

# Do appraisal tools affect equitability in infrastructure projects?

A case study on infrastructural projects  
in the United Kingdom and The Netherlands

By

Wouter Johannes Cornelis Seerden

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Student number: 4595386

**Thesis Committee**

dr. Wijnand Veeneman (Chairman)	TU Delft
dr. Nihit Goyal (First Supervisor)	TU Delft
dr. mr. Niek Mouter (Second supervisor)	TU Delft





# Abstract

In order to understand the impact of new infrastructure projects, appraisal tools are used to estimate the impact it will have on society. Infrastructure is a key part of society, enabling and disabling society to work and live, playing a vital part in everyone's lives. Former studies by Annema, Frenken, et al. (2017), Niek Mouter (2017b) and Eliasson and Lundberg (2012) have researched how appraisal tools and especially CBA are used by decision-makers to get to a decision. Other research by Van Wee (2012) has shown the ethical problems which arise when using CBA as an appraisal tool. However, there has not been any research on the impact appraisal tools have on the process and outcome of infrastructure projects. This thesis will provide insights in the impact of appraisal tools on social and process equitability. By using a framework by D. Levinson (2002), case studies, interviews and policy documents, the incorporation of social and process equity factors can be depicted per country. Results show that the Dutch appraisal tools do not incorporate a wide array of dimensions and stratifications, which are depicted in literature. This lack of information results in social inequitable decision-making as well as inequitable outcomes due to negligence of not incorporating more dimensions. Two reasons can be found for this Dutch approach, namely the funding reason which results in solution-oriented design, and the general Dutch mindset of seeing and treating everyone as equal, resulting in inequitable outcomes due to not taking differences into account. The Dutch process equity is boosted by its near-perfect transparency in terms of accessibility of documents, but hurt by the lack of participation and the lack of impact when participation is present. The United Kingdom on the other hand has an elaborate appraisal process which analyses a much wider variety of dimensions and stratifications. However, due to a solution-oriented process design, the alternatives for a project have already been shot down when the social impact information is available to a decision-maker. Another reason which hurts the social equitability in the United Kingdom is the fact that it is necessary to have a high value-for-money project to receive funding, resulting in ignoring of social impact analyses due to this economic focus. In terms of process equity, the United Kingdom has a solid consultation process which is used consistently. However, a lack of transparency in the process with regard to decisions made and the availability of (policy) documents results in poor process equity overall. This thesis shows that social and process equity cannot be improved by simply adding tools which gather social impact information to the appraisal process. Political play, the drift for efficiency and cultural differences per country makes it difficult to create a single strategy to improve equity in appraisal processes. However, by improving transparency, focusing on getting a problem-oriented design and using a third party as a validation for the incorporation of equity factors, it is possible to improve the inclusion of equity factors in appraisal processes. This thesis can be used as a basis for analysing and understanding appraisal processes in other countries.

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*Wouter Johannes Cornelis Seerden  
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# List of abbreviations

AST = Appraisal Summary Table

BCR = Benefit Cost Ratio

BO = Bestuurlijk Overleg (Administrative Consultation)

BR = British Railways

CBA = Cost Benefit Analysis

CTRL = Channel Tunnel Rail Link

DfT = Department for Transport

EIA = Environmental Impact Assessment

FBC = Final Business Case

HGV = Heavy Good Vehicle

HM Treasury = Her Majesties Treasury

HREC = Human Resource and Ethics Committee

IODES = Integrale Ontwikkeling Delft Schiedam (Integral Development Delft Schiedam)

MCA = Multi Criteria Analysis

MER = Milieu Effect Report (Environmental Impact Report)

MIRT = Meerjarenprogramma Infrastructuur, Ruimte en Transport (Multi-Year Programme for Infrastructure, Spatial Planning and Transport)

MIT = Meerjarenprogramma Infrastructuur en Transport (Multi-year programme for Infrastructure and Transport)

MP = Member of Parliament

NL = The Netherlands

NOVI = Nationale Omgevingsvisie (National Strategy on Spatial Planning and the Environment)

OEI = Overzicht Effecten Infrastructuur (Overview Effects Infrastructure)

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PT = Public Transport

POPE = Post Opening Project Evaluation

SCBA = Societal Cost Benefit Analysis

SQ = Subquestion

TAG = Transport Appraisal Guidance

TASM = Transport Appraisal and Strategic Modelling division

TBC = Transport Business Case

TN/MER = TrajectNota / Milieu Effect Report (Planning Approval Decision, Environmental Impact Report)

UK = United Kingdom

VfM = Value for Money

WEI = Wider Economic Impacts

WOO = Wet Openbare Overheid (Law Transparent Government)

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# Chapter 1

## Introduction and research question

### 1.1 Introduction

A fundamental discussion in policy making is the debate about the definition of policy success. What makes a policy successful? The evaluation of policy objectives is currently one of the most used ways to assess policy success. However, a growing group of authors tries to alter this way of thinking. McConnell (2017) states that policy success cannot be evaluated by looking solely at policy objectives, but also by looking at who wins and who loses from policies. Understanding what policy success entails can only be achieved by acknowledging that the world of public policy is messy, complex, and filled with politicization. Other authors such as Newman (2014) argue that more dimensions should be added to be able to answer the question of what makes a policy successful. Newman adds political consequences for decision-makers, as well as the process of how statements are converted into policies, to the equation. There still is no agreement on the definition of policy success. However, all authors agree that policy success should include a human and a process factor (McConnell, 2017; McConnell, Greal, and Lea, 2020; Newman, 2014; Bovens, 2001). Predetermined policy goals are the goals which should be met, but often do not include the unintended consequences for other groups of society. Therefore, adding the human factor will include all end users to the equation, incorporating unintended consequences. The process factor is meant to increase the understanding of how policies are created. Comprehending the path of the birth of a new policy helps to understand the trade-offs that have been made, enabling the understanding of how good politics can lead to bad policy making. A combination of the inclusion of the human factor as well as the comprehension of the policy pathway creates a new view on the question of policy success.

A sector which could benefit from this new perspective is the transport infrastructure sector. The infrastructure sector has impact on society by enabling or disabling groups of society to key facilities such as education, healthcare, food, and employment (Mraihi and Anis, 2013; Cui et al., 2019; Durrant, 2017). Accessibility is seen as the key factor for climbing the economic ladder. Giving poor members of society access to a wider spectrum of employment options or reducing the travel time towards education and food have proven to be significant factors in the rising out of poverty (Mraihi and Anis, 2013; Pereira, Schwanen, and Banister, 2017; D. Levinson, 2010). Therefore, transport infrastructure has a significant impact on the daily lives of everyone.

Current infrastructure projects use different ex-ante appraisal techniques to determine the impact new projects will have on society. One of the most commonly used ex-ante analysis methods for the appraisal of infrastructure projects is the Cost-Benefit Analysis (CBA). Even though CBA is one of the most used appraisal tools, it is far off from being perfect. Many studies state how CBA has problems with incorporating distributional effects or non-monetisable effects (Van Wee, 2012; Savelberg, 't Hoen, and CC Koopmans, 2005; Rienstra, 2008; Carl Koopmans and Niek Mouder, 2020; Schmid, Vetschera, and Lienert, 2021), resulting in the impossibility of answering the questions raised as important by McConnell and others. Even though CBA applications differ per country (Groth and Scholtens, 2016), the

problems discussed are seen as overarching and tied to the tool itself, not to the application of the country.

Other studies have researched the impact of CBA in infrastructure processes. Questions as ‘is CBA incorporated into the decision-making?’ have been answered by studies such as from Annema, Carl Koopmans, and Van Wee (2007), Niek Mouter (2017a) and Eliasson, Börjesson, et al. (2015). Most of these studies have been quantitative and have tied the output of CBA towards the output of the decision-making process, the decision to choose for a certain alternative. The results showed that there is no correlation between the output of a CBA and the output of a decision, thus rendering the insignificance of executed CBAs. Another study from Niek Mouter (2017b) has studied the manners in which CBA is used by decision-makers. The results showed that there are different ways how CBA can be used, with the most important ones being using CBA to form an opinion on the desirability of the project, as political ammunition and to make their own decisions look more rational. The ways how CBA is used by decision-makers and the flaws of CBA are known in the literature. Something that is rather unknown, is to what extent the current practice of CBA and other tools combined are able to answer the questions raised by McConnell and others. It is known that there are flaws in the general approach of CBA, as well as how CBA is used in decision-making. However, the impact it has on different levels of society is unknown. What is the impact of the known flaws and the current use by decision-makers? Most studies which looked into the influence of CBA have been quantitative studies, tying the BCR to the output of the project. Fewer studies have been qualitative, trying to understand if there are other influences present due to the usage of CBA or other appraisal tools. Analysing the impact of appraisal tools qualitatively with a focus on social and process equity will help to answer the questions raised by McConnell, clarifying what the current practice of policy success is in the transport infrastructure sector.

