overall conclusion is that feasibility analysis is the principal methodology to develop a comprehensive and professional study and a range of result for a particular assignment. The purpose is to provide a series of examinations to determine the viability of an investment proposal. Just as Icelandic law on public project arrangement requests, it is a coherent conclusion that it is considered important in the feasibility analysis process to find different ways to solve a specific need and explore a few alternative concepts for that purpose. It is also considered an important part of the feasibility analysis process to use approved professional procedures to ensure that the project is achievable and likely to deliver what is required which is consistent with the main objective of imposing Icelandic law on public project arrangement.

Additionally, it is considered important, both in Norway and Britain to get an outside evaluation from independent consultants. These consultants use their experience and expertise to determine the viability of an investment proposal.

The theoretically best practices for conducting feasibility analysis for public projects according to this literature review include six processes; project overview, alternatives, benefits and cost, net present value (NPV), sensitivity analysis and finally making a recommendation. Despite the fact that each project has its own characteristics, there is enough commonality at a generic level to permit the development of a unified framework for planning and control of the feasibility analysis process.

The following list contains the major activities for feasibility analysis of a “typical” public project:

1. project overview
  - explain the origin of the project
  - project background
  - project objectives
  - needs analysis
2. alternatives
  - development of alternatives, limit to at least two and less than six in addition to the zero alternative
3. benefits and cost
  - decide whose benefits and cost count. Economic, social and environmental factors or attributes
  - catalogue the impacts and select measurement indicators (unit)
  - predict the impacts quantitatively over the life of the project
  - monetize (put a price on) all impacts
4. net present value (NPV)
  - discount benefits and cost to obtain present values
  - compute the net present value (NPV) of each alternative
5. sensitivity analysis
  - perform sensitivity analysis of each alternative
6. recommendations
  - evaluation of alternatives
  - selection of the “most promising” alternative

The importance and content of each of these activities in the feasibility analysis process is discussed in detail in chapter 3.6 Discussion.



## 4. Case study

### 4.1. Introduction

To provide extensive knowledge and understanding of current practices regarding feasibility analysis procedures for public projects in Iceland, a case study approach was adopted in this study. The researcher collected twenty-one initial study reports from The Icelandic Road Administration (ICERA), The Icelandic Maritime Administration (IMA), The Government Construction Contracting Agency (GCCA), The East Port Project and The University of Akureyri Research Centre (RHA) about proposed construction projects, intended to support the proposal for funding. These initial study reports are supposed to be a product from studies and comparison of possible alternatives to solve a specific problem or need which the proposed projects are intended to solve (*Lög um skipan opinberra framkvæmda nr. 84/2001*, 2001). The collection of data from these initial reports of practical cases enables the researcher to obtain insight into the quality of the prerequisite used when specific projects are approved by the parliament. The examination of these cases leads to the understanding of what factors and/or attributes have been used and how in the process of feasibility analysis before deciding on implementing public projects in Iceland. Therefore, analysis can be given on whether current feasibility analysis procedures are proper or sufficient for implementing public projects in Iceland.

### 4.2. Collection of data

The approach of data collection aims at collecting information about specific prerequisites, methods, processes and procedures for conducting a feasibility analysis for public projects in Iceland from the perspective of public institutions in Iceland. According to Icelandic law on public project arrangement, concerned ministries, public institutions, communities, or other expected owners must prepare and deliver to concerned ministries an initial study report about proposed construction projects covering among other things examination of different solutions to achieve the defined need. One of the few products of this work according to this law, shall be a feasibility analysis used for comparison (*Lög um skipan opinberra framkvæmda nr. 84/2001*, 2001). See defined process and responsibility according to aforementioned law more closely in **Figure 6**.

The data collection is first and foremost dependent on access to aforementioned initial study reports from concerned ministries, public institutions, communities, or other expected owners. The data collection will be limited to six accepted construction projects in Iceland, larger than 5 million ISK, from three ministries. This limitation is intended to reflect the most decentralized sets of data without being too extensive, as well as the Icelandic law no. 84/2001, which this research is based on, does not cover public projects that are smaller than 5 million ISK.

**Initial study process according to Icelandic law concerning public project arrangement no. 84/2001**

**Process**

Project awareness → Initial study → Proposal for funding → State budget processing → State budget approval

**Responsibility**

Concerned ministry, Public institutions, Communities, Other expected owner

Initial reports about proposed constructing projects, intended to support the proposal for funding.

Concerned ministry → Ministry of Finance ↔ State budget committee → Althingi (the Icelandic legislative assembly)

#### 4.2.1. Data sampling and sampling size

Because of this it was necessary to seek information from the Ministry of Finance about the distribution of resources down to individual construction projects.

Because of the abovementioned conclusion it was decided to cancel selecting construction projects from the Icelandic national budget for the year 2011 and instead select construction projects randomly. The selection of construction projects was aimed at selecting projects based on their variety and with regard to selecting projects from several ministries. It was decided to search for six accepted construction projects under the authority of three ministries as well as being larger than 5 million ISK.

The following six projects were selected:

<b>Project name</b>	<b>Concerned ministry</b>
• Vaðlaheiði tunnel	Ministry of the Interior
• Landeyjar port (Bakkafjara port)	Ministry of the Interior
• Harpa, Reykjavík concert hall and conference centre	Ministry of Education, Science and Culture
• Upper secondary school in Mosfellsbær	Ministry of Education, Science and Culture
• Avalanche protection in Bolungarvík	Ministry for the Environment
• Snæfellsstofa visitor centre in Vatnajökull national park	Ministry for the Environment

The data sampling aims at collecting appropriate documents for each project that were used to support the proposal for funding. The data sample (types of data) is further outlined in the following section.

#### **4.2.2. Types of data**

The approach of data analysis aims to develop a coherent and comprehensive view of specific prerequisites, methods, processes and procedures for conducting feasibility analysis for public projects in Iceland. The data will be collected from existing reports about initial study which has been prepared by concerned ministries, public institutions, communities, or other expected owners in Iceland. Each individual report reflects the results for one single public project and by investigating the results from a certain number of reports, a holistic view of current feasibility analysis methodology is obtained.

The data collection is based on studying what methods, processes and procedures for conducting feasibility analysis were applied and what factors and/or attributes were used. The unit of analysis was based on the following questions:

- What was done? (feasibility analysis method)
- How was it done? (processes and procedures)
- What sort of prerequisites were used? (factors and/or attributes)

These questions are addressed to define major activities for conducting feasibility analysis in accordance with the conclusion of the literature review, section 3.7.

The following list contains the major activities for feasibility analysis of a “typical” public project:

1. project overview
  - explain the origin of the project
  - project background
  - project objectives
  - needs analysis
2. alternatives
  - development of alternatives, limit to at least two and less than six in

- addition to the zero alternative
- 3. benefits and cost
  - decide whose benefits and cost count. Economic, social and environmental factors or attributes
  - catalogue the impacts and select measurement indicators (unit)
  - predict the impacts quantitatively over the life of the project
  - monetize (put a price on) all impacts
- 4. net present value (NPV)
  - discount benefits and cost to obtain present values
  - compute the net present value (NPV) of each alternative
- 5. sensitivity analysis
  - perform sensitivity analysis of each alternative
- 6. recommendations
  - evaluation of alternatives
  - selection of the “most promising” alternative

Additionally, it will be checked whether an outside evaluation from independent consultants has been performed.

The collection of initial study reports and data is further outlined in the following two sections.

#### **4.2.3. Obtaining initial study reports**

Given the fact that all initial study reports for proposed construction projects should be preserved at concerned ministries, it was decided to start the collection of initial study reports at the appropriate ministries. Permanent Secretaries at the Ministry of the Interior, Ministry of Education, Science and Culture and Ministry for the Environment were contacted by e-mail with the aim of being allowed to view and / or obtain copies of appropriate initial study reports. See e-mails to ministries more closely in Appendix II. All three ministries answered the inquiry by referring to other institutions. The actual process of obtaining initial study reports is explained graphically in *Figure 7*.

The following is a list of initial study reports that were obtained:

- Vaðlaheiði tunnel
  - Report on the basis for Vaðlaheiði tunnel (Jón Þorvaldur Heiðarsson, 2011)
  - Profitability of road construction (Verkís, 2009)
  - Vaðlaheiði tunnel, Traffic increase assessment on opening day (Jón Þorvaldur Heiðarsson, 2007)
  - Vaðlaheiði tunnel, Social impact assessment (Haraldur Reinhardsson, 2006)
  - Vaðlaheiði tunnel, Social profitability assessment (Jón Þorvaldur Heiðarsson, 2006)
- Landeyjar port (Bakkafjara port)
  - Bakkafjara Ferry Port, Report of the Steering Committee on the port in Bakkafjara (Eiríkur Bjarnason, Sigurður Áss Grétarsson, & Hreinn Haraldsson, 2007)
  - Bakkafjara Ferry Port, Review of IMA provided reports (COWI A7S, 2007)
  - Icelandic Maritime Administration, Risk assessment of ferry Bakkafjara – Vestmannaeyjar (Tommy Johnsen & Henrik Tobiassen, 2007)

- Impact of ferry by Bakkafjara port on community and inhabited area in Vestmannaeyjar and other areas in the southern part of Iceland (Grétar Þór Eypórsson, Vífill Karlsson, & Kolfinna Jóhannesdóttir, 2006)
  - Transport to Vestmannaeyjar, Final report of minister of transport work group (Páll Sigurjónsson et al., 2006)
  - Bakkafjara Ferry Port, Report on research and recommendations (Gísli Viggósson, 2006)
  - Final report of work group on transport to Vestmannaeyjar (Kristján Vigfússon et al., 2003)
- Harpa, Reykjavík concert hall and conference centre
  - Agreement between Reykjavík and the Icelandic government for the construction of concert hall and conference centre in Reykjavík (Tómas Ingi Olrich, Ingibjörg Sólrún Gísladóttir, Sturla Böðvarsson, & Geir H. Haarde, 2001)
  - Information Memorandum – Draft (Hospitality Consulting International, 2001)
  - Initial cost plan and time schedule (VSÓ Ráðgjöf, 2002)
  - Facility Description and Revised Space List – 2001 (ARTEC Consulting Inc., 2001)
  - Concert hall and conference centre. Utilization and feasibility study. (VSÓ Ráðgjöf, 1998)
- Upper secondary school in Mosfellsbær
  - Preliminary study. A new upper secondary school in Mosfellsbær (Framkvæmdasýsla ríkisins, 2009)
- Avalanche protection in Bolungarvík
  - Avalanche protection in Bolungarvík – Traðarhryna. Environmental impact assessment (Þorleifur Eiríksson, Hafsteinn H. Gunnarsson, Arnlín Óladóttir, Jón Reynir Sigurvinsson, & Margrét Valdimarsdóttir, 2002)
- Snæfellsstofa visitor centre in Vatnajökull national park
  - Vatnajökulspjóðgarður. Visitor Centres. Preliminary study (Framkvæmdasýsla ríkisins, 2007)
  - Report of the Ministry for the Environment Advisory Committee on the establishment of Vatnajökull national park (Umhverfísráðuneytið, 2006)

In addition to the reports above the Icelandic national budgets from the year 2003 to and including the year 2011 were examined to obtain information about the funding of these projects. In this context it should be noted that the Icelandic national budgets does only account for each budget year but never the total project cost if the construction time is longer than one year.