Interestingly enough, the usage of CBA (Groth and Scholtens, 2016) as well as the problems raised in literature (Van Wee, 2012; Carl Koopmans and Niek Mouter, 2020; Schmid, Vetschera, and Lienert, 2021) are overarching over all countries. The difference lies in the other appraisal techniques used per country, which sometimes can and sometimes cannot compensate for the known flaws. The United Kingdom for instance has an elaborate distributional effect analysis next to the CBA (Worsley and Mackie, 2015), while Germany, the Netherlands, and Norway do not have such analyses. A consequence should be that the United Kingdom has more socially equitable outcomes. However, there are no studies which compare those countries on this impact. Some studies show that there are still problems with the incorporation of the distributional analyses in the United Kingdom (Network, 2021; H. Treasury, 2020; Baldwin, 2021), but there is no international comparison on this level present. A lot of studies solely focus on the impact CBA has on the process. It is therefore interesting to see whether or not there are other appraisal tools which compensate for the flaws such as a lack of distributional effects, and what the impact is of these tools on decision-making of infrastructure projects.

To understand which part of the policy process is analysed in this thesis, a popular policy heuristic is used to indicate in which part of the policy chain this thesis operates. This heuristic is often used by economists, scholars, public policy, program evaluation and management (Lulofs and Schuddeboom, 1991; Rekenkamer, 2005; Financiën, 2001). The heuristic categorizes characteristics of policy processes into input, (organizational) throughput, output, and outcome (Hoppe, Van der Vegt, and Stegmaier, 2016). An article of Hoppe, Van der Vegt, and Stegmaier (2016:page 3) elaborates on what the different policy steps entail: "Input refers to resources that are required like personnel, materials, budget and time. Throughput refers to activities and work processes that are required to ‘produce’ services and products. Some call these items “process indicators” or “institutional framework conditions”. Output refers to those products and services, and can be viewed as actions or ‘performance’ of the policy implementing organization (e.g., policy instruments and projects). Outcome refers to the (intended and non-intended) effects of these services and products. However, they may also concern the trust, experience, or satisfaction of citizens vis-à-vis those products and services", page 3. This thesis is interested in understanding the impact, or the outcome as named by the heuristic, of the appraisal process in infrastructure projects. This is analysed by using the information of the throughput and output of the guidelines and several cases. The throughput in this thesis will be appraisal tools such as CBA, Environmental Impact Assessment (EIA), Transport Analyses Guidance (TAG) units, consultation and more. The output will be the decisions made during the process, for instance, the decision of preference in the Netherlands, and

the outcome of a project, the realized project. The outcome will be the social and process impact the throughput and output have on society. By analysing the throughput and output, it can be stated if the outcome is equitable and, in an ideal situation, determine where in the policy chain the problem lies.

## 1.2 Research questions

To answer some problems discussed in the introduction, the main research question has been set up:

*How do standardized ex-ante appraisal techniques affect the outcome of infrastructural projects with a focus on process and social equity in the Netherlands and the United Kingdom?*

This thesis will shed light on how CBAs are used in the appraisal process of the Netherlands and the United Kingdom, what the impact of this usage is in the decision-making process, as well as how these appraisal tools contribute toward a social and process equitable decision. The choice for the Netherlands and the United Kingdom is made because both countries have mandatory use of CBA within their appraisal process, but are different in the form of the CBA and how other appraisal tools are used. Therefore, it is interesting to understand the similarities and differences per country, to understand what appraisal tools do influence the process and why. This can lead to potential lessons for the other country to learn from.

To help answer the main research question, several subquestions have been created.

1. What should the influence of ex-ante appraisal tools used in the appraisal of infrastructure processes be according to the guidelines per country?
2. To what extent do current guidelines incorporate social and process equity?
3. What is the influence of ex-ante appraisal tools used in the appraisal of infrastructure processes per country in practice?
4. Which different groups of society are differentiated and incorporated in ex-ante techniques per country?
5. What are the similarities and differences per country in terms of the guidelines and the practice?
6. What are the lessons that could be learned from both countries in regard to including social and process equity into ex-ante appraisal techniques?

The novelty of this research is that there is a specific focus on how currently applied tools in the infrastructure sector contribute towards (in)equitability rather than stating that tools do not take certain specifications into account. An example can be given with CBA. It is known what the flaws are, and how this differs per country, but it is unknown how these flaws influence the decision-making due to a lack of information gathered. It is unknown which equitability information is gathered and how this (lack of) information influences the decision-making. Where most studies contribute towards the understanding of how much influence a tool has or what the flaws are in general of such tools, there is little to no research done on the impact of these flaws on social and process equity. This research can add a different perspective on infrastructure projects. A perspective that is becoming more interesting and necessary for future appraisal techniques due to raising interest in equality within society.

## 1.3 Structure

The structure of the thesis is as follows. Chapter 2 will elaborate on the definitions on equity which are used within this thesis. Chapter 3 will elaborate on the methodology. This thesis will use a case study design to compare the Netherlands and the UK, enabling a ‘what can be learned’ structure to see the impact of different approaches and what can be learned from each other. Chapter 4 will analyse

the guidelines on the usage of CBA in the United Kingdom and the Netherlands through the Levinson framework. Understanding how the guidelines are pushing the analyses in a certain direction will help to understand how these can have an effect on different groups in society. Chapter 5 and 6 contains the case studies of the Netherlands and the UK. Two cases per country will be analysed through the Levinson framework, to understand what level of social and process equity is applicable in these cases. Analysing the cases next to the guidelines will enable a comparison between theory and practice. This comparison will be done in Chapter 7, which will also entail strengths and weaknesses per country. The last chapter, Chapter 8, will discuss the found results in comparison to the literature, answer the main research question in the final conclusion, as well as elaborating on the main contribution of this thesis to science and society. It also gives input for future research.

## 1.4 What makes this a CoSEM thesis?

This thesis can be seen as a typical TPM CoSEM thesis. The issue sketched in the introduction is a complex issue in a socio-technical system. Technical analyses, decision-making processes, and social impacts are combined in the projects that will be discussed. It can be seen as an example of a socio-technical system where the social side is underexposed in the tools but is exposed in a more general way in the literature. Furthermore, the thesis will analyse the effects of (the lack of) social impact analysis, which can be seen as a system engineering approach, as well as the effects of (the lack of) this analysis on the decision-making process, which is more related to process management. The analysis and discovery of the impact of CBA on the realization and evaluation of infrastructure projects cover a combination of public and private partnerships. The government is a public player that issues the project. Private companies are those who fulfil the task of completion of the project.

Lastly, several limitations to this study must be addressed. Foremost, the used Levinson framework entails the answering of questions qualitatively, leaving room for interpretation of the researcher. Therefore, the results from the framework are partly dependent on the researcher and their background. This bias is tried to be minimized by using the framework solely as a way of analysing the current status and combining the results with a multitude of sources to confirm or deny the findings of the framework. Still, the interpretation of the researcher can alter some details in the outcome of the research.

Furthermore, several interviews with decision-makers did not occur, therefore making the results more difficult to extrapolate to a decision-maker perspective. Even though other studies have provided insights into values used by decision-makers, the novelty of this approach on social equity could add value to the understanding of appraisal processes and social equity.

Thirdly, the low amount of cases makes it difficult to generalize the findings towards the whole process of the country. The conclusions currently drawn are based on a few cases in combination with a few interviews. Even though the results are supported by earlier studies as well as interviews, it does not lead to indisputable proof. More cases and interviews should be conducted to confirm or tweak the impact the tools have on social and process equity.

## Chapter 2

# Literature on equity

In the introduction, several notions have been given about policy success, equity, and process understanding. A definition of equity is difficult if not impossible to define. A project's equitability changes are dependent on the perspective of individual users or residents who are affected. Therefore, the concept of equity is highly subjective (D. Levinson, 2002; Geurs, Boon, and Van Wee, 2009; Lee Jr, 1978; Thomopoulos, Grant-Muller, and Tight, 2009) and does not have a single correct answer. This chapter will elaborate on several definitions and concepts of social and process equity and gives an operationalized definition which will be used in this thesis. The definition of equity used in this thesis will be of not having any value towards equity, only if a process or the outcome is evenly distributed over different groups of society. This chapter will elaborate on why and how this definition is used.

### 2.1 Equality of opportunity versus equality of outcome

A first definition is introduced by D. Levinson (2002). Levinson discusses the human factor and the process factor as respectively equality of outcome and equality of opportunity.

#### 2.1.1 Equality of opportunity

Equality of opportunity, or process equity, entails the extent to which different groups are able to participate, access and alter the planning and decision-making process (D. Levinson, 2002; J, 1996). Questions such as 'what is the impact participation or consultation is able to make to the outcome of the process?' and 'are participators able to change the process itself?' are central within process equity. Process equity contributes to the understanding and acceptance of different decisions that are made, as well as creating the possibility for out-of-the-box ideas due to participation (Ng, Li, and Wong, 2012).

Within infrastructure, this equity is raised to three levels, namely 'who, what and how?' (Ng, Li, and Wong, 2012). The 'who' question highlights the importance of stakeholder identification and analysis during the consultation process. It is important to delineate who are affected by the project, who are the decision-makers in the project and who are important to keep close to the process. Finally, it should be analysed who should be included in the process.

The 'what' question relates to the content participation will influence. Constraints, unsolved problems and the goals of a project must be described in order to indicate properly what the scope of the participation is, what can be changed and what is already decided.

The 'how' question entails to what extent different stakeholders are able to make changes to the process. Different stakeholders have different standpoints as well as different levels of importance. In general, it is unreasonable to expect to reach a unanimous acceptance of a project (Ng, Li, and Wong, 2012). Therefore, it is important to delineate the power of different actors and how this power will unfold itself in the process. Expectation management of the different actors in the play will contribute to the acceptance of



a scheme.

### 2.1.2 Equality of outcome

Equality of outcome, or social equity, focuses on how the impact of the outcome is distributed over different groups in society. Social equity is different from social justice. Geurs, Boon, and Van Wee (2009) uses the following definition for social (in)justice: "... if social differences are unacceptable according to the values and standards of society, they are labelled a social injustice, which is a subjective and often political decision.", (Geurs, Boon, and Van Wee, 2009:page 73). Where social justice focuses on a subjective and political answer to whether or not an outcome is fair, social equity answers the question of how the effects are distributed amongst the affected people. The question of who are the relative winners and losers is answered by social equity, whereas social justice answers whether this distribution of winners and losers is fair. Even though the words 'winner' and 'loser' already have some meaning with regard to fairness, this meaning is not used within this thesis. For example, if a low-income family would carry most of the costs of a new infrastructure project by having the most nuisance of noise and air, while a millionaire would not be harmed by these impacts and would have a reduction in his travel time, the millionaire would in terms of social equity be seen as a winner while the low-income family would be the loser. Within the definition provided by Geurs, the current standards of society would state that this would be a form of social injustice, giving a value judgement towards the impact of the new infrastructure project, rather than defining somewhat objectively who are the winners and the losers of the project. This thesis will focus on social equity. Therefore, the goal of this thesis is to try to understand the impact of appraisal tools on the understanding of who are winners and losers within a project. If this information is available to decision-makers, it will enable the decision-maker to make a socially just decision, or argue why this socially unjust decision is still worthwhile.

To define different kinds of winners and losers of projects, Lee (Lee Jr, 1978) has defined several concepts of equity, which are still used in some form today. One of his main contributions is the split between horizontal and vertical equity within social equity.

#### 2.1.2.1 Horizontal equity

Horizontal equity is "the equivalent treatment of individuals in equal circumstances, and relates most directly to popular notions of fairness" (Lee Jr, 1978:page 1). Lee describes horizontal equity as a fair distribution of costs and benefits among the directly related parties within a project. An example Lee gives of inequity is that of the construction of a road in two jurisdictions, jurisdictions A and B. The benefits are unevenly distributed in the two jurisdictions, mainly benefiting jurisdiction A. However, the costs are evenly distributed over both jurisdictions through taxes, giving an imbalance in the cost-benefit ratio, resulting in a social inequitable outcome in terms of horizontal equity.

D. Levinson (2002) rephrases the definition of Lee, based on several other articles (J, 1996; T, 1996). Levinson describes horizontal equity as "the equivalent or impartial treatment of individuals with regard to the allocation of the benefits and costs among individuals and groups who are similar in terms of wealth and ability" (D. Levinson, 2002:page 179). Its difference in phrasing from 'popular notions of fairness' to 'similar in terms of wealth and ability' enables an easier way to classify different groups within society without getting into a circle argumentation with social justice as given by Geurs, Boon, and Van Wee (2009), as well as being able to differentiate classes of society on objective measures instead of subjective.

#### 2.1.2.2 Vertical equity

Lee Jr (1978:page1) discusses vertical equity as "the distribution of income between different classes of incomes". Lee only refers to different classes of income in his definition, making it quite a narrow definition. Lee focuses his equity definitions around income groups within society, which forms a proper basis for the expansion of this definition by Levinson. D. Levinson (2002:page 179) discusses vertical equity as the "distribution of benefits and costs among different income groups or other strata, such as physical

disability”, opening the equity sector open to more stratifications next to income. Thomopoulos, Grant-Muller, and Tight (2009) continue on the definition of Levinson. Thomopoulos et al. describe vertical equity as “Disadvantaged individuals, groups, or regions deserve protection.”, discussing the necessity of burdening people accordingly to their ability to contribute

For horizontal equity as well as vertical equity, the definitions used by Levinson will be applied in this thesis. The definition of Thomopoulos, Grant-Muller, and Tight (2009) already adds a certain value to the distribution of burdens on different groups of society. However, the goal of this thesis is to assess what the current distribution is and in what way this is assessed and what that impact will be, rather than assessing if the distribution is fair. It is important to understand that social equity as a whole is much broader than just income groups. This also entails (dis)abilities, cultures and even genders. Today’s society is becoming more aware of the fact that such stratifications are still necessary to assess, since not all groups are treated equally in practice. A further elaboration, on which stratifications are used in this thesis, is given in chapter 3.4. It is important to understand which groups and subgroups are benefiting from projects and which are not. This enables decision-makers to understand the impact of decisions and be able to consciously make society more equal.

Thomopoulos, Grant-Muller, and Tight (2009) discusses other forms of equity such as territorial equity, a level playing field, territorial cohesion and many others. Even though these forms of equity are also interesting and important, the used definitions within this thesis will focus on the equality of opportunity and equality of outcome, with an emphasis on horizontal and vertical equity. This is done because, as also mentioned in the introduction, it is currently rather unknown what the impact is of appraisal tools on social and process equity.

## Chapter 3

# Methodology

To find the answers to main and sub-questions, different methods are used. The design of the thesis will be a case study, and the most important methods that are used are the framework by D. Levinson (2002), process tracing and interviews. The first section will elaborate on the overall design and methods used in this thesis. The other sections will elaborate on the usage of the methods.

First, the Levinson framework will be used to create a foundation for understanding the current level of social and process equity involved in the guidelines as well as the cases. Secondly, process tracing will be conducted to gain insights into the case studies. Thirdly, interviews will be conducted to gain more insights into the different appraisal tools, and the appraisal process, as well as give insights in practice, which cannot be provided through documents only.

### 3.1 Overall design and methods used

The aim of this thesis is to gain a greater understanding of the dynamics of tools within the appraisal system of infrastructural projects, with a focus on social and process equity. Several methods are used to gather and analyse the data. This section will elaborate on the design used for the analyses, as well as which methods are used in what way. Lastly, the design and the methods will be tied to the different sub-questions.

#### 3.1.1 Design

The design of the thesis revolves around case studies. Case studies will be used to form the core of the analyses performed in this study. Four cases across two countries will be analysed on what level of social and process equity is incorporated into the analyses and decision-making process, as well as the strengths and weaknesses per country. When looking at the research question, one case study design flourishes, namely the multiple embedded case study design (Yin, 2012). This design entails that there are multiple cases which are analysed in similar ways. The main contribution of such a multiple embedded case study is the possibility for direct replications (predicting similar results) or theoretical replications (predicting contrasting, but anticipatable results). It is expected that the appraisal tools are used consistently, and the results of the study are directly replicable to other cases, therefore enabling generalization.

Furthermore, the replicability of the design enables cross-country comparison due to using the same factors in the analyses. Therefore, the used theoretical frameworks can be used in both countries to make a meaningful comparison.

#### 3.1.2 Methods

The methods that will be used are the Levinson Framework 3.1, process training and impact analyses. The methods used will be delineated per sub-question, indicating which methods are used to answer the questions in which manner.

- *What should the influence of ex-ante appraisal tools used in the appraisal of infrastructure processes be according to the guidelines per country?*

A simple analysis of reading and understanding the guidelines is performed to understand what the current goal is of ex-ante appraisal tools and to what extent the tools should influence the appraisal process. The data necessary is gathered by performing interviews and gathering policy documents. This SQ is based mostly on factual evidence. Therefore, studying the guidelines themselves as well as other policy documents which mention how the tools should be used will be enough to answer this question. Interviews can be used to understand nuances between the textual guidelines and the interpretation of the guidelines.

- *What is the influence of ex-ante appraisal tools used in the appraisal of infrastructure processes per country in practice?*

Case studies are used to design the answering of this SQ. Process tracing is the used method to analyse different cases. The necessary data is collected through interviews, (policy) documents and other research already performed. The process tracing throughout the cases highlights when and how the tools are used in a case. The policy documents give insights into how much impact the tool has had on the process, the output, and the outcome. The interviews are an addition to the found documents and can provide extra information or nuance on the found policy documents. Interviews help to assess the real impact a tool has instead of the written impact.

- *Which different groups of society are differentiated and incorporated in ex-ante techniques per country?*

The Levinson framework, social impact analyses and case studies will be used to answer this question. The necessary data is gathered by collecting (policy) documents, performing interviews and studying earlier research. The Levinson framework enables the understanding of which dimensions and stratifications are incorporated within the ex-ante techniques. The social impact analysis argues what the impact is of the included and missing dimensions and stratifications on the process, the output, and the outcome. The case studies will give empirical evidence of usage and impact of the used tools.