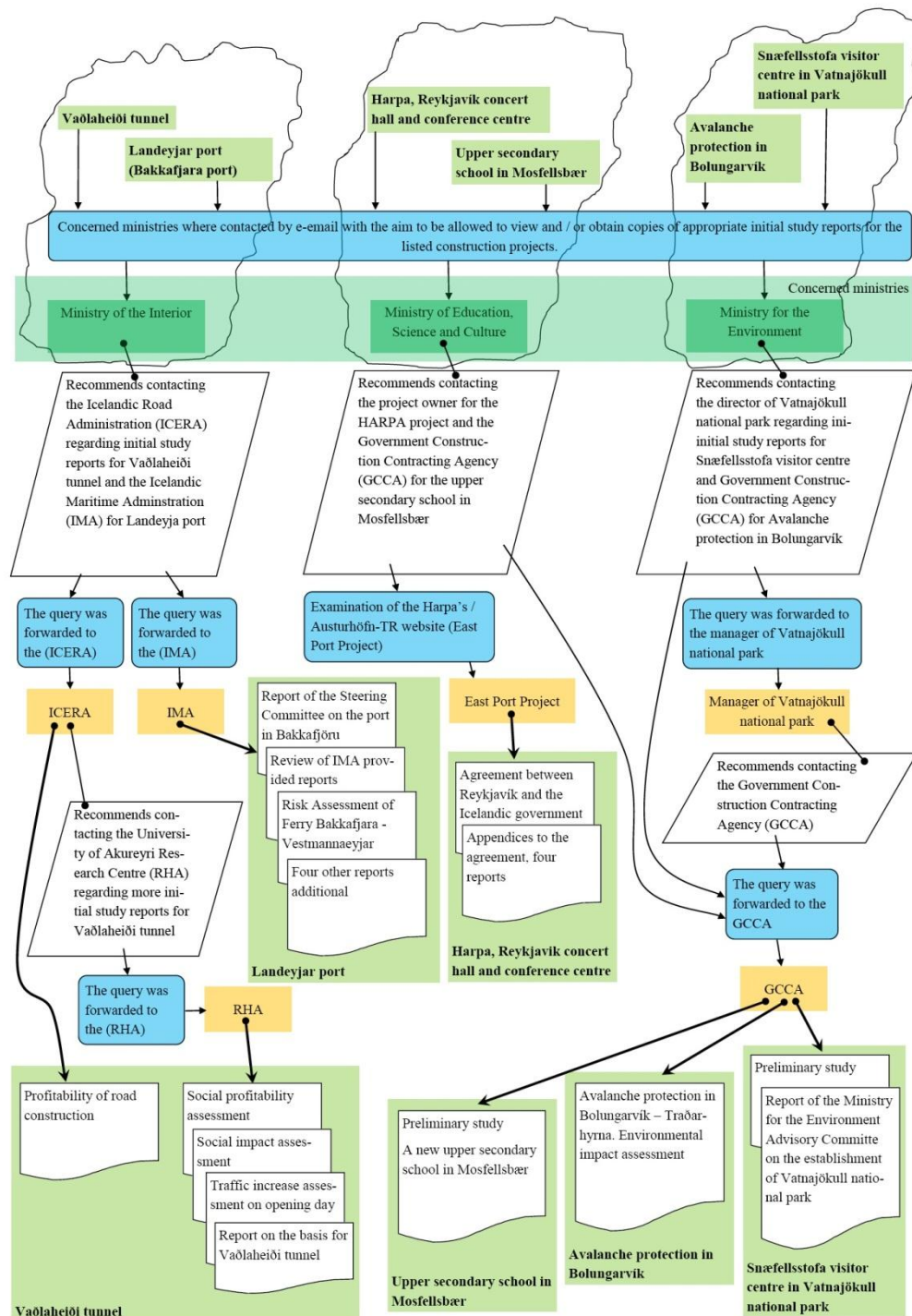


Figure 7 The actual process of obtaining initial study reports

## 4.2.4. Obtaining data and classification

The needed data were collected from obtained initial study reports, as listed in section 4.2.3. The information was collected on special forms for each project designed in accordance with the conclusion of the literature review, section 3.7 and further results in section 4.2.2.



Data collection of the initial study reports was in such a way that all reports were carefully read and comments registered in the abovementioned form for each question, seventeen questions in total. In addition, consistency with best practice for each question was also evaluated and registered. The consistency with best practice was assessed and classified into the following three categories:

- **Full** consistency with best practice
- **Partial** consistency with best practice
- **No** consistency with best practice

In assessing the consistency with best practice it was evaluated for each question how consistent the answer was to the conclusion of the literature review, see section 3.7 and further results in section 4.2.2.

Completed forms for all projects reviewed are (to be found) in Appendix I.

### 4.3. Analysis of data

Analysis of data was based on the researcher's comments from examination of initial study reports and his evaluations of consistency with best practice as reported in the defined form for each project (see completed forms for all projects reviewed in Appendix I). An overview of the consistency with best practice for each question, 17 questions in total, and of each project are shown in **Figure 8**. In this figure (radar chart) the consistency with best practice is marked with a specific line style for each project and under the radar chart the owners of each line are listed.

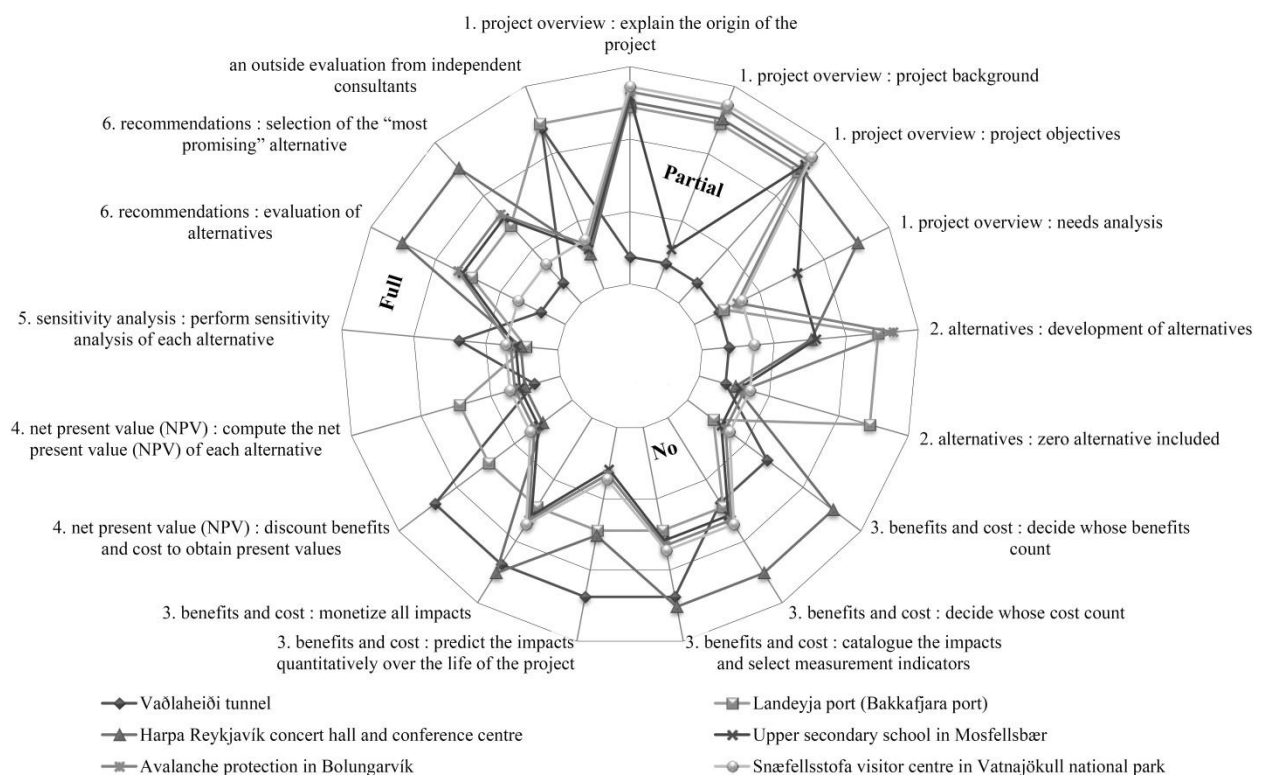


Figure 8 Radar chart of the consistency with best practice of each project

Project name	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
Vaðlaheiði tunnel	5	3	9
Landeyjar port (Bakkafjara port)	6	8	3
Harpa, Reykjavík concert hall and conference centre	10	2	5
Upper secondary school in Mosfellsbær	2	7	8
Avalanche protection in Bolungarvík	4	5	8
Snæfellsstofa visitor centre in Vatnajökull national park	3	3	11

If the attention is directed to the consistency with best practice with regard to major activities, a very different emphasis can be detected between certain activities. The following summary illustrates consistency with best practice for all projects with regard to major activities.

Table 2 Consistency with best practice – summary for major activities

And further, if all major activities are given equal weight, it can be seen that only 24.2% occurrences fall into category with **Full** consistency with best practice as illustrated in **Figure 9**.



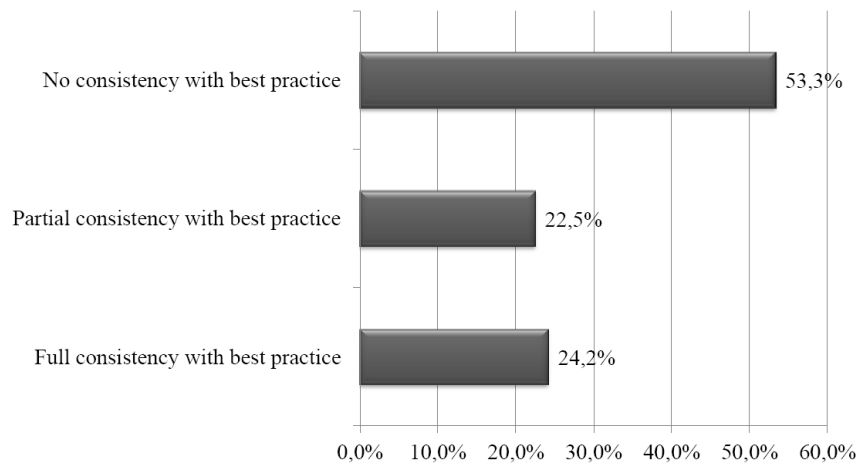


Figure 9 Percent consistency with best practice

In order to facilitate further data processing and analysis, a rating for each project was calculated. The rating was based on equal weight for each major activity and **partial** consistency with best practice was weighed 50% against **full** consistency with best practice. Rating was from 0 to 10 were the overall rating for each project could at most be 10 and 1.43 for each major activity. The following summary shows the rating for each project:

Major activities for feasibility analysis	Vaðlaheidi tunnel	Landeyjar port (Bakkafara port)	Harpa Reykjavík concert hall and conference centre	Upper secondary school in Mosfellsbær	Avalanche protection in Bolungarvík	Snæfellsstofa visitor centre in Vatnajökull national park
1. Project overview	0.00	1.07	1.43	0.89	1.07	1.07
2. Alternatives	0.00	1.43	0.36	0.36	0.71	0.00
3. Benefits and cost	1.15	0.57	1.28	0.43	0.43	0.43
4. Net present value (NPV)	0.71	0.71	0.00	0.00	0.00	0.00
5. Sensitivity analysis	0,71	0.00	0.00	0.00	0.00	0.00
6. Making recommendation	0.00	0.71	1.43	0.71	0.71	0.00
Independent consultants	1.43	1.43	0.00	0.00	0.00	0.00
<b>Overall rating</b>	<b>4.00</b>	<b>5.92</b>	<b>4.50</b>	<b>2.39</b>	<b>2.92</b>	<b>1.50</b>

Table 3 Rating for each project

As the rating for each major activity shows it is possible to identify that current methodology can to some extent be classified as best practice, looking at individual rating.

In five cases, result shows the highest rating (1.43) and in six additional cases the rating are higher than 0.86 which stand for an overall rating higher than 6. However, in thirty-one cases the ratings are lower than 0.86 thereof, in eighteen cases rating are 0.00. It can therefore be said that this is a significant deviation from best practice.

Looking at the overall rating, a large difference can also be seen between projects and all ratings are lower than 6, albeit one project is very close to that rating.

If overall ratings are tested to the hypothesis that the average rating is equal to 10 (full consistency with best practice) by using the following t-test equation, the conclusion is that the hypothesis will not stand.

$$t = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

Where  $\bar{x}$  is the average rating,  $\mu$  is 10,  $\sigma$  is the standard deviation and  $n$  is the total number of ratings.

The average rating,  $\bar{x}$  is = 3.54

The standard deviation,  $\sigma$  is = 1.59

$t_{10} = -9.94$  i.e. a cumulative probability of 0.0001. Hence, if the true average rating were 10, there is a 0.01% chance that the average rating for 6 randomly selected public projects would be equal to 10.

In the same way, if overall ratings are tested to the hypothesis that the average rating is equal to 5 (partial consistency with best practice) by using the t-test, the conclusion is that it is unlikely that the hypothesis will stand.

$t_5 = -2.25$  i.e. a cumulative probability of 0.0372. Hence, if the true average rating were 5, there is a 3.72% chance that the average rating for 6 randomly selected public projects would be equal to 5.

Overall, the analysis of data shows that there is a large discrepancy of applied methodology between projects when conducting feasibility analysis and the work procedures lacks a lot of processes, in order to be considered to be best practice.

#### **4.4. Conclusions**

The purpose of this case study was aimed at collecting and evaluating data from initial study reports regarding specific methodology for conducting feasibility analysis for public projects in Iceland. The following six accepted construction projects in Iceland were examined:

- Vaðlaheiði tunnel
- Landeyjar port (Bakkafjara port)
- Harpa, Reykjavík concert hall and conference centre
- Upper secondary school in Mosfellsbær
- Avalanche protection in Bolungarvík
- Snæfellsstofa visitor centre in Vatnajökull national park

At the beginning of the initial study reports collection, three points were observed that caught the attention of the researcher. First, that the Icelandic national budget does not include a complete list of all accepted construction projects whereas many projects are included in total funding for various institutions and it is impossible to see which projects have been approved. In addition, the Icelandic national budget does only account for each budget year but never the total project cost if the construction time is longer than one year and it is therefore impossible to see total funding for those projects. Second, it is interesting that a list of all public construction projects which have been accepted for funding is not available at the Ministry of Finance, given the fact that it must be a comprehensive overview of funding in that institute. Third, it is also interesting that none of the ministries in concern could directly provide initial study reports for proposed construction projects despite the fact that these reports should be preserved at the concerned ministries.

The case study of the abovementioned projects involved data collection and evaluation of twenty-one initial study reports from The Icelandic Road Administration (ICERA), The Icelandic Maritime Administration (IMA), The Government Construction Contracting Agency (GCCA), The East Port Project and The University of Akureyri Research Centre (RHA).

Evaluation of the data was based on benchmarking current practises and procedures against best practices for conducting feasibility analysis in accordance with the conclusion of the literature review. The conclusion of the case study is that there is a large discrepancy of applied methodology between projects when conducting feasibility analysis and the work procedures lacks a lot of processes in order to be considered best practice. However, exemplary work was done in some cases, for example the project overview in the Harpa project, examination of alternatives in the Landeyjar port project and evaluations of an independent consultant for the Vaðlaheiði tunnel and Landeyjar port projects.

## **5. Results**

### **5.1. Introduction**

This research was aimed at determining and defining what factors and/or attributes must be analysed in the feasibility analysis process as well as finding what procedures can be classified as best practises when performing feasibility analysis during the conception phase of public projects in Iceland. The research was divided into two phases, on the one hand literature review to find out the real meaning of the phrase “feasibility analysis” and the theoretically best practice for conducting a feasibility analysis for public projects, and on the other hand, a case study of twenty-one initial study reports associated with six accepted construction projects in Iceland.

The following three sections discuss the results of the literature review and the case study along with the overall conclusions.

### **5.2. Feasibility analysis – Best practice**

The real meaning of the phrase “feasibility analysis” is that it stands for a principal methodology to develop a comprehensive and professional study and a range of results for a particular assignment. The purpose is to provide a series of examinations to determine the viability of an investment proposal. It is a coherent conclusion that it is considered important in the feasibility analysis process to find different ways to solve a specific need and explore a few alternative concepts for that purpose. It is also considered an important part of a feasibility analysis process to use approved professional procedures to ensure that the project is achievable and likely to deliver what is required. Additionally, it is considered important to get an outside evaluation from independent consultants. These consultants use their experience and expertise to determine the viability of an investment proposal.

The theoretically best practices for conducting feasibility analysis for public projects according to the literature review include six processes; project overview, alternatives, benefits and cost, net present value (NPV), sensitivity analysis and finally recommendations.

The importance and content of each of these six processes in the feasibility analysis process is discussed in detail in chapter 3.6 Discussion and 3.7 Conclusion.

### **5.3. Feasibility analysis – Current methodology**

The case study of the six accepted construction projects in Iceland involved data collection and evaluation of twenty-one initial study reports from The Icelandic Road Administration (ICERA), The Icelandic Maritime Administration (IMA), The Government Construction Contracting Agency (GCCA), The East Port Project and The University of Akureyri Research Centre (RHA). The following six accepted construction projects in Iceland were examined:

- Vaðlaheiði tunnel
- Landeyjar port (Bakkafjara port)
- Harpa Reykjavík concert hall and conference centre
- Upper secondary school in Mosfellsbær
- Avalanche protection in Bolungarvík
- Snæfellsstofa visitor centre in Vatnajökull national park

Evaluation of the data was based on benchmarking current practices and procedures against best practice for conducting feasibility analysis which includes the following six processes; project overview, alternatives, benefits and cost, net present value (NPV), sensitivity analysis and finally recommendations. Additionally, it was examined whether an outside evaluation from independent consultants had taken place.

The overall conclusion of the case study is that there is a large discrepancy of applied methodology between projects when conducting feasibility analysis and the work procedures lacks a lot of processes in order to be considered best practice. However, exemplary work was done in some cases, for example the project overview in the Harpa project, examination of alternatives in the Landeyjar port project and evaluations of an independent consultant for the Vaðlaheiði tunnel and Landeyjar port projects.

A detailed discussion of the case study is in chapter 4 Case study.

### **5.4. Conclusions**

The conclusion of this research is that feasibility analysis is a principal methodology to develop a comprehensive and professional study and a range of results for a particular assignment. The feasibility analysis consists of a series of examinations to determine the viability of an investment proposal which include the following six processes; project overview, alternatives, benefits and cost, net present value (NPV), sensitivity analysis and finally recommendations. Additionally, and no less important, it is crucial to get an outside evaluation from independent consultants.

The conclusion also shows that implementation of public projects in Iceland does not follow this principal methodology of feasibility analysis and there is large discrepancy of applied methodology between the projects which were examined.

## **6. Discussion**

### **6.1. Introduction**

The impetus of this research was the statement that investment decisions for public projects in Iceland have often been controversial and it is not always clear how prioritization and selection of projects is evaluated. The approach of this research was based on the requirements of Icelandic law on public project arrangement no. 84/2001. This law requires that different solutions to achieve the defined need must be examined and compared internally before applying for funding. One of the few products of this work according to this law shall be a feasibility analysis used for comparison. The objective of this research is to benchmark current practises and procedures within the official sector in Iceland against best practises and recommend changes.

### **6.2. Feasibility analysis – Current methodology versus best practice**

The current methodology of performing feasibility analysis during the conception phase of public projects in Iceland varies considerably. There does not seem to be much consistency regarding methodology and there are only a few incidents that can be defined as best practice. This result, which is obtained from a case study of six accepted construction projects in Iceland involved data collection and evaluation of twenty-one initial study reports. To improve the procedure it is important that the Minister of Finance issues detailed guidelines for performing feasibility analysis in accordance with best practice.

In addition to the conclusion above, a limited transparency with the management of initial study reports was detected whereas none of the ministries in concern could directly provide initial study reports for proposed construction projects despite the fact that these reports should be preserved at the concerned ministries. To improve the procedure it is also important to increase the value of these initial study reports within each ministry.

It is also worth pointing out that the Icelandic national budget gives a very limited view of financing public projects whereas it does not include a complete list of all accepted construction projects. Many projects are included in total fundings to various institutions and it is impossible to see what projects have been approved. In addition, the Icelandic national budget does only account for each budget-year but never the total project cost if the construction time is longer than one year, and it is therefore impossible to see the total funding for those projects. Minor improvements in the Icelandic national budget contents and arrangements would considerably improve the transparency of funding for public constructions projects.

### **6.3. Conclusion**

The conclusion shows that there are good and valid reasons for the statement that investment decisions for public projects in Iceland are often controversial and it is not always clear how prioritization and selection of projects is evaluated. The research shows that current methodology of performing feasibility analysis during the conception phase of public projects in Iceland varies considerably. There does not seem to be much consistency

in procedures and there are only a few incidents that can be defined as best practice. There is also limited transparency with management of initial study reports and the Icelandic national budget gives a very limited view of public projects financing.

It is recommended to improve the current methodology by improving procedures containing new detailed guidelines for performing feasibility analysis in accordance with best practices and definitions of new procedures within each ministry to increase the value of the initial study reports. It is also worth pointing out that minor improvement in the Icelandic national budget contents and arrangements would considerably improve the transparency of funding for public constructions projects.

## 7. Conclusion

### 7.1. Final conclusion

Feasibility analysis is a principal methodology to develop a comprehensive and professional study and give a range of results for a particular assignment. The purpose is to provide a series of examinations to determine the viability of an investment proposal. It is also important in the feasibility analysis process to find different ways to solve a specific need and explore a few alternative concepts for that purpose. An important part of the feasibility analysis process is to use approved professional procedures to ensure that the project is achievable and likely to deliver what is required. Additionally, it is important to get an outside evaluation from independent consultants.

The theoretically best practices for conducting feasibility analysis for public projects according to the literature review include six processes; project overview, alternatives, benefits and cost, net present value (NPV), sensitivity analysis and finally making recommendation.

The importance and content of each of these six processes in the feasibility analysis process is discussed in detail in chapter 3.6 Discussion and 3.7 Conclusion.

To begin with, in relation to the research questions initial study reports of six accepted construction projects in Iceland were reviewed. The evaluation was based on studying what methods, processes and procedures for conducting feasibility analysis were applied and what factors and/or attributes were used. The basis of the evaluation was based on seventeen questions which were addressed to defined major activities for conducting feasibility analysis in accordance with the conclusion of the literature review, section 3.7. Answers to these questions were recorded on defined forms for each project (see completed forms for all projects reviewed in Appendix I).