- *What are the similarities and differences per country in terms of the guidelines and the practice?*

The Levinson framework will be used to compare the incorporation per country for the guidelines as well as in practice. All analyses performed by the other sub-questions, as well as the interviews, (policy) documents and other research, will function as the data for answering this question.

- *What are the lessons that could be learned from both countries in regard to including social and process equity into ex-ante appraisal techniques?*

No specific method is used to create the lessons learned from both countries. The most interesting similarities and differences and their impact are used to dictate the lessons that can be learned.

## 3.2 Case study

The study of Yin (2012) is known to delineate the added value of case studies, as well as which type of case study would fit this type of research.

### 3.2.1 Why case studies?

As described by Yin (2012), there are two reasons to perform case studies. One of these reasons applies to the research questions in this thesis, namely an explanatory question answering ‘how or why did something happen?’. Case studies help to understand the different mechanisms at play by researching how they have been played out in real-life cases. Looking at the research questions of this thesis, a case study fits perfectly within this usage as described by Yin. Case studies can be used as a comparison between the theory and the real-life context of the applications of guidelines as well as policy tools. How policy is intended can be different in comparison to how policy is applied. Therefore, case studies can help to see whether the guidelines are in-line with the execution. The comparison of theory and practice, especially with policy studies, adds value to understanding the different mechanisms in play. A second

reason is that case studies help to gather data within its real-world context rather than relying on derived data sets (Yin, 2012). Several other tools can be used to gather data, but a better understanding of phenomena can be caused by the “original fieldwork” of the cases, enabling the researcher to fully grasp the complexity of phenomena.

### 3.2.2 Amount of cases

There is no clear answer to the question of Yin (2012:page 9) “How many cases should be included in a multiple-case study?”. Several authors (Yin, 2012; Rowley, 2002) discuss that it is a trade-off between the amount of time available to the researcher as well as the question ‘How many experiments need to be conducted to result in an unqualified result?’. This thesis will consist of two cases per country, one road and one rail, making it a total of four cases. The choice of road and rail over for instance water or flight is due to higher usage of road and rail for daily transportation purposes.

The analyses of two different forms of infrastructure will add value to the understanding of the impact of appraisal processes in the width of the term infrastructure. It will be worth having two different cases instead of two road cases, for instance, due to the understanding of the relationship and interaction between both modes of infrastructure within appraisal processes. The cross-country comparison will add value to the understanding of relative quality, the strengths, and the flaws of the tools and process per country. Analysing two cases per country combined with the guidelines will enable the research to learn the impact of the tools on the process to some extent.

The amount of cases used in this thesis is enough to state the general impact of tools. More cases would be useful to strengthen the results, but it is not necessary to draw conclusions already. An increase would strengthen the possibility for generalizability, but will not increase the value exponentially.

### 3.2.3 Criteria for choosing the cases

The criteria for choosing the case studies can be split into two main sections. Yin (2012) discusses that a case can either be based on unique and extreme phenomena or common and everyday phenomena. The first category focuses on special cases, making for a unique result. Examples of such cases are occurrences of natural disasters or a critical political election. Such events do not occur often and result in a unique set of outcomes. The second group, more common and everyday phenomena, revolve around cases which occur more often than once every few years and will add value to more general research literature. The second group applies to this study. Infrastructure projects often occur, and this thesis should contribute to the research literature. For this second group, Yin (2012) recommends choosing a compelling theoretical framework as well as compelling criteria for the cases to make it a ‘special’ case study. The more compelling the cases and the framework, the more value that can be contributed to research literature. The criteria used to choose the cases are the following:

#### Cases are limited to the Netherlands and the UK

As delineated in the introduction and literature review, different countries have different appraisal techniques for infrastructure. Two interesting countries to analyse are the Netherlands and the UK. Both countries are seen as having qualitatively high appraisal processes. However, where the United Kingdom has elaborate social distributional effect studies and even some ex-post analyses, the Netherlands do not have this (Eijgenraam et al., 2000; Baldwin, 2021; Annema, Frenken, et al., 2017; Worsley and Mackie, 2015). Also, the way the CBA is used is different between both countries. (Geurs, Boon, and Van Wee, 2009). Furthermore, the usage of CBA is mandatory in the Netherlands (Ministerie van Infrastructuur en Milieu, 2016), with a mandatory rationale based on the CBA, whereas the United Kingdom has an implied obligation but not a strict one (Transport, 2019). Therefore, it is interesting to compare both countries. It can give insights into the impact of social distribution analyses, as well as if a different application of CBA still leads to the same problems as discussed by Van Wee (2012).

#### CBA has to be used in the appraisal system

CBA is a core appraisal tool used in many countries worldwide on infrastructure appraisal. Therefore, it is important for a case to have a CBA performed. The only exception possible for not having a CBA is that CBA was not used in infrastructure at that point in time. That way, it enables the comparison option for seeing how CBA has grown over time. The rail case of the Netherlands does not have a CBA due to the reason mentioned.

#### **Data availability**

The cases should have data available to perform the analyses. A CBA must be available, as already mentioned, and preferably other tools used such as the Environmental impact analyses and the distributional impact analyses as well. Furthermore, information on the decision-making process should be accessible as well to be able to understand and analyse the process. An indirect result of this criterium is that only major infrastructure projects will be chosen as cases. The data availability on major cases is better than for smaller projects due to more attention given by decision-makers and the media.

#### **The date of the rail and/or road case per country needs to be in a similar time frame**

To make the comparison fair, it is important to let projects be run within a similar timeframe. By doing this, it can be somewhat ensured that there were no new methods or tools created which would give a project a disproportionate advantage and make the comparison unfair. It is logical that projects which were done earlier in time should be less adequate than new methods.

### **3.2.4 How to operationalize the cases**

The final step for the case studies is a description of how the cases will specifically add value to the answering of the research question. The case studies will be analysed in the same way as the guidelines. The goal of the case studies is to be able to compare the theory versus the practice, delineate the strengths and weaknesses, to be able to compare the different countries and to be able to learn from the similarities and differences. To be able to achieve these goals, several steps are necessary to perform.

- First of all, every case will have a timeline to understand what the appraisal process looked like and at what stage which tools were used. This allows understanding the context of the case.
- Secondly, the Levinson framework (D. Levinson, 2002) will be applied to the cases to see how the CBA and other tools incorporate the different forms of social and process equity in the process. An elaboration of the Levinson Framework can be found in chapter 3.4. The Levinson framework can be seen as the backbone of the analyses, giving an elaborate analysis without judgement on what different levels of equity are incorporated. Furthermore, the framework will be compared to the analysis of the guideline.
- Thirdly, interviews will be conducted to provide further information on specific cases. These interviews are meant to give extra context and either support already found results or add new information to better understand the appraisal process.
- Finally, a conclusion will be drawn per case which states to what extent this case can be seen as social process equitable.

After the analyses of single cases, the cross-case and cross-country comparisons will take place. First of all, a conclusion per country will be drawn to discuss the impact the current guidelines and practices have on social and process equity. This is a combination of both cases, assessed by several social and process equity pillars, which are based on literature, results from interviews as well as findings from (policy) documents. This will be elaborated on later in this chapter, in Section 3.5.

After the intercountry comparison, the cross-country comparison will be made. The most important differences and similarities, extracted from interview results as well as focus points found through the frameworks, will result in an overview of the similarities and differences. This overview will then be derived into strengths and weaknesses per country, making clear what is working, what is not and what can be learned from each other.

### 3.3 Process tracing

A possible methodology to analyse the dynamics within a system and in projects is project tracing. A definition of process tracing is given by Derek Beach (Beach, 2017:page 1): “Process tracing is a research method for tracing causal mechanisms using detailed, within-case empirical analysis of how a causal process plays out in an actual case. Process tracing can be used both for case studies that aim to gain a greater understanding of the causal dynamics that produced the outcome of a particular historical case and to shed light on generalizable causal mechanisms linking causes and outcomes within a population of causally similar cases”. When looking at the definition of Beach, it is clear that it can be used to understand mechanisms and link causes within cases and guidelines. Therefore, process tracing will be used to analyse the cases.

There are multiple ways to conduct process tracing. This thesis will follow the method as described by (Beach, 2017:page 19) called “theory-building process tracing”. Theory-building process tracing is a way of process tracing which revolves around the general question “how did we get here?” (Frieden, 1986:page 582) & (Swedberg, 2012:page 6-7). It is usually used when it is known that there might be a relationship between a cause and an outcome, but it is uncertain which mechanisms are linking the two. Theory-building process tracing is a fitting method to analyse the feeling that there might be a relationship between the cause, usage of CBA or other appraisal tools in the appraisal process and the outcome, a social (in)equitable outcome and process (in)equitable process. It is known that CBA in general has flaws in terms of social and process equity (Mouter, 2012; Annema, Carl Koopmans, and Van Wee, 2007; Van Wee, 2012), that CBAs are used in different manners than intended in the guidelines (Niek Mouter, 2017b; Niek Mouter, 2017a; Rienstra, 2008), and what the position is of CBA within the policy cycle (Rienstra, 2008; Niek Mouter, 2017b). However, it is unknown what the impact is of CBA on social and process equity. Does the usage of CBA or other appraisal tools affect the equity levels of the outcome? Literature and internal reports have stated that in most applications of CBA, CBA is the analysis which could attribute to social inclusion within the analyses due to its core position in the policy cycle. However, there is a feeling that current infrastructure projects are not social or process equitable.