Secondly, in relation to the research questions, the abovementioned answers were evaluated and it was examined whether these factors and/or attributes along with procedures were proper or sufficient for implementing public projects in Iceland. The conclusion is that there is a major discrepancy of applied methodology between projects when conducting feasibility analysis and the work procedures lacks a lot of processes, in order to be considered best practice. However, exemplary work was done in some cases, for example the project overview in the Harpa project, examination of alternatives in the Landeyjar port project and evaluations of an independent consultant for the Vaðlaheiði tunnel and Landeyjar port projects.

A detailed discussion of the case study is in chapter 4 Case study.

**The final conclusion is that the current methodology of performing feasibility analysis during the conception phase of public projects in Iceland varies considerably. There does not seem to be much consistency in procedures and there are only a few incidents that can be defined as best practice.**



In addition to the conclusion above a limited transparency with the management of initial study reports was detected whereas none of the ministries in concern could directly provide initial study reports for proposed construction projects despite the fact that these reports should be preserved at concerned ministry.

It is also worth pointing out that the Icelandic national budget gives a very limited view of financing public projects whereas it does not include a complete list of all accepted construction projects. Many projects are included in total fundings to various institutions and it is impossible to see what projects have been approved. In addition, the Icelandic national budget does only account for each budget-year but never the total project cost if the construction time is longer than one year and it is therefore impossible to see the total funding for those projects.

With regard to the above discussion, it is safe to say that the following hypothesis which was put forward in section 1.4 can stand unchanged.

*Unprofessional decision-making in public financial management is partly the result of poor or no methodology for feasibility analysis to evaluate various options.*

### **7.2. Recommendations**

It is recommended to improve the current methodology by improving procedures containing new detailed guidelines for performing feasibility analysis in accordance with best practice (defined in section 3.7) and definitions of new procedures within each ministry to increase the value of the initial study reports. It is also worth pointing out that minor improvement in the Icelandic national budget contents and arrangement would considerably improve the transparency of funding for public constructions projects.

### **7.3. Contribution**

The true outcome of this research is a systematic procedure regarding the feasibility analysis process before deciding on implementing public projects in Iceland which will help participants to make the best decisions possible with the information they have available. These procedures will help to map out the likely consequences of decisions, work out the importance of individual factors and choose the best course of action.

### **7.4. Limitations**

This research was limited to examination of initial study reports from six public construction projects under the authority of three ministries, and therefore it can be said that it gives a limited perspective to the case. The presented theoretically best practices for conducting feasibility analysis for public projects was limited to literature review and the conclusion is therefore limited to the extent of that review. Some experience has been gained but there are many questions that need to be answered to evaluate the result of this research in terms of improvement of procedures and transparency in the decision-making process when public projects investment in Iceland are under consideration.

### **7.5. Further research**

This research shows that current methodology of performing feasibility analysis varies greatly and there seems to be little consistency in procedures. This research, however, does not evaluate the consequences of current methodology, for example whether a certain public project has achieved the defined need that it was supposed to fulfil and whether the legislative authority has used the results of the feasibility analysis when the decision of implementation of certain public project was taken. Further research from that perspective could benefit the improvement of public procurement and transparency.

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## Appendix I : Completed forms for all projects reviewed

Project name :	Vaðlaheiði tunnel
Responsibility :	Ministry of the Interior
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year : 2009 and 2010, but no funding
Funding in the Icelandic national budget :	ISK : Not on the Icelandic national budget, but Finance Minister is authorized to negotiate for the construction and operation
Total cost of project :	ISK :10,400,000,000.- (Estimated in Mars 2011)

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
1. Project overview						
Is the origin of the project explained?	The origin of the project is not explained.	Nothing done.	No prerequisites were used.	0	0	1
Is the background of the project described?	The background of the project is not described.	Nothing done.	No prerequisites were used.	0	0	1
Are the objectives of the project described?	The project objectives are not explicitly described, but it is mentioned that Vaðlaheiði tunnel must be regarded as a major factor in promoting Akureyri as the core region of northern Iceland.	No method was applied to formulate objectives.	No prerequisites were used.	0	0	1
Has needs analysis been carried out?	No needs analysis was carried out.	Nothing done.	No prerequisites were used.	0	0	1
2. Alternatives						
Number of alternatives?	One, only Vaðlaheiði tunnel.	Nothing done.	No prerequisites were used.	0	0	1
Is the zero alternative included?	The zero alternative was not included as an option.	Nothing done.	No prerequisites were used.	0	0	1
3. Benefits and cost						
Has it been decided whose benefits count?	Social profitability assessment Social impact assessment Traffic increase assessment on opening day Profitability of road construction	<ul style="list-style-type: none"> <li>Road accidents reduction assessment</li> <li>Traffic forecast based on population forecast, communication model and annual increase in people mobility.</li> <li>Willingness to pay assessment based on travel distance shortening and travel time reduction.</li> <li>Estimate of savings due to reduced snow removal and maintenance</li> </ul>	Economic [x]yes [ ]no Social [x]yes [ ]no Environmental [ ]yes [x]no  Factors and /or attributes: <ul style="list-style-type: none"> <li>Road accidents</li> <li>Traffic forecast</li> <li>Willingness to pay</li> <li>Operating cost</li> </ul>	0	1	0

## Feasibility analysis procedures for public projects in Iceland



Project name :	Vaðlaheiði tunnel		
Responsibility :	Ministry of the Interior		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	2009 and 2010, but no funding	
Funding in the Icelandic national budget :	ISK :	Not on the Icelandic national budget, but Finance Minister is authorized to negotiate for the construction and operation	
Total cost of project :	ISK :	10,400,000,000.- (Estimated in Mars 2011)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
Has it been decided whose cost count?	Social profitability assessment Social impact assessment Traffic increase assessment on opening day Profitability of road construction	<ul style="list-style-type: none"> <li>Initial cost assessment</li> <li>Cost of capital assessment</li> <li>Residual value assessment</li> <li>Profitability assessment of road construction</li> </ul>	Economic <input checked="" type="checkbox"/> yes <input type="checkbox"/> no Social <input type="checkbox"/> yes <input checked="" type="checkbox"/> no Environmental <input type="checkbox"/> yes <input checked="" type="checkbox"/> no  Factors and /or attributes: <ul style="list-style-type: none"> <li>Initial cost</li> <li>Cost of capital</li> <li>Residual value</li> <li>Profitability</li> </ul>	0	1	0
Have the impacts been catalogued with measurement indicators?	Social profitability assessment Social impact assessment Traffic increase assessment on opening day Profitability of road construction	The impacts were catalogued with measurement indicators.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Cost of capital</li> <li>Residual value</li> <li>Operating cost</li> <li>Road accidents</li> <li>Traffic forecast</li> <li>Willingness to pay</li> </ul>	1	0	0
Have the impacts been predicted quantitatively over the life of the project?	Social profitability assessment Social impact assessment Traffic increase assessment on opening day Profitability of road construction	The impacts were predicted quantitatively over a 20 year's lifetime.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Cost of capital</li> <li>Residual value</li> <li>Operating cost</li> <li>Road accidents</li> <li>Traffic forecast</li> <li>Willingness to pay</li> </ul>	1	0	0
Have all impacts been monetized?	Social profitability assessment Social impact assessment Traffic increase assessment on opening day Profitability of road construction	All impacts was monetized in millions ISK	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Cost of capital</li> <li>Residual value</li> <li>Operating cost</li> <li>Road accidents</li> <li>Traffic forecast</li> <li>Willingness to pay</li> </ul>	1	0	0
4. Net present value (NPV) Has the benefits and cost been discounted to obtain present values?	Net present value calculations.	The benefits and cost were discounted to obtain present value of total benefit.	<ul style="list-style-type: none"> <li>Growing benefits</li> <li>Fixes benefits</li> <li>Residual value</li> <li>Initial cost and cost of capital</li> </ul>	1	0	0
Has the net present value (NPV) been computed of each alternative?	Only one alternative.	Nothing done.	No prerequisites were used.	0	0	1

## Feasibility analysis procedures for public projects in Iceland



Project name :	<b>Vaðlaheiði tunnel</b>		
Responsibility :	<b>Ministry of the Interior</b>		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	<b>2009 and 2010, but no funding</b>	
Funding in the Icelandic national budget :	ISK :	<b>Not on the Icelandic national budget, but Finance Minister is authorized to negotiate for the construction and operation</b>	
Total cost of project :	ISK :	<b>10,400,000,000.-</b> (Estimated in Mars 2011)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
5. Sensitivity analysis Has sensitivity analysis of each alternative been performed?	Only one alternative. Sensitivity analysis for profitability.	Sensitivity analysis for profitability in the form of internal rate of return (IRR).	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> <li>Vehicle cost</li> <li>Vehicle time cost</li> <li>Road accidents cost</li> </ul>	0	1	0
6. Making recommendation Has an evaluation of alternatives been performed?	Only one alternative.	Nothing done.	No prerequisites were used.	0	0	1
Has a selection of the “most promising” alternative been performed?	Only one alternative.	Nothing done.	No prerequisites were used.	0	0	1
Independent consultants Has an outside evaluation from independent consultants been performed?	Two independent consultants were engaged to undertake, on the one hand an initial cost estimate by VSO Ráðgjöf, and on the other hand a profitability study by Verkís.	<ul style="list-style-type: none"> <li>Initial cost estimate</li> <li>Profitability study in the form of internal rate of return (IRR).</li> <li>Sensitivity analysis</li> </ul>	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> <li>Maintenance cost</li> <li>Traffic forecast</li> <li>Road accidents cost</li> </ul>	1	0	0



## Feasibility analysis procedures for public projects in Iceland



Project name :	Landeyjar port (Bakkafjara port)		
Responsibility :	Ministry of the Interior		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	2008	
Funding in the Icelandic national budget :	ISK :	2,853,200,000.- (835.0 million ISK 2008, 770.1 / 2009, 1045.1 / 2010 and 203.0 / 2011)	
Total cost of project :	ISK :	3,500,000,000.- (Estimated in February 2007 and only for port construction, but 5,600,000,000.- with road construction and a new ferry)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
1. Project overview						
Is the origin of the project explained?	The origin of the project is described as a requirement among inhabitants in Vestmannaeyjar for improved transportation with Vestmannaeyjar. A higher level of service and shorter travel time than is now available is requested. These requirements are considered to be reasonable and are consistent with the general requirements of other Icelandic inhabitants concerning easy and good transportation.	Description in general terms.	<ul style="list-style-type: none"> <li>Improved transportation</li> <li>Shorter travel time</li> <li>Quality level of service</li> </ul>	1	0	0
Is the background of the project described?	The background of the project was studied in detail by examining all current transportation options.	Examination of current transportation options involved: <ul style="list-style-type: none"> <li>Transportation capacity of the existing ferry and utilization</li> <li>Air transport with Vestmannaeyjar</li> <li>The Vestmannaeyjar – Reykjavik air route</li> <li>The Vestmannaeyjar – Bakki air route</li> <li>Vestmannaeyjar airport</li> <li>Bakki airport at Landeyjar</li> <li>Possibilities of different transportation services</li> </ul>	<ul style="list-style-type: none"> <li>Population of Vestmannaeyjar</li> <li>Number of passengers</li> <li>Number of trips</li> <li>Frequency of trips</li> <li>Fare</li> <li>Capacity utilization</li> <li>Number of cancellation</li> </ul>	1	0	0
Are the objectives of the project described?	The project objectives are described as improvement and strengthening of transportation with Vestmannaeyjar under the current circumstances with respect to future long term policy.	Description in general terms.	<ul style="list-style-type: none"> <li>Improvement of transportation</li> <li>Strengthening of transportation</li> <li>Current circumstances</li> <li>Future policy</li> </ul>	1	0	0
Has needs analysis been carried out?	No needs analysis was carried out.	A decision to find ways to improve transportation with Vestmannaeyjar.	<ul style="list-style-type: none"> <li>Improved transportation</li> <li>Shorter travel time</li> <li>Quality level of service</li> </ul>	0	0	1
2. Alternatives						
Number of alternatives?	Six alternatives were examined.	Different alternatives which were examined: <ul style="list-style-type: none"> <li>Lengthening the existing ferry and increasing mechanical power</li> <li>New ferry for the route Vestmannaeyjar - Þorlákshöfn</li> <li>Purchase and operation of high a speed ferry for the route Vestmannaeyjar - Þorlákshöfn</li> <li>Purchase and operation of hovercraft ferry for the route Vestmannaeyjar – Þorlákshöfn or Bakki shore</li> <li>Landeyjar port and new ferry for the route Vestmannaeyjar – Bakki shore</li> <li>Road connection with Vestmannaeyjar, undersea tunnel</li> </ul>	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> </ul>	1	0	0

## Feasibility analysis procedures for public projects in Iceland



Project name :	Landeyjar port (Bakkafjara port)		
Responsibility :	Ministry of the Interior		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	2008	
Funding in the Icelandic national budget :	ISK :	2,853,200,000.- (835.0 million ISK 2008, 770.1 / 2009, 1045.1 / 2010 and 203.0 / 2011)	
Total cost of project :	ISK :	3,500,000,000.- (Estimated in February 2007 and only for port construction, but 5,600,000,000.- with road construction and a new ferry)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
Is the zero alternative included?	The zero alternative was included.	Cost assessment.	<ul style="list-style-type: none"> <li>Operating cost</li> </ul>	1	0	0
3. Benefits and cost Has it been decided whose benefits count?	There was no accounting for any benefits.	Nothing done.	Economic [ ]yes [x]no Social [ ]yes [x]no Environmental [ ]yes [x]no	0	0	1
Has it been decided whose cost count?	Cost assessment.	<ul style="list-style-type: none"> <li>Initial cost assessment</li> <li>Operating cost assessment</li> </ul>	Economic [x]yes [ ]no Social [ ]yes [x]no Environmental [ ]yes [x]no  Factors and/or attributes: <ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> </ul>	0	1	0
Have the impacts been catalogued with measurement indicators?	Only the cost impacts were catalogued with measurement indicators.	The cost impacts were catalogued with measurement indicators.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> </ul>	0	1	0
Have the impacts been predicted quantitatively over the life of the project?	Only the cost impacts predicted quantitatively over the life of the project.	The cost impacts were predicted quantitatively over a 20 and 30 year's lifetime.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> </ul>	0	1	0
Have all impacts been monetized?	Only cost impacts were monetized.	Cost impacts were monetized in millions ISK	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> </ul>	0	1	0
4. Net present value (NPV) Has the benefits and cost been discounted to obtain present values?	Net present value calculations for cost.	The cost was discounted to obtain present value of total cost.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> </ul>	0	1	0
Has the net present value (NPV) been computed of each alternative?	Net present value was computed of each alternative.	The cost was discounted to obtain present value of total cost of each alternative.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> </ul>	0	1	0
5. Sensitivity analysis Has sensitivity analysis of each alternative been performed?	There was no recorded evidence for sensitivity analysis of each alternative.	Nothing done.	No prerequisites were used.	0	0	1

## Feasibility analysis procedures for public projects in Iceland



Project name :	Landeyjar port (Bakkafjara port)		
Responsibility :	Ministry of the Interior		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	2008	
Funding in the Icelandic national budget :	ISK :	2,853,200,000.- (835.0 million ISK 2008, 770.1 / 2009, 1045.1 / 2010 and 203.0 / 2011)	
Total cost of project :	ISK :	3,500,000,000.- (Estimated in February 2007 and only for port construction, but 5,600,000,000.- with road construction and a new ferry)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
6. Making recommendation Has an evaluation of alternatives been performed?	The evaluation was based on total cost.	Total cost and NPV assessment.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> </ul>	0	1	0
Has a selection of the “most promising” alternative been performed?	The selection was based on total cost.	Total cost and NPV assessment.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Operating cost</li> </ul>	0	1	0
Independent consultants Has an outside evaluation from independent consultants been performed?	Two independent consultants were engaged to undertake an outside evaluation, on the one hand a second opinion desk study by COWI A/S, and on the other hand a risk assessment by Det Norske Veritas (DNV).	<p>COWI A/S: Undertaking a second opinion desk study concerning the proposed Bakkafjara ferry and ferry harbour with respect to the questions:</p> <ol style="list-style-type: none"> <li>Are the studies of accepted standards?</li> <li>Is the evaluation of the sediment transport and morphology realistic?</li> <li>Is the risk assessment of the ferry realistic?</li> <li>Are there any weaknesses in the studies which require further improvements for the project basis?</li> </ol> <p>DNV performed a risk assessment between a planned new ferry route between Bakkafjara and Vestmannaeyjar. The risk for people, property and environment was measured as was the frequency of fatalities, property damage and oil spills. The risk of the new ferry was compared with the existing ferry operating between the harbour of Thorlakshofn and Vestmannaeyjar.</p>	<p>Second opinion desk study:</p> <ul style="list-style-type: none"> <li>Impact on and from the sediment transport</li> <li>Navigational safety and security to passengers and vessel, in combination with down time (cancellation) considerations</li> <li>Etc.</li> </ul> <p>Risk assessment:</p> <ul style="list-style-type: none"> <li>Personnel risk, quantified as fatality frequency.</li> <li>Property risk, quantified as the frequency of damage to the ferry.</li> <li>Environmental risk, quantified as the frequency of oil spills.</li> </ul>	1	0	0

## Feasibility analysis procedures for public projects in Iceland



Project name :	<b>Harpa Reykjavík concert hall and conference centre</b>		
Responsibility :	<b>Ministry of Education, Science and Culture</b>		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	<b>2003</b>	
Funding in the Icelandic national budget :	ISK :	<b>727.400.000,-</b> (45,3 million ISK 2003, 13,5 / 2004, 10,0 / 2005, 75,0 / 2008, 50,0 / 2009, 70,0 / 2010 and 463,6 / 2011)	
Total cost of project :	ISK :	<b>5.960.000.000,-</b> (Estimated in January 2002. The State (54%) and the City of Reykjavík (46%) divide between themselves the cost)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
1. Project overview						
Is the origin of the project explained?	In February 1996, the Minister of Education appointed a committee to study the opportunity to create a new Icelandic Concert Hall. The committee comprised of representatives of the City of Reykjavík and the Government. The main objective of the committee was to examine whether such a hall should be built, where it should be located and how the building should be financed and operated.	Amongst other things, a needs analysis for the Icelandic Symphony Orchestra was prepared, an assessment of the appropriate size and scale of facilities was made and the cost of construction and operation was estimated.	<ul style="list-style-type: none"> <li>The development of musical life in Iceland</li> <li>The history of concert halls in Iceland</li> <li>Musical practitioners</li> <li>Concerts and concert attendance</li> <li>Facilities for concerts and musical performance</li> <li>Concert Halls in neighbouring countries</li> </ul>	1	0	0
Is the background of the project described?	The background of the project was studied in detail by examining the development of musical life in Iceland and the needs for a Concert Hall.	A general description of the development of musical life in Iceland was made.	<ul style="list-style-type: none"> <li>The development of musical life in Iceland</li> <li>The history of concert halls in Iceland</li> <li>Musical practitioners</li> <li>Concerts and concert attendance</li> <li>Facilities for concerts and musical performance</li> <li>Concert Halls in neighbouring countries</li> </ul>	1	0	0
Are the objectives of the project described?	The objectives of the project are described as creation of a major complex in central Reykjavik comprising a Concert Hall, Conference Centre and Hotel with a further opportunity to develop office or retail elements as an integral part of the scheme. It is imperative that the proposed buildings should utilise and enhance the advantages of the area designated for the scheme. The buildings within the designated area will have high visibility from the sea, the harbour area, the central Kvos area and from Sæbraut (the main road along the shoreline). It is intended that the visual impact and the dimension of the prospective buildings will create a “beacon” or icon symbolising Reykjavik City Centre. Therefore, the interplay of buildings and aesthetic values will be paramount and great emphasis is put on ensuring that the urban planning and conceptual architectural forms of the proposed buildings on the site, and generally within the entire area, shall be of the highest standards.	Description in general terms and definition of the main dimensions.	<p>The designing for the Music Hall and Conference Centre was supposed to be able to accommodate the following:</p> <ol style="list-style-type: none"> <li>A specially designed concert hall of a superior category, accommodating 1500 persons, whereof 200 will be behind the stage. Those seats will be usable for a choir, thus enabling the hall to seat an audience of 1300.</li> <li>A specially designed conference hall, with a capacity for 500 persons in a so called class room arrangement and 750 persons in a cinema arrangement. It should be possible to divide the hall into two minor halls.</li> <li>A rehearsal and concert hall, where a big symphony orchestra and choir, a total of 240 persons could rehearse. The hall should take 450 guests at chamber music performances. The hall should also be adaptable for conferences.</li> <li>Facilities for performers and the offices of The Icelandic Symphony Orchestra.</li> <li>Approximately 16 smaller meeting and conference rooms, seating 400-500 persons.</li> <li>Service, support and technical facilities pertaining to a concert hall and conference centre of these proportions.</li> </ol> <p>It was estimated that the total size of the Concert Hall and Conference Centre should be approx. 15.000 m<sup>2</sup>.</p>	1	0	0