The ‘theory building process tracing’ will consist of several steps. First of all, general facts need to be gathered and analysed. This will be done by analysing the guidelines of the appraisal process to understand at what point in time which part of the policy cycle applies, as well as filtering out where CBA should be used. After this, several cases will be analysed similarly to see whether the cases are in line with the guidelines, where they differ and why and how this affects social and process equity. This will be done by gathering policy documents, rationales by decision-makers, as well as interviews with decision-makers and other stakeholders.

#### 3.3.1 Theory-building

To further depict the methodology for this thesis, the article on theory-building from (Swedberg, 2012) is used. Swedberg argues for the method of theory-building, a method where there is theorizing instead of linking a theory. This means that hypotheses will not be used, but the theory will be based on facts found in the cases. That means that there is no starter bias present and there will only be built upon found facts such as the guidelines as well as the cases.

For the cases, the following steps will therefore be tacking to build the theory. First, the facts per case will be researched. The timeline of the project, the timeline of the policy trajectory and the taken decisions will be analysed to understand what has happened. After this has been done, the impact of CBA within the project will be determined based on found facts as well as literature. Thirdly, theorizing will take place. By combining the facts, analysis of the facts as well as the literature, it will be determined if there is a link between social and process equity factors and the influence of CBA and other appraisal tools per case.

To elaborate further on the different steps that will be taken during the process tracing, a timeline

will be sketched below.

1. *What is the whole appraisal timeline?*

A timeline will lay out the different facts and used instruments throughout the appraisal process, enabling a full understanding of the project and what information was available at which point in time.

2. *Where is CBA mentioned?*

Pinpointing where CBA is mentioned can help to understand the impact CBA has on the process.

3. *How has CBA had an impact on the case?*

Understanding at what points in time CBA has been mentioned, together with other documents such as rationales or debates, can help to determine the impact CBA has had on the case if any.

4. *How does the whole process score in terms of social and process equity?*

Combining the found facts with the analyses done on CBA and other appraisal tools will help to determine how much impact these tools could have had on social and process equity, as well as how much impact they actually had.

5. *What has the impact been of appraisal tools on the outcome of the case in terms of social and process equity?*

This goes beyond CBA and refers to general tools and specifically the outcome. Even though instruments can have little influence during the process, it can be that the outcome of the project is still affected due to these analyses in other ways. Therefore, this specific question has to be asked as well.

## 3.4 The Levinson Framework

The framework by D. Levinson (2002) will be used to assess the social and process equity of the general guidelines for appraisal projects, as well as the practice of appraisal in use-cases. This section will argue why this framework will be used, what its limitations are, and elaborate on the different stratifications it entails. The framework can be found in 3.1.

	Process	Outcomes				
	Opportunity to Engage in Decision-Making					
Stratification		Mobility	Economic	Environmental	Health	Other
Population						
Spatial						
Temporal						
Modal						
Generational						
Gender						
Racial						
Ability						
Cultural						
Income						

Figure 3.1: The framework by D. Levinson (2002). To apply this checklist, each cell should be considered. E.g. the mobility income statement. Is the change of modality different for different income groups? Will some income groups be affected through different modalities? There are no predefined questions per cell, but are suggestive for considerations that should explicitly be taken. Therefore, base knowledge with regard to equity is necessary.



### 3.4.1 Why this framework?

The checklist of Levinson is an easy-to-use checklist to differentiate which subgroups of society are taken into account and in what way they are affected or involved. This results in an overview which makes it easier to spot where a project ignores some groups of society and where it favours some, thus resulting in a list of winners and losers (D. Levinson, 2002). The checklist is based on the theory of Chen (2001), who states that “The principles of social equity and environmental justice can be realized only when the conventional top-down approach to decision-making ends. The only way that this can be done is by including all the groups of the community in the decision-making process. Social equity can be realized only when the needs of all groups are adequately represented” (Chen, 2001:page 184).

The framework suits the research questions well because it does not directly lead toward a statement saying if a process or outcome is equitable or not. The framework provides a checklist and an overview of which groups of society are taken into account and in what way, leaving room for interpretation for the researcher. The framework can also be used as a summation to see what the social equity level is of different tools that are in use.

### 3.4.2 Stratifications of the framework

This subsection will discuss the importance of the stratification chosen by Levinson. Per stratification, a brief explanation is given on why it is important and the possible consequences that could go wrong if it is not taken into account. It is important to note that the possible consequences are generalized and will not always arise due to different contexts.

#### 3.4.2.1 Population

Infrastructure decisions have impacts on several groups of society, but also on a societal level. The current standard is based on the principle of the Pareto optimum, which says that the optimum is reached if nobody can increase his welfare unless someone else his welfare decreases (Van Wee, 2012). It is important to consider the impact on a general population level, therefore being a gatekeeper, to understand what the goal of a project will be. If a project is meant to improve a major problem spanning a significant portion of the population, it is necessary to consider the impacts on a population-wide level before analysing different stratifications. When a project for example is meant to increase the living situation of a certain group of people, it is important to see what the costs would be for the general population to check whether the project would not indirectly hurt its own goals.

#### 3.4.2.2 Spatial

“... organizing without a spatial consciousness is like sailing the oceans, expecting to fall off the edge of the (flat) world.” (Liss, 2010:page 612). The inclusion of spatial factors is a necessity for decision-makers. Soja Soja (2010) argues that for transport policy to become equitable, questions such as who lives where and why are not only political questions but spatial planning questions as well. Reasons for people to live somewhere are often based on the proximity of key facilities such as education, healthcare, employment, and grocery shopping. A spatial consciousness is necessary to understand the implications of transport policy on different levels of society.

#### 3.4.2.3 Temporal

D. M. Levinson (2001) describes temporal as the temporary issues which are raised due to a project. An example is hinder caused by construction, such as an increase in emissions or noise nuisance. Another example is when a project is part of a bigger whole, resulting in temporarily lower gains or higher costs. For example, when several new roads are built to increase accessibility, it can occur that one road is finished before another. This means that the new road could cause hinder to residents than modelled because of a temporary increase in usage. It is important to incorporate such temporary measures to understand the full impact a project has.

#### 3.4.2.4 Modal

Different modalities are used for day-to-day transportation. A new project could impact the journey of another modality. This could lead to various forms of harm or extra benefits. An example of harm is when a road is changed to not accommodate cyclists anymore, this can harm the accessibility of cyclists. An example of extra benefits is when the construction of a new road would decrease the usage of a road where cyclists are present as well, resulting in a safer road for cyclists while the travel time for cars reduces as well. Incorporating the changes to other modalities is, therefore, key to understanding the full impact of a policy (Pereira, Schwanen, and Banister, 2017).

#### 3.4.2.5 Generational

Different generations pay for different use of infrastructure. However, projects impact the mobility of generations differently. Can it be seen as fair that the young have to pay for something which is most beneficial for the elderly (D. Levinson, 2002)? It is important to at least be wary of the information on which age groups are mostly benefiting from the proposed project to see whether it can be deemed as fair or socially equitable.

#### 3.4.2.6 Gender

Kronlid (2008) argues that gender-equal transport is currently more or less ignored because travel should be inclusive by definition, and it is not the right place to solve such a difficult problem. In general, equality between genders starts when different segments of society cooperate in understanding the differences and enabling everyone to fulfil their own goals and needs. Every man and woman should be able to travel from A to B in a decent time while feeling safe, for instance. It is important to understand the differences in travel patterns between men and women if there are any. It is important to include the different needs for travel between the genders and incorporate this into the decision-making system, Kronlid argues. A study in Sweden by Ryan, Wretstrand, and Schmidt (2015) states that factors such as being female increase the likelihood of using public transport over a car as the main modality. This study is a clear indication that, even in high-inclusive countries such as Sweden, gender-specific transport needs are present. Incorporating such studies can increase gender equity in transport and therefore the overall social equity scores. Important to mention is that current studies have been performed solely on the traditional male and female genders. It can also be applicable to the whole LGBTQ spectrum. However, since there is too little literature at the moment, this study will focus on the traditional genders. It would be beneficial for future studies to include the travel differences amongst the whole gender spectrum.

#### 3.4.2.7 Racial

Racial is similar to the cultural explanation, which can be found in Section 3.4.2.9. The main difference in culture is the fact that different ethnic groups use transport differently due to historical segregation, feelings of safety and current inclusion. Persons of the same race can have different uses of transport, while still being impacted the same due to feelings of unsafety for example. Persons from the same culture use generally speak the same modes of transport.

#### 3.4.2.8 Ability

A major decrease in accessibility and therefore creating unequal opportunities, in the long run, is the lack of incorporation for possibilities to travel for vulnerable groups, such as the disabled (Pereira, Schwanen, and Banister, 2017; Lucas, 2012). “While aiming to enhance overall levels of accessibility, policies should prioritize vulnerable groups and thereby mitigate morally arbitrary disadvantages that systematically reduce their accessibility levels, such as being elderly, disabled, or born in an ethnic minority or poor family” (Pereira, Schwanen, and Banister, 2017:page 184).