## Feasibility analysis procedures for public projects in Iceland



Project name :	<b>Harpa Reykjavík concert hall and conference centre</b>		
Responsibility :	<b>Ministry of Education, Science and Culture</b>		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	<b>2003</b>	
Funding in the Icelandic national budget :	ISK :	<b>727.400.000,-</b> (45,3 million ISK 2003, 13,5 / 2004, 10,0 / 2005, 75,0 / 2008, 50,0 / 2009, 70,0 / 2010 and 463,6 / 2011)	
Total cost of project :	ISK :	<b>5.960.000.000,-</b> (Estimated in January 2002. The State (54%) and the City of Reykjavík (46%) divide between themselves the cost)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
Has needs analysis been carried out?	Needs of the Icelandic Symphony Orchestra and other musical activities along were evaluated along with a needs assessment.	Current activities of the Icelandic Symphony Orchestra and its history was summarized and evaluated. Discussions with numerous parties who have managed concerts in the capital city area exploring what needs must be fulfilled for the general music activities. The main points for acoustics were summarized and evaluated. The current status of conferences in Iceland and ther history was summarized and evaluated.	<ul style="list-style-type: none"> <li>The Icelandic Symphony Orchestra rehearsals</li> <li>The Icelandic Symphony Orchestra concert</li> <li>The Icelandic Symphony Orchestra recording</li> <li>Space plan for the Icelandic Symphony Orchestra</li> <li>The needs of other musical activities</li> <li>Acoustics</li> <li>The need for conferences</li> </ul>	1	0	0
2. Alternatives Number of alternatives?	Different options were examined, but not directly related to the defined needs, i.e. the needs of the Icelandic Symphony Orchestra and other musical activities along with acoustics.	Five different location of the concert hall were examined before it was decided to place it in the current location. It was also considered to build the concert hall alone against building it jointly with a conference centre.	<ul style="list-style-type: none"> <li>Evaluation of different characteristic and present facilities of each location</li> <li>Initial cost</li> <li>Operating cost</li> </ul>	0	1	0
Is the zero alternative included?	The zero alternative was not included as an option.	Nothing done.	No prerequisites were used.	0	0	1
3. Benefits and cost Has it been decided whose benefits count?	Revenues assessment	The revenue projections were developed from utilisation patterns and rental and pricing levels appropriate to each element of the facility and the market.	<p>Economic <input checked="" type="checkbox"/>yes <input type="checkbox"/>no</p> <p>Social <input type="checkbox"/>yes <input checked="" type="checkbox"/>no</p> <p>Environmental <input type="checkbox"/>yes <input checked="" type="checkbox"/>no</p> <p>Factors and /or attributes:</p> <ul style="list-style-type: none"> <li>Revenues <ul style="list-style-type: none"> <li>Icelandic Symphony Orchestra, rental revenues</li> <li>Performance rental revenues</li> <li>Impresario presentations</li> <li>Concession sales revenues</li> <li>Per-performance technical staff cost chargebacks</li> <li>Conference and meeting revenues</li> <li>Conference hall rentals</li> <li>Meeting room rentals</li> <li>Concert hall conference rentals</li> <li>Per-event variable staff cost chargebacks to conferences</li> </ul> </li> </ul>	1	0	0

Feasibility analysis procedures for  
public projects in Iceland



Project name :	Harpa Reykjavík concert hall and conference centre		
Responsibility :	Ministry of Education, Science and Culture		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	2003	
Funding in the Icelandic national budget :	ISK :	727.400.000,- (45,3 million ISK 2003, 13,5 / 2004, 10,0 / 2005, 75,0 / 2008, 50,0 / 2009, 70,0 / 2010 and 463,6 / 2011)	
Total cost of project :	ISK :	5.960.000.000,- (Estimated in January 2002. The State (54%) and the City of Reykjavík (46%) divide between themselves the cost)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
Has it been decided whose cost count?	Cost assessment.	Detailed schedule of staff requirements was prepared as well as estimates of other costs and overhead expenses.  Preliminary development cost was estimated based on assumed construction volumes and areas.	Economic <input checked="" type="checkbox"/> yes <input type="checkbox"/> no Social <input type="checkbox"/> yes <input checked="" type="checkbox"/> no Environmental <input type="checkbox"/> yes <input checked="" type="checkbox"/> no  Factors and /or attributes: <ul style="list-style-type: none"><li>Initial cost</li><li>Capital cost</li><li>Operating expenses, conferences<ul style="list-style-type: none"><li>Salaries &amp; related expenses</li><li>Variable cost personnel</li></ul></li><li>Operating expenses, performances<ul style="list-style-type: none"><li>Salaries &amp; related expenses</li><li>Variable cost personnel – Icelandic Symphony</li><li>Variable cost personnel – Other performances</li><li>Impresario productions</li></ul></li><li>Admin and overheads expenses<ul style="list-style-type: none"><li>Salaries &amp; related expenses</li><li>Overhead</li></ul></li></ul>	1	0	0

## Feasibility analysis procedures for public projects in Iceland



Project name :	<b>Harpa Reykjavík concert hall and conference centre</b>		
Responsibility :	<b>Ministry of Education, Science and Culture</b>		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	<b>2003</b>	
Funding in the Icelandic national budget :	ISK :	<b>727.400.000,-</b> (45,3 million ISK 2003, 13,5 / 2004, 10,0 / 2005, 75,0 / 2008, 50,0 / 2009, 70,0 / 2010 and 463,6 / 2011)	
Total cost of project :	ISK :	<b>5.960.000.000,-</b> (Estimated in January 2002. The State (54%) and the City of Reykjavík (46%) divide between themselves the cost)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
Have the impacts been catalogued with measurement indicators?	The revenues and cost impacts were catalogued with measurement indicators.	Collection of revenues and cost impacts and pricing in millions ISK.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Capital cost</li> <li>Operating expenses, conferences <ul style="list-style-type: none"> <li>Salaries &amp; related expenses</li> <li>Variable cost personnel</li> </ul> </li> <li>Operating expenses, performances <ul style="list-style-type: none"> <li>Salaries &amp; related expenses</li> <li>Variable cost personnel – Icelandic Symphony</li> <li>Variable cost personnel – Other performances</li> <li>Impresario productions</li> </ul> </li> <li>Admin and overheads expenses <ul style="list-style-type: none"> <li>Salaries &amp; related expenses</li> <li>Overhead</li> </ul> </li> <li>Revenues <ul style="list-style-type: none"> <li>Icelandic Symphony Orchestra, rental revenues</li> <li>Performance rental revenues</li> <li>Impresario presentations</li> <li>Concession sales revenues</li> <li>Per-performance technical staff cost chargebacks</li> <li>Conference and meeting revenues</li> <li>Conference hall rentals</li> <li>Meeting room rentals</li> <li>Concert hall conference rentals</li> <li>Per-event variable staff cost chargebacks to conferences</li> </ul> </li> </ul>	1	0	0
Have the impacts been predicted quantitatively over the life of the project?	Only initial contribution costs were predicted quantitatively over the life of the project.	The initial contribution cost was predicted quantitatively over a 25 and 40 year's lifetime. The revenues and expenses were predicted quantitatively over a 5-year period.	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Revenues</li> <li>Expenses</li> </ul>	0	1	0
Have all impacts been monetized?	All defined impacts were monetized.	Defined impacts were monetized in millions ISK	<ul style="list-style-type: none"> <li>Initial cost</li> <li>Capital cost</li> <li>Operating expenses, conferences</li> <li>Operating expenses, performances</li> <li>Admin and overhead expenses</li> <li>Revenues</li> </ul>	1	0	0



## Feasibility analysis procedures for public projects in Iceland



Project name :	<b>Harpa Reykjavík concert hall and conference centre</b>		
Responsibility :	<b>Ministry of Education, Science and Culture</b>		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	<b>2003</b>	
Funding in the Icelandic national budget :	ISK :	<b>727.400.000,-</b> (45,3 million ISK 2003, 13,5 / 2004, 10,0 / 2005, 75,0 / 2008, 50,0 / 2009, 70,0 / 2010 and 463,6 / 2011)	
Total cost of project :	ISK :	<b>5.960.000.000,-</b> (Estimated in January 2002. The State (54%) and the City of Reykjavík (46%) divide between themselves the cost)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
4. Net present value (NPV) Has the benefits and cost been discounted to obtain present values?	The benefits and cost were not discounted to obtain present values.	Nothing done.	No prerequisites were used.	0	0	1
Has the net present value (NPV) been computed of each alternative?	The net present value (NPV) was not computed for each alternative	Nothing done.	No prerequisites were used.	0	0	1
5. Sensitivity analysis Has sensitivity analysis of each alternative been performed?	A sensitivity analysis of each alternative was not performed.	Nothing done.	No prerequisites were used.	0	0	1
6. Making recommendation Has an evaluation of alternatives been performed?	The evaluation was based on cost, revenues and expenses.	See the benefits and cost, (3).	See the benefits and cost, (3).	1	0	0
Has a selection of the “most promising” alternative been performed?	The selection was based on cost, revenues and expenses.	See the benefits and cost, (3).	See the benefits and cost, (3).	1	0	0
Independent consultants Has an outside evaluation from independent consultants been performed?	The firm Artec Consultants in New York provided a special consulting on acoustics and construction of concert hall and the Danish firm Scanticon Comwell was a consulting party on conference facilities. The firm VSÓ Consulting did a utilization and feasibility study. Work in connection with the hotel facilities was in the main carried out by the firm Hospitality Consulting International.	The work of the consultants did not involve second opinion desk study.	No prerequisites were used which involved a second opinion desk study.	0	0	1



## Feasibility analysis procedures for public projects in Iceland



Project name :	Upper secondary school in Mosfellsbær		
Responsibility :	Ministry of Education, Science and Culture		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	2008	
Funding in the Icelandic national budget :	ISK :	335.000.000,- (80,0 million ISK 2008, 85,0 / 2009, 85,0 / 2010 and 85,0 / 2011)	
Total cost of project :	ISK :	1.400.000.000,- (Estimated in June 2009)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
1. Project overview						
Is the origin of the project explained?	... Noted that Mosfellsbær is a municipality that has grown rapidly in recent years and the need for an upper secondary school has become urgent.	Description in general terms.	No prerequisites were used.	1	0	0
Is the background of the project described?	The background of the project is not described.	Nothing done.	No prerequisites were used.	0	0	1
Are the objectives of the project described?	The project objectives are described as a 4,000 m <sup>2</sup> school building for 400-500 academic students in the first phase and an 8,000 m <sup>2</sup> fully built school for 700 students.	Description in general terms and definition of the main dimensions	<ul style="list-style-type: none"> <li>Size of buildings</li> <li>Number of students</li> </ul>	1	0	0
Has needs analysis been carried out?	A need analysis to find out the need for an upper secondary school in Mosfellsbær was not carried out. Admittedly, a needs analysis for the school itself was carried out.	The need analysis is among other things based on information from the Ministry of Education, Science and Culture that an estimate of about 75% of youth in each school class chooses to go to an upper secondary school in their district.	<ul style="list-style-type: none"> <li>Population change - estimated number of students</li> <li>School policy</li> <li>Flexibility</li> <li>Personnel development</li> <li>Building space schedule/need</li> <li>Parking space need</li> </ul>	0	1	0
2. Alternatives						
Number of alternatives?	Only one option, i.e. a new upper secondary school in Mosfellsbær. Admittedly, some locations were examined.	The firm Batterfið arkitektar carried out a site selection study for upper secondary school in Mosfellsbær. The proposed location of the school in the downtown area was one of four proposals that were examined.	<ul style="list-style-type: none"> <li>Location site with respect to approach, traffic, and how central it is</li> <li>The impact of school on local environment and the local planning</li> <li>Other things that affect the choice</li> </ul>	0	1	0
Is the zero alternative included?	The zero alternative was not included as an option.	Nothing done.	No prerequisites were used.	0	0	1
3. Benefits and cost						
Has it been decided whose benefits count?	There was no accounting for any benefits.	Nothing done.	Economic [ ]yes [x]no Social [ ]yes [x]no Environmental [ ]yes [x]no	0	0	1
Has it been decided whose cost count?	Cost assessment.	<ul style="list-style-type: none"> <li>Initial cost assessment</li> </ul>	Economic [x]yes [ ]no Social [ ]yes [x]no Environmental [ ]yes [x]no  Factors and /or attributes: <ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0

## Feasibility analysis procedures for public projects in Iceland



Project name :	Upper secondary school in Mosfellsbær		
Responsibility :	Ministry of Education, Science and Culture		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	2008	
Funding in the Icelandic national budget :	ISK :	335.000.000,- (80,0 million ISK 2008, 85,0 / 2009, 85,0 / 2010 and 85,0 / 2011)	
Total cost of project :	ISK :	1.400.000.000,- (Estimated in June 2009)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
Have the impacts been catalogued with measurement indicators?	Only the cost impacts were catalogued with measurement indicators.	The cost impacts were catalogued with measurement indicators.	<ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0
Have the impacts been predicted quantitatively over the life of the project?	The impacts were not predicted quantitatively over the life of the project.	Nothing done.	No prerequisites were used.	0	0	1
Have all impacts been monetized?	Only cost impacts were monetized.	Cost impacts were monetized in millions ISK	<ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0
4. Net present value (NPV) Has the benefits and cost been discounted to obtain present values?	The benefits and cost were not discounted to obtain present values.	Nothing done.	No prerequisites were used.	0	0	1
Has the net present value (NPV) been computed of each alternative?	The net present value (NPV) was not computed for each alternative.	Nothing done.	No prerequisites were used.	0	0	1
5. Sensitivity analysis Has sensitivity analysis of each alternative been performed?	A sensitivity analysis of each alternative was not performed	Nothing done.	No prerequisites were used.	0	0	1
6. Making recommendation Has an evaluation of alternatives been performed?	Only one option, i.e. a new upper secondary school in Mosfellsbær. Admittedly, some locations were examined.	Site selection study.	<ul style="list-style-type: none"> <li>Location site with respect to approach, traffic, and how central it is</li> <li>The impact of school on local environment and the local planning</li> <li>Other things that affect the choice</li> </ul>	0	1	0
Has a selection of the “most promising” alternative been performed?	Only based on location.	Site selection study.	<ul style="list-style-type: none"> <li>Location site with respect to approach, traffic, and how central it is</li> <li>The impact of school on local environment and the local planning</li> <li>Other things that affect the choice</li> </ul>	0	1	0
Independent consultants Has an outside evaluation from independent consultants been performed?	The Government Construction Contracting Agency and the firm Verkís took part in initial study for this project.	The work of the consultants did not involve a second opinion desk study.	No prerequisites were used which involved second opinion desk study.	0	0	1

## Feasibility analysis procedures for public projects in Iceland



Project name :	<b>Avalanche protection in Bolungarvík</b>		
Responsibility :	<b>Ministry for the Environment</b>		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	<b>No direct information in the Icelandic national budget</b>	
Funding in the Icelandic national budget :	ISK :	<b>No direct information in the Icelandic national budget</b>	
Total cost of project :	ISK :	<b>420.000.000,-</b> (Estimated in 2001)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
1. Project overview						
Is the origin of the project explained?	Noted that the project is carried out according to Icelandic law no. 49/1997 on avalanche and landslide defences and in accordance with regulations no. 505/2000 on slides risk assessment, classification and utilization of hazard zones and carrying out temporary risk assessment.	Description in general terms.	No prerequisites were used.	1	0	0
Is the background of the project described?	Noted that until recently, the avalanche danger in Bolungarvík has been considered insignificant, but after the avalanche in Tungudalur in Isafjörður in 1994 and the avalanches in Sudavík and Flateyri in 1995 closer attention was paid to snow layer and possible avalanches.	Description in general terms.	No prerequisites were used.	1	0	0
Are the objectives of the project described?	The project objectives are to protect inhabited areas in Bolungarvík against avalanches.	Description in general terms.	No prerequisites were used.	1	0	0
Has needs analysis been carried out?	No need analysis was carried out.	Nothing done.	No prerequisites were used.	0	0	1
2. Alternatives						
Number of alternatives?	Five options were examined.	The following alternatives were examined: <ul style="list-style-type: none"> <li>Avalanche protection with construction at source</li> <li>No avalanche protection, purchase or apply evacuation from houses</li> <li>Avalanche protection with canal above inhabited area</li> <li>Avalanche protection with mixture of protective lead walls and protective crosswise walls along with purchase houses and evacuation from houses</li> <li>Direct protection of each house</li> </ul>	<ul style="list-style-type: none"> <li>Construction at source</li> <li>Canal above inhabited area</li> <li>Protective lead walls</li> <li>Protective crosswise walls</li> <li>Protection of each house</li> <li>Purchase houses / remove inhabited area</li> <li>Apply evacuation from houses</li> </ul>	1	0	0
Is the zero alternative included?	The zero alternative was not included as an option.	Nothing done.	No prerequisites were used.	0	0	1
3. Benefits and cost						
Has it been decided whose benefits count?	There was no accounting for any benefits.	Nothing done.	Economic [ ] yes [x] no Social [ ] yes [x] no Environmental [ ] yes [x] no	0	0	1

## Feasibility analysis procedures for public projects in Iceland



Project name :	<b>Avalanche protection in Bolungarvík</b>		
Responsibility :	<b>Ministry for the Environment</b>		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	<b>No direct information in the Icelandic national budget</b>	
Funding in the Icelandic national budget :	ISK :	<b>No direct information in the Icelandic national budget</b>	
Total cost of project :	ISK :	<b>420.000.000,-</b> (Estimated in 2001)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
Has it been decided whose cost count?	Cost assessment.	<ul style="list-style-type: none"> <li>Initial cost assessment</li> </ul>	Economic <input checked="" type="checkbox"/> yes <input type="checkbox"/> no Social <input type="checkbox"/> yes <input checked="" type="checkbox"/> no Environmental <input type="checkbox"/> yes <input checked="" type="checkbox"/> no  Factors and /or attributes: <ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0
Have the impacts been catalogued with measurement indicators?	Only the cost impacts were catalogued with measurement indicators.	The cost impacts were catalogued with measurement indicators.	<ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0
Have the impacts been predicted quantitatively over the life of the project?	The impacts were not predicted quantitatively over the life of the project.	Nothing done.	No prerequisites were used.	0	0	1
Have all impacts been monetized?	Only cost impacts were monetized.	Cost impacts was monetized in millions ISK	Initial cost assessment.	0	1	0
4. Net present value (NPV) Has the benefits and cost been discounted to obtain present values?	The benefits and cost were not discounted to obtain present values.	Nothing done.	No prerequisites were used.	0	0	1
Has the net present value (NPV) been computed of each alternative?	The net present value (NPV) was not computed for each alternative.	Nothing done.	No prerequisites were used.	0	0	1
5. Sensitivity analysis Has sensitivity analysis of each alternative been performed?	A sensitivity analysis of each alternative was not performed	Nothing done.	No prerequisites were used.	0	0	1
6. Making recommendation Has an evaluation of alternatives been performed?	The evaluation of alternative was only based on initial cost assessment.	Initial cost assessment.	<ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0
Has a selection of the “most promising” alternative been performed?	The selection of the “most promising” alternative was only based on initial cost assessment.	Initial cost assessment.	<ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0
Independent consultants Has an outside evaluation from independent consultants been performed?	Preliminary study was carried out by the firms ORION Ráðgjöf ehf., Verkfræðistofa Austurlands and Norges Geotekniske Institut (NGI)	The work of the consultants did not involve a second opinion desk study.	No prerequisites were used which involved second opinion desk study.	0	0	1

## Feasibility analysis procedures for public projects in Iceland



Project name :	<b>Snæfellsstofa visitor centre in Vatnajökull national park</b>		
Responsibility :	<b>Ministry for the Environment</b>		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	<b>2007 However, preparation began in 2003</b>	
Funding in the Icelandic national budget :	ISK :	<b>843.000.000,-</b> (3,0 million ISK 2003, 3,0 / 2004, 3,1 / 2005, 6,5 / 2006, 56,8 / 2007, 160,5 / 2008, 245,5 / 2009, 214,8 / 2010 and 149,8 / 2011)	
Total cost of project :	ISK :	<b>700.000.000,-</b> (Estimated in October 2007. Total for four visitor centres, 175 million ISK for each)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
1. Project overview						
Is the origin of the project explained?	The origin of the project is very thoroughly explained. from preparing the establishment of Vatnajökull national park, which has remained since 1999, when a parliamentary resolution proposal was approved, where the minister of the environment was assigned to investigate the possibility of establishing a national park.	Description in general terms.	No prerequisites were used.	1	0	0
Is the background of the project described?	The background of the project is very thoroughly described, among other things states that the purpose of establishing the Vatnajökull National Park will not be achieved unless it is supported by a network structure of the park, i.e. four visitor centres.	Description in general terms.	No prerequisites were used.	1	0	0
Are the objectives of the project described?	The objectives of the project are described as 550 - 600 m <sup>2</sup> buildings for visitor centres. Each visitor centre shall have a reception, exhibition area, an office, a meeting room, guest toilets and a restaurant.	Description in general terms and definition of the main dimensions and function.	<ul style="list-style-type: none"> <li>Size of buildings</li> <li>Function <ul style="list-style-type: none"> <li>Reception</li> <li>Exhibition area</li> <li>Office,</li> <li>Meeting room</li> <li>Guest toilets</li> <li>Restaurant.</li> </ul> </li> </ul>	1	0	0
Has needs analysis been carried out?	No need analysis was carried out.	Nothing done.	No prerequisites were used.	0	0	1
2. Alternatives						
Number of alternatives?	Only one alternative.	Nothing done.	No prerequisites were used.	0	0	1
Is the zero alternative included?	The zero alternative was not included as an option.	Nothing done.	No prerequisites were used.	0	0	1
3. Benefits and cost						
Has it been decided whose benefits count?	There was no accounting for any benefits. Apart from the assertion that the increase in foreign exchange earnings due to the introduction of the Vatnajökull national park could be 3 to 4 billion ISK per year.	Nothing done.	Economic [ ]yes [x]no Social [ ]yes [x]no Environmental [ ]yes [x]no	0	0	1
Has it been decided whose cost count?	Cost assessment.	<ul style="list-style-type: none"> <li>Initial cost assessment</li> </ul>	Economic [x]yes [ ]no Social [ ]yes [x]no Environmental [ ]yes [x]no  Factors and /or attributes: <ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0

## Feasibility analysis procedures for public projects in Iceland



Project name :	<b>Snæfellsstofa visitor centre in Vatnajökull national park</b>		
Responsibility :	<b>Ministry for the Environment</b>		
The project was approved by the Icelandic legislative assembly (Alþingi) in :	Year :	<b>2007 However, preparation began in 2003</b>	
Funding in the Icelandic national budget :	ISK :	<b>843.000.000,-</b> (3,0 million ISK 2003, 3,0 / 2004, 3,1 / 2005, 6,5 / 2006, 56,8 / 2007, 160,5 / 2008, 245,5 / 2009, 214,8 / 2010 and 149,8 / 2011)	
Total cost of project :	ISK :	<b>700.000.000,-</b> (Estimated in October 2007. Total for four visitor centres, 175 million ISK for each)	