#### 3.4.2.9 Cultural

Cultural differences occur in travel behaviour as well and result in different types of modalities and therefore use of infrastructure (Hamidi and Zhao, 2020). Historic cultural differences lead to different

use of transport. While the Dutch want to cycle wherever they are, this is not common for other countries such as the USA (Buehler, 2011). Plenty of research has been done on why cycling is more common in the Netherlands than in the United States, but for creating new policies or projects, it is important to understand what is the common use of transport to match the policy goals to cultural preferences. If the goal is to change cultural preferences, it is important to know what these are and how the new policy would affect these preferences exactly. Therefore, it is important to include culture into the equation.

#### 3.4.2.10 Income

Accessibility to transport is one of the most important factors that can increase equal opportunity for different groups of people. It is important to understand that low-income groups have a higher benefit from a decrease in travel time/increase in affordability for transport to important areas such as education, healthcare, and employment than mid- and high incomes (Cui et al., 2019). The study shows that lower-income groups have overall longer commute and travel times than their high-income counterparts. This results in less time available for low-income groups to perform work or exercise, creating an imbalance.

#### 3.4.2.11 Country specific incorporation of Levinson

In general, all stratifications mentioned above should be incorporated as seen through the lens of Levinson. However, it must be mentioned that every country and its infrastructure is different and unique for its own reasons. This uniqueness can solve the problems mentioned by Levinson. For instance, when many authors talk about spatial equality, they mention the necessity to have access to healthcare within 30 minutes. It is rare to not meet this necessity within the Netherlands due to it being a densely populated country and former policy-making on this specific issue. Therefore, even if not all different stratifications as discussed by Levinson are included in the appraisal process of a country, it does not automatically mean that this will lead to an inequitable outcome because the inequity is already taken care of. Nonetheless, the stratifications that are not taken into account per country should still be added to take care of extremities or for optimization purposes.

### 3.4.3 Focus points within this thesis

This thesis will focus on the different distributions of equity in transport and the impact appraisal tools have in terms of social and process equity. Looking at the Levinson framework, this will entail the analysis of understanding how diverse appraisal tools are. How many stratifications are taken into account? To what extent can and do different cells influence the process outcome? Are there checks and balances in place to distribute the benefits and the costs amongst different stratifications?

### 3.4.4 Operationalization of the framework

The framework will be used within the cases to visualize to what level a certain stratification/dimension combination is considered. This will be done using the legend found in Figure 3.2. The different levels are based on the paper of D. Levinson (2002) itself, as well as D. Levinson (2010), Thomopoulos, Grant-Muller, and Tight (2009) and J (1996).

First, the lowest level is plain white, stating that this cell is not taken into account at all. The second level, slightly considered, indicates that a cell is mentioned in the guidelines/case, but not that extensive. An example of this is the population /opportunity to join decision-making cells. A level two is that decision-makers are chosen democratically, therefore, the general population does an opportunity to join the decision-making process and has some impact. However, it is very narrow. Another example could be given in the spatial / health cell. If only a low amount of health factors is incorporated for regional areas, or only a single region is incorporated when multiple are harmed, this level will be used. The third level, considered, comes just after the second, being the incorporation of more than the second level clearly being some input in the process, but not adding enough information to make a worthwhile trade-off. Level four, sufficient, can be seen as the bare minimum to provide a sufficient trade-off. An example can be given by the spatial/health cell. When all affected areas are considered for air quality

	Not taken into account
	Slightly taken into account, but very narrow
	Considered, provides some information
	Sufficient, delivers significant info in the analyses provided
	Good, analyses deliver spectrum of decision-making info
	Near perfect, provides lots of decision-making information
	Fully incorporated, up to standards set by literature

Figure 3.2: Legend of the operationalization of the Levinson framework. The deeper the colour blue, the more extensively a stratification/dimension is incorporated into the analyses.

and noise nuisance, it does give significant information on the impact and can therefore be used in trade-offs. Other impacts such as vibration nuisance and decrease in safety due to the new project can still be missing, therefore not giving a complete image. The sufficient level does not automatically result in equitable outcomes, but does provide information on which a significant trade-off can be made. Level five, good, is simply an increase in incorporated impacts. Level six, near-perfect, is reached when almost all incorporations discussed in the literature are used. An example in the spatial/health cell is when noise nuisance, vibration nuisance, air quality and change in the number of accidents are considered for all affected areas, but, physical activity is not incorporated. It can be that a new road is expected to significantly decrease the number of cyclists, therefore reducing the health of residents of that area. Lots of information is present at this level, but not all information that is mentioned and seen as important by most literature is taken into account. Level seven, perfect, is achieved when all information that is mentioned by most literature is taken into account. All questions that could be asked for a cell have been answered to reach this level. This is theoretically possible, but in practice almost impossible to achieve due to an immensely high amount of analyses that need to be performed. In essence, all cells should be at the highest level to be up to literature standards. However, in practice, the goal is to provide the decision-maker with enough information to assess the impact a project has on different levels of society. Therefore, cells do not need to have a perfect score to reach this level of information.

### 3.4.5 Limitations of framework

The framework is open for interpretation on which questions to ask exactly per cell, as well as how to interpret the different columns. This leads to the possibility to use the framework in many ways and makes it flexible for many use cases, but it loses some consistency and clear guidance for which it is meant. Levinson gives an explanation per stratification on how to interpret the subgroup, but it leaves the example of what questions to ask per cell open to the reader. This is a limitation of the framework which can harm consistency. Furthermore, because it is open to interpretation, it can also mean that the original idea of the usage of the framework can be lost, resulting in a skewed outcome on equity levels, influenced by the bias of the researcher. This can be somewhat solved by being aware of the possible bias effect and sticking as close to the descriptions given by Levinson, but it means that the outcomes of the framework should not be seen as the hard truth, but rather as a way to summarize and structure the found results.

## 3.5 Strengths and weakness pillars from literature

The Levinson framework can only be used to assess the diversity of tools used, not giving any value to something as a strength or a weakness. To be able to concretize the strengths and weaknesses found in the appraisal processes, several social and process equity pillars are derived from the literature. These

pillars will be used as analyses to give somewhat of a value judgement towards strength or a weakness, based on literature. Levinson's framework can only be used to sketch the current level of equity that is incorporated, while the pillars will be used as a point of departure for why certain aspects of the appraisal process can be seen as a strength or a weakness.

### 3.5.1 Social equity

Lucas (2012) discusses and summarizes the topic of social exclusion in transport systems. One of the key findings comes from Church, Frost, and Sullivan (2000), namely, seven points of social exclusion which contribute to social inequity. These inequities can be adjusted to form the base of the analyses for the pillars. The list from Church has a lot of overlap with the checklist of Levinson D. Levinson (2002), which is used in the analyses of the cases and described in Section 3.4. The main difference between both frameworks is that the Church list focuses on exclusion points, whereas the framework has a wider view, incorporating impacts on health and the environment as well. Therefore, item six and seven are added because of the Levinson framework and entails the impact on the health and environment of affected residents. The differences in analysing different stratifications are included in these items and will, if necessary, be added to the explanation of the strengths and weaknesses.

#### **SEP1 Physical exclusion**

Physical barriers will exclude groups to access transport services. Examples are lack of timetable information, lack of disabled facilities and poor design.

#### **SEP2 Spatial impact**

Living in rural areas and/or having poor transport connections through Public Transport (PT) can cause exclusion based on geographical location. Furthermore, The distance to key facilities such as education, healthcare, and shops can prevent access to the proper use of these facilities. Poor access to such facilities can lead to lower income and quality of life.

#### **SEP3 Affordability impact**

High costs of travel due to long distances or expensive ways of travel can exclude low-income groups from (necessary) facilities. Other examples of affordability discrimination are in first-class waiting rooms, VIP systems and gated communities can prevent certain groups from access to public spaces, resulting in discrimination due to lack of affordability.

#### **SEP4 Time-based exclusion**

Lots of work hours and/or child-care duties can reduce the time available for travel, disabling people from being able to travel to necessary facilities.

#### **SEP5 Fear-based exclusion**

High criminality rates or high feelings of unsafety can lead to exclusion of public spaces and/or transport services.

#### **SEP6 Health impact**

The impact a project has on the health of residents and the population as a whole is important to discuss in the project description. In the short term, it can cause direct health deficits such as sleep deprivation. In the long run, health problems can have a major impact on people's lives due to long exposure to for instance emissions, causing lung problems or worse. It is important to understand what the impact is of a new project on the health of people, as well as which kind of people are affected.

#### **SEP7 Environmental impact**

The environmental impact is linked directly to health impact. What is bad for people their health, is also bad for nature (Van der Aa, 2022). However, there are differences, such as places where people do not live or other factors such as the direct impact on habitats. Therefore, it is important to incorporate the environment next to health impact.