Major activities for feasibility analysis	What was done? (Feasibility analysis method)	How was it done? (Processes and procedures)	What sort of prerequisites were used? (Factors and/or attributes)	Full consistency with best practice	Partial consistency with best practice	No consistency with best practice
Have the impacts been catalogued with measurement indicators?	Only the cost impacts were catalogued with measurement indicators.	The cost impacts were catalogued with measurement indicators.	<ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0
Have the impacts been predicted quantitatively over the life of the project?	The impacts were not predicted quantitatively over the life of the project.	Nothing done.	No prerequisites were used.	0	0	1
Have all impacts been monetized?	Only cost impacts were monetized.	Cost impacts were monetized in millions ISK	<ul style="list-style-type: none"> <li>Initial cost</li> </ul>	0	1	0
4. Net present value (NPV) Has the benefits and cost been discounted to obtain present values?	The benefits and cost were not discounted to obtain present values.	Nothing done.	No prerequisites were used.	0	0	1
Has the net present value (NPV) been computed of each alternative?	The net present value (NPV) was not computed for each alternative.	Nothing done.	No prerequisites were used.	0	0	1
5. Sensitivity analysis Has sensitivity analysis of each alternative been performed?	A sensitivity analysis of each alternative was not performed	Nothing done.	No prerequisites were used.	0	0	1
6. Making recommendation Has an evaluation of alternatives been performed?	An evaluation of alternatives was not performed.	Nothing done.	No prerequisites were used.	0	0	1
Has a selection of the “most promising” alternative been performed?	A selection of the “most promising” alternative was not performed.	Nothing done.	No prerequisites were used.	0	0	1
Independent consultants Has an outside evaluation from independent consultants been performed?	An outside evaluation from independent consultants was not performed.	Nothing done.	No prerequisites were used.	0	0	1

## Appendix II : E-mails to ministries

E-mail to Permanent Secretary of Ministry of the Interior (*Icelandic*)

*Frá: [haflidi06@hr.is](mailto:haflidi06@hr.is)*

*Til: [ragnhildur.hjaltadottir@irr.is](mailto:ragnhildur.hjaltadottir@irr.is)*

*Málefni: Hagkvæmisreikningar opinberra verkefna á Íslandi / MSc. Rannsóknarverkefni*

Frú Ragnhildur Hjaltadóttir

Ég heiti Haflíði Richard Jónsson og er nemandi við Háskólann í Reykjavík þar sem ég er að vinna að master verkefni mínu í byggingartæknifræði, framkvæmdarstjórnun. Rannsóknarverkefni þetta snýr að aðferðarfræði, vinnuferlum og forsendum sem tengjast hagkvæmisreikningum á upphafstigum opinberra verkefna á Íslandi. Rannsóknarverkefni þetta er jafnframt hluti af stærra verkefni sem nefnist „Improvement of Public Project Life Cycle“ sem Þórður Víkingur Friðgeirsson, lektor við HR stýrir og er gert í samvinnu við fjármálaráðuneytið.

Megin markmið með rannsóknarverkefninu er að bera saman núverandi aðferðarfræði, vinnuferla og forsendur við það sem fræðilega getur talist best í dag og leggja til endurbætur ef þess gerist þörf.

Til þess að geta metið núverandi fyrirkomulag við gerð hagkvæmisreikninga á upphafstigum opinberra verkefna á Íslandi, þá er það mér mjög mikilvægt að fá tækifæri til þess að skoða eða fá afrit af frumathugunargögnum eftirfarandi framkvæmdarverkefna sem eru á vegum innanríkisráðuneytisins:

- Vaðlaheiðargöng
- Landeyjahöfn

Til upplýsingar þá mun ég einnig leita til mennta- og menningarmálaráðuneytisins og umhverfisráðuneytisins í tengslum við eftirfarandi verkefni:

- HARPA, tónlistar- og ráðstefnuhúsið í Reykjavík
- Framhaldsskólinn í Mosfellsbæ
- Snjóflóðavarnir í Bolungarvík
- Snæfellsstofa í Vatnajökulsþjóðgarði

Ég væri því mjög þakklátur ef þú hefðir tök á því að taka á móti mér til þess að fara nánar yfir ofangreint mál.

Virðingarfyllst,

Haflíði Richard Jónsson



E-mail to Permanent Secretary of Ministry of the Interior (*English*)

*From: [haflidi06@hr.is](mailto:haflidi06@hr.is)*

*To: [ragnhildur.hjaltadottir@irr.is](mailto:ragnhildur.hjaltadottir@irr.is)*

*Subject: Feasibility analysis procedures for public projects in Iceland / MSc. Thesis*

Mrs Ragnhildur Hjaltadóttir

My name is Haflíði Richard Jónsson and I am a student at Reykjavík University where I am working on my master thesis in civil engineering, construction management. This research relates to the methodology, procedures and prerequisites in connection with feasibility analysis during the conception phase of public projects in Iceland. This research is also a part of larger programme called “Improvement of Public Project Life Cycle” which Þórður Víkingur Friðgeirsson, assistant professor at the University of Reykjavik manages and is carried out in cooperation with the Ministry of Finance.

The main objective of this research is to benchmark current practises and procedures within the official sector in Iceland against best practices and recommend changes.

In order to assess the current practices and procedures for the feasibility analysis process during the conception phase of public projects in Iceland, it is very important for me to have the opportunity to see or get copies of the initial study reports of the following construction projects under the govern of the Ministry of the Interior:

- Vaðlaheiði tunnel
- Landeyjar port

For your information, I will also seek information from the Ministry of Education, Science and Culture and the Ministry for the Environment regarding the following projects:

- Harpa Reykjavík concert hall and conference centre
- Upper secondary school in Mosfellsbær
- Avalanche protection in Bolungarvík
- Snæfellsstofa visitor centre in Vatnajökull national park

I would be very grateful if you could meet me in order to go more closely over the above mentioned issues.

Respectfully,

Haflíði Richard Jónsson

E-mail to Permanent Secretary of Ministry of Education, Science and Culture (*Icelandic*)

*Frá: [haflidi06@hr.is](mailto:haflidi06@hr.is)*

*Til: [asta.magnusdottir@mrn.is](mailto:asta.magnusdottir@mrn.is)*

*Málefni: Hagkvæmisreikningar opinberra verkefna á Íslandi / MSc. Rannsóknarverkefni*

Frú Ásta Magnúsdóttir

Ég heiti Haflíði Richard Jónsson og er nemandi við Háskólann í Reykjavík þar sem ég er að vinna að master verkefni mínu í byggingartæknifræði, framkvæmdarstjórnun. Rannsóknarverkefni þetta snýr að aðferðarfræði, vinnuferlum og forsendum sem tengjast hagkvæmisreikningum á upphafstigum opinberra verkefna á Íslandi. Rannsóknarverkefni þetta er jafnframt hluti af stærra verkefni sem nefnist „Improvement of Public Project Life Cycle“ sem Þórður Víkingur Friðgeirsson, lektor við HR stýrir og er gert í samvinnu við fjármálaráðuneytið.

Megin markmið með rannsóknarverkefninu er að bera saman núverandi aðferðarfræði, vinnuferla og forsendur við það sem fræðilega getur talist best í dag og leggja til endurbætur ef þess gerist þörf.

Til þess að geta metið núverandi fyrirkomulag við gerð hagkvæmisreikninga á upphafstigum opinberra verkefna á Íslandi, þá er það mér mjög mikilvægt að fá tækifæri til þess að skoða eða fá afrit af frumathugunargögnum eftirfarandi framkvæmdarverkefna sem eru á vegum mennta- og menningar-málaráðuneytisins:

- HARPA, tónlistar- og ráðstefnuhúsið í Reykjavík
- Framhaldsskólinn í Mosfellsbæ

Til upplýsingar þá mun ég einnig leita til innanríkisráðuneytisins og umhverfisráðuneytisins í tengslum við eftirfarandi verkefni:

- Vaðlaheiðargöng
- Landeyjahöfn
- Snjóflóðavarnir í Bolungarvík
- Snæfellsstofa í Vatnajökulsþjóðgarði

Ég væri því mjög þakklátur ef þú hefur tök á því að taka á móti mér til þess að fara nánar yfir ofangreint mál.

Virðingarfyllst,  
Haflíði Richard Jónsson

E-mail to Permanent Secretary of Ministry of Education, Science and Culture (*English*)

*From: [haflidi06@hr.is](mailto:haflidi06@hr.is)*

*To: [asta.magnusdottir@mrn.is](mailto:asta.magnusdottir@mrn.is)*

*Subject: Feasibility analysis procedures for public projects in Iceland / MSc. Thesis*

Mrs Ásta Magnúsdóttir

My name is Hafliði Richard Jónsson and I am a student at Reykjavík University where I am working on my master thesis in civil engineering, construction management. This research relates to the methodology, procedures and prerequisites in connection with feasibility analysis during the conception phase of public projects in Iceland. This research is also a part of larger programme called “Improvement of Public Project Life Cycle” which Þórður Víkingur Friðgeirsson, assistant professor at the University of Reykjavik manages and is carried out in cooperation with the Ministry of Finance.

The main objective of this research is to benchmark current practises and procedures within the official sector in Iceland against best practices and recommend changes.

In order to assess the current practices and procedures for the feasibility analysis process during the conception phase of public projects in Iceland, it is very important for me to have the opportunity to see or get copies of the initial study reports of the following construction projects under the govern of the Ministry of Education, Science and Culture:

- Harpa Reykjavík concert hall and conference centre
- Upper secondary school in Mosfellsbær

For your information, I will also seek information from the Ministry of the Interior and the Ministry for the Environment regarding the following projects:

- Vaðlaheiði tunnel
- Landeyjar port
- Avalanche protection in Bolungarvík
- Snæfellsstofa visitor centre in Vatnajökull national park

I would be very grateful if you could meet me in order to go more closely over the above mentioned issues.

Respectfully,

Hafliði Richard Jónsson

E-mail to Permanent Secretary of Ministry for the Environment (*Icelandic*)

Frá: [haflidi06@hr.is](mailto:haflidi06@hr.is)

Til: [magnus.johannesson@umhverfisraduneyti.is](mailto:magnus.johannesson@umhverfisraduneyti.is)

Málefni: Hagkvæmisreikningar opinberra verkefna á Íslandi / MSc. Rannsóknarverkefni

Hr. Magnús Jóhannesson

Ég heiti Haflíði Richard Jónsson og er nemandi við Háskólann í Reykjavík þar sem ég er að vinna að master verkefni mínu í byggingartæknifræði, framkvæmdarstjórnun. Rannsóknarverkefni þetta snýr að aðferðarfræði, vinnuferlum og forsendum sem tengjast hagkvæmisreikningum á upphafstigum opinberra verkefna á Íslandi. Rannsóknarverkefni þetta er jafnframt hluti af stærra verkefni sem nefnist „Improvement of Public Project Life Cycle“ sem Þórður Víkingur Friðgeirsson, lektor við HR stýrir og er gert í samvinnu við fjármálaráðuneytið.

Megin markmið með rannsóknarverkefninu er að bera saman núverandi aðferðarfræði, vinnuferla og forsendur við það sem fræðilega getur talist best í dag og leggja til endurbætur ef þess gerist þörf.

Til þess að geta metið núverandi fyrirkomulag við gerð hagkvæmisreikninga á upphafstigum opinberra verkefna á Íslandi, þá er það mér mjög mikilvægt að fá tækifæri til þess að skoða eða fá afrit af frumathugunargögnum eftirfarandi framkvæmdarverkefna sem eru á vegum umhverfisráðuneytisins:

- Snjóflóðavarnir í Bolungarvík
- Snæfellsstofa í Vatnajökulsþjóðgarði

Til upplýsingar þá mun ég einnig leita til innanríkisráðuneytisins og mennta- og menningar-  
málaráðuneytisins í tengslum við eftirfarandi verkefni:

- Vaðlaheiðargöng
- Landeyjahöfn
- HARPA, tónlistar- og ráðstefnuhúsið í Reykjavík
- Framhaldsskólinn í Mosfellsbæ

Ég væri því mjög þakklátur ef þú hefur tök á því að taka á móti mér til þess að fara nánar yfir ofangreint mál.

Virðingarfyllst,

Haflíði Richard Jónsson

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