### 3.5.2 Process equity

A different paper from D. Levinson (2010) describes some necessary criteria to achieve process equity. These will form the basis for the strengths and weaknesses based on process equity. Levinson describes three items which are the centre of process equity:

#### PEP1 Transparency in the decision-making process

An essential item of process equity is transparency within the decision-making process. It is important that all people, affected and merely interested people, are able to access documentation around the decision-making process as well as know what the process looks like. Transparency is the cornerstone of process equity, minimizing the information asymmetry between different parties, resulting in less of a power difference between decision-makers and others.

#### PEP2 Allowing various forms of input from all affected individuals

There are differences in the forms of input allowed from affected individuals. The forms of input accepted also affect the process equity. Example questions such as ‘at what point in the process is input allowed?’, ‘from whom is input allowed?’ and ‘what kind of input is allowed?’ are the centre of this pillar.

#### PEP3 Degree to how the input can affect the process and/or the process outcome

The degree input can affect the process is a key part to make a process equitable. Participation without power is no participation. Some examples of degrees are being able to tweak minor things in the project, the power to affect the chosen alternative within an infrastructure project, affecting the process design itself and finally being able to veto a decision made. It is important to mention that the literature states that the more power the affected persons have, the better the process equity (D. Levinson, 2010; Lee Jr, 1978).

## 3.6 Data collection

This section will elaborate on the different sources for data gathering. It is split into two groups, namely documents and interviews. The documents will dive into the different sources, used websites and search methods used. The interview section will dive into which persons are interviewed, why they are eligible, and what the contribution of the interviews will be to the thesis.

### 3.6.1 Documents

Due to the qualitative and political nature of the subject, various sources and types of documents are necessary to assess. A distinction can be made between two main types of documents, namely scientific and non-scientific. Scientific documents are peer-reviewed and are written for academic purposes. Non-scientific documents vary from legislation to policy documents, case documents, evaluation reports and many more. The non-scientific documents are necessary to understand how certain tools are used in cases, what the rationales are, what the official guidelines are and what has already been evaluated internally. It is necessary to understand the current practice to gain academic insights into what is working, what is not and why.

For the scientific type of articles, a combination of Scopus, Worldcat and Google Scholar has been used. A narrative type of literature review is used to gain the necessary information for the subject. This means that next to the search terms, snowballing is used to gain further information and other articles. The initial search terms included terms such as ‘Infrastructure’, ‘Social equity’, ‘policy success’, ‘appraisal techniques’, ‘CBA’, ‘EIA’ and ‘transportation equity’. Lastly, other scientific articles have been recommended by interviewees. The found articles formed the basis for the knowledge gap, as well as how the framework of Levinson has been found and further context and information used throughout the thesis.

Next to the scientific articles, a lot of policy documents, guidelines, legislation, and case reports are used in this study. These are accessed and searched for differently than the scientific articles. In the Netherlands, the website of *mirtoverzicht*, *Rijksoverheid* and *mkbaoverzicht.nl* have been used to gain information on cases as well as general guidelines. *Tweedekamer.nl/kamerstukken* and *officielebekendmakingen.nl* have been used to find most of the parliamentary documents, rationales, and legislation. For the UK, *webarchive.nationalarchives.gov.uk/* and *gov.uk/guidelines* are used to gain the official reports on the cases. *legislation.gov.uk* is used to access the legislation. Google has been used for gaining some documents which could not be found using the websites mentioned, resulting in gaining information from a variety of websites. All currently mentioned websites are official websites, mostly hosted by governments themselves. Other websites found through Google have only delivered reports. The reports are validated by checking the authors and publishers.

### 3.6.2 Interviews

Next to documentation, interviews will also be used to gain information. Interviews are a method which can add value when it is hard to collect data on a certain case or to better understand mechanisms in place which are not known in the guidelines. When dealing with processes, especially when they contain some form of political play and less objective values such as equity, it is useful to add perspectives from different persons in the field to the equation (Ball, 1994). A key feature of political play is that a lot of decisions are not made on paper, but face to face. Also, the documents available do not always provide information on why choices or trade-offs have been made, as well as which parties have had an influence on the decision-making process. Therefore, interviews are a necessary method.

Several specific types of persons and professions are of interest to interview. First of all, interviews are held with people who have worked on specific cases. These interviewees can add extra information about the cases which cannot be found in the documents and can add nuance to the found results. Case interviewees can be categorized into two sections, namely decision-maker or experts. Decision-makers are people who were managing the project at a municipality, national government or *Rijkswaterstaat*/Department for Transport. Experts are people who worked on the content of a case rather than the trajectory. Only the latter has been interviewed due to not being able to get a response from (former) decision-makers for the specific cases. Furthermore, it was difficult to gain the contact information or even the names of people who worked on United Kingdom cases. Emails sent to institutes such as the Highway authority or specific divisions such as the TASM (Transport appraisal and strategic modelling division) have not resulted in interviews. Secondly, interviews are held with experts who have experience with appraisal processes. These interviews can add value to the understanding of the guidelines, as well as the difference between the guidelines and practice. These experts have experience in projects, but not necessarily in the specific cases which are analysed in this thesis.

#### 3.6.2.1 List of interviews

The following list contains all interviews that are held. The name, current function, specific interest for this thesis and country in which the interview is applicable are mentioned.

- *Employees of the Department for Transport with experience in the appraisal process in the UK (UK)*  
This interview was a duo interview. The interviewees have experience with the appraisal process in the United Kingdom and are employees of the Department of transport. The names are anonymized for personal reasons. They can add value towards the understanding of the practices in the UK, as well as pinpointing current strengths and flaws and helping with further information, if necessary and applicable. They have performed research on the appraisal process themselves as well.
- *Eric van der Aa, Ecologist at Rho Adviseurs and member of Committee m.e.r. (NL)*  
Eric has 15+ years of experience as a member of the Committee m.e.r. for infrastructure processes. The importance of the Committee m.e.r. will be elaborated on in chapter 4.1.3. The m.e.r. stands for Milieu Effect Report, a Dutch committee for the Environmental Impact Assessment (EIA). Eric

can add his contributions to how the environmental impact assessments affect decision-makers, as well as what kind of focus is applied. Furthermore, he can add information on the position of the Committee m.e.r. within the whole process.

- *Tanja Bremer, Project manager Environment and spatial at Rho Adviseurs and member of Committee m.e.r. (NL)*

Tanja also has 15+ years of experience at the Committee m.e.r.. However, her background is less found in transportation infrastructure and more in spatial planning. Tanja can therefore give some other insights into the methods and process analyses of the Committee m.e.r., while not being biased by the infrastructure projects. This can provide fresh insights in the impact the Committee m.e.r. has, as well as some cross-sectional input. The transcript can be found in chapter ??

- *Sander Zondervan, senior advisor spatial planning at Antea group (NL)*

Sander has worked with the appraisal of infrastructure processes for 10+ years, therefore being able to add nuance, perspective, and insights into the practice of the guidelines, what information is used and to what extent social and process equity is of importance in appraisal processes. Before he worked at Antea, he worked as a project secretary for various major infrastructure projects at Rijkswaterstaat.

More people than the list above have been contacted for an interview but were not willing to have an interview due to various reasons or simply giving no response. Furthermore, it was difficult to get the name and contact information of persons in the United Kingdom who have worked on specific projects or who are a member of specific teams due to being unable to find the names of authors or divisions. Emails have been sent to a few single names found, as well as to the general e-mail addresses of the Department for Transport, the National highway authority and the Transport appraisal and strategic modelling division of the DfT. Unfortunately, this has not led to interviews.

### 3.6.2.2 Interview protocol and coding

Before the interviewees have been contacted, an interview plan has been made and approval has been given by the Human Resource and Ethics Committee (HREC) of the TU Delft to conduct the interviews. The interviews have been conducted in a semi-structured way. This type of structure is chosen because there was a combination present of known unknowns and unknown unknowns. Every interview has some overarching questions. However, the interviews are especially used to gain information which could not be found previously through official documentation. Therefore, it is important to be able to respond to findings while doing the interview, gaining more knowledge and being able to dive deeper into subjects that suddenly arise. Every interviewee will receive a short description of my thesis as well as some topics and short example questions which will be discussed. This helped them prepare for the interview.

The goal of the interviews is to better understand the processes at hand, to understand which tools have an impact and how. This means that there is not a clear questionnaire which can be asked, and freedom to discuss new findings directly with the interviewee is necessary. The process and the cases will be the main line of argumentation and will be the focal point of the interview. However, it is important to understand the underlying mechanisms of the appraisal process. As seen in different studies (Annema, Carl Koopmans, and Van Wee, 2007; Worsley and Mackie, 2015; Niek Mouter, 2017a; Niek Mouter, 2017b), the way the appraisal tools are used differs per person and case and is often politically influenced. It is key to let practitioners give their vision and experiences on the processes to grasp the underlying principles and values on how decisions come about. Therefore, a semi-structured interview will be the best option for this thesis (Tierney, 1991). Because these interviews are of a personal nature, a bias can occur out of the interviews. This is known and taken into account when analysing the results of the interview.

Each interview started with an introduction of myself and a more elaborate explanation behind the research, followed by an introduction of the interviewee itself. This introduction was used to place the answers in the perspective of the interviewee in its field of work. Based on what they had said in their introduction, the questions were asked per major pillar. Furthermore, a distinction was made to focus on



the expertise of the interviewee. For instance, a member of the Committee m.e.r. received more questions about the m.e.r. procedure as well as its impact than an expert on the MIRT process. Table 3.1 and 3.2 discuss the main concepts for the interview, as well as some example questions. During the interview, all different concepts will be addressed. Dependent on the expertise of the interviewee, some concepts will be discussed in more detail. Because there are different appraisal tools in the United Kingdom and the Netherlands, there are two tables with concepts. The Dutch table can be found in table 3.1, and the United kingdom its table is table 3.2. The coding within the tables is used for structuring the results given in the interview.

Table 3.1: This table shows the core concepts and example questions which are used within the semi-structured interviews. The questions at hand are not all asked but are example questions which can be asked, dependent on the interviewee its expertise. The coding refers to the transcripts of the interview, which have paragraphs coded with this number to easily track which core concept is discussed in what part of the interview.

Core concept	Subconcept	Example questions	Coding
CBA	Goal of CBA	What is the goal of CBA? What should the value of CBA be within an appraisal process?	1
	Impact on the appraisal process	Can CBA make or break a project? How much value is given towards the outcome of (parts of) the CBA by decision-makers? Why is there a difference between the value attributed to different parts of the CBA?	1
	Content of the CBA	Looking at the current content of CBA, are there parts which are over or underrepresented? Is the current content fitting the needs for decision-makers? Is the current content fitting the needs of society? What should or should not be added? Would it be worthwhile to add this content?	1
	Social and process equity within CBA	What value is given towards the social analyses within the CBA? What is the current belief of social equity factors in the CBA? Is it important, why, or why not?	1
MIRT	Goal of the MIRT	What is the goal of the MIRT? What should the value of the MIRT be?	2
	Impact of different appraisal tools	Which different tools for appraisal are used in the MIRT? What is the goal of these different tools? Are some tools more important or impactful than others? Why or why not?	2
	CBA	What is the role of CBA within the MIRT?	2
	m.e.r.	What is the role of the m.e.r. within the MIRT?	2
	Local agenda	The local agenda is a prequel to the MIRT. What is the goal and the value of the local agenda to the MIRT? What is the impact of the local agenda on the rest of the MIRT trajectory?	2
	Stakeholders	Who are the different stakeholders at play? How much power do these stakeholders have? How is this power distributed in the trajectory and the outcome?	2

Core concept	Subconcept	Example questions	Coding
m.e.r.	Goal of the m.e.r.	What is the goal of the MER? What should the value of the m.e.r. be?	3
	Content of the m.e.r.	Looking at the current content of the MER, are there parts which are over or underrepresented? Is the current content fitting the needs of decision-makers? Is the current content fitting the needs of society? What should or should not be added? Would it be worthwhile to add this content?	3
	Impact within the whole appraisal process, official and unofficial	Can the m.e.r. make or break a project? How much value is given towards the outcome of (parts of) the m.e.r. by decision-makers? Why is there a difference between the value attributed to different parts of the MER?	3
	Stakeholders	Who create the MER? Can the m.e.r. be influenced by other stakeholders? Have there been any trials for influencing the outcome of the report? What was the result of this?	3
Political play	Usage of appraisal tools	How are the different tools used within the political play? What has the effect been of these tools within this political play?	4
	Defining stakeholders, who was the power?	Who have the power within the game? How can these be influenced or affected?	4
	Impartiality: Is there any influencing on the outcome of appraisal tools?	Are there attempts to influence the outcome of appraisal tools? Do they succeed, what is the main goal of this influencing?	4
	Social and process equity within political play	How do social and process equity take part in the political plays? Which parts of social equity are seen as important, if any? How does this work out?	4

Table 3.2: This table shows the core concepts and example questions which are used within the semi-structured interviews. The questions at hand are not all asked but are example questions which can be asked, dependent on the interviewee its expertise. The coding refers to the transcripts of the interview, which have paragraphs coded with this number to easily track which core concept is discussed in what part of the interview.

Core concept	Subconcept	Example questions	Coding
CBA	Goal of CBA	What is the goal of CBA? What should the value of CBA be within an appraisal process?	1
	Impact on the appraisal process	Can CBA make or break a project? How much value is given towards the outcome of (parts of) the CBA by decision-makers? Why is there a difference between the value attributed to different parts of the CBA?	1
	Content of the CBA	Looking at the current content of CBA, are there parts which are over or underrepresented? Is the current content fitting the needs for decision-makers? Is the current content fitting the needs of society? What should or should not be added? Would it be worthwhile to add this content?	1
	Social and process equity within CBA	What value is given towards the social analyses within the CBA? What is the current belief of social equity factors in the CBA? Is it important, why, or why not?	1
Five case model	Goal of the five case model	What is the goal of the five-case model? What should the value of the five-case model be?	2
	Impact of different appraisal tools	Which different tools for appraisal are used in the five-case model? What is the goal of these different tools? Are some tools more important or impactful than others? Why or why not? Are monetized and non-monetized of different value for decision-makers?	2
	CBA	What is the role of CBA within the five case model?	2
	EIA	What is the role of the EIA within the five case model?	2
	DI	What is the role of DI within the five-case model?	2
		How are they being appraised and included in the decision-making?	2

Core concept	Subconcept	Example questions	Coding
webTAG	Goal of the TAG units	What is the goal of the TAG units? What should the value of the TAG units be?	3
	Content of the TAG units	Looking at the current content of the TAG units, are there parts which are over or underrepresented? Is the current content fitting the needs of decision-makers? Is the current content fitting the needs of society? What should or should not be added? Would it be worthwhile to add this content? What is the difference in monetized versus non-monetized values?	3
	Impact within the whole appraisal process, official and unofficial	Can the outcome of TAG units make or break a project? How much value is given towards the outcome of (parts of) the TAG units by decision-makers? Why is there a difference between the value attributed to different parts of the TAG?	3
	Stakeholders	Who executes the TAG units?	3
Political play	Usage of appraisal tools	How are the different tools used within the political play? What has the effect been of these tools within this political play?	4
	Defining stakeholders, who was the power?	Who have the power within the game? How can these be influenced or affected?	4
	Impartiality: Is there any influencing on the outcome of appraisal tools?	Are there attempts to influence the outcome of appraisal tools? Do they succeed, what is the main goal of this influencing?	4
	Social and process equity within political play	How do social and process equity take part in the political plays? Which parts of social equity are seen as important, if any? How does this work out?	4

## Chapter 4

# Positioning of CBA

This chapter will provide an analysis of the guidelines on the usage of CBA for the Netherlands as well as the United Kingdom. An introduction will be given on how a standard policy cycle for infrastructure projects looks like per country, followed by what the impact is of CBA and other appraisal tools in terms of social and process equity, solely based on the guidelines. Furthermore, the most important legislation per country is included to provide a wider context of the system. This legislative information will help to understand why current systems are as they are and where some strengths and weaknesses come from.

### 4.1 The appraisal process in the Netherlands

This section will delineate the formal process of the appraisal of infrastructure projects, from the creation of the idea up until the opening of the new infrastructural unit. It is necessary to understand how the formal process of appraisal is used to be able to delineate the value of CBA within the whole appraisal process, as well as all used tools combined. This section will show the current level of process and social equity within the process guidelines for the Netherlands.

#### 4.1.1 Timeline of infrastructure projects

Since the '90s, the MIT (Multi-year Infrastructure and Transport) program has been the standard planning method for major infrastructural processes. In 2010, the MIT evolved into the MIRT (Meerjarenprogramma Infrastructuur, Ruimte en Transport, Multi-year program Infrastructure, Spatial and Transport) to include spatial projects which do not only consist of infrastructure or transportation parts.

An elaboration on the whole MIRT process can be found in Appendix A. A visual overview is given in Figure 4.1, together with a short textual summary.

At the very start of the appraisal process, local governments and the national government come together to discuss the current problems in terms of infrastructure. This is combined into the regional agenda (gebiedsagenda in Dutch). Within a BO MIRT (Bestuurlijk Overleg in Dutch, meaning consultation between local and national government bodies), all current problems and therefore possible projects are discussed. The ministry states which projects will continue the MIRT process and which are put on hold or are declined to the MIRT. There are no guidelines on which criteria the ministry will test the different projects. As stated in the MIRT play book: “The national government and the region will draw up the Regional Agenda together, in cooperation with citizens, social partners, knowledge institutions and the business community” (Ministerie van Infrastructuur en Milieu, 2016:page 20). Key terms which are mentioned are things as feasibility, supportability and if projects are in-line with other policies. It is possible to conduct the MIRT research phase if certain parts of a problem need some more research before entering the whole MIRT trajectory. The MIRT research is formless and can therefore contain many things, from stakeholder analyses to CBAs. The regional agenda ends with a start decision, which contains a problem description and the main scope of the project. Hereafter, the exploration phase of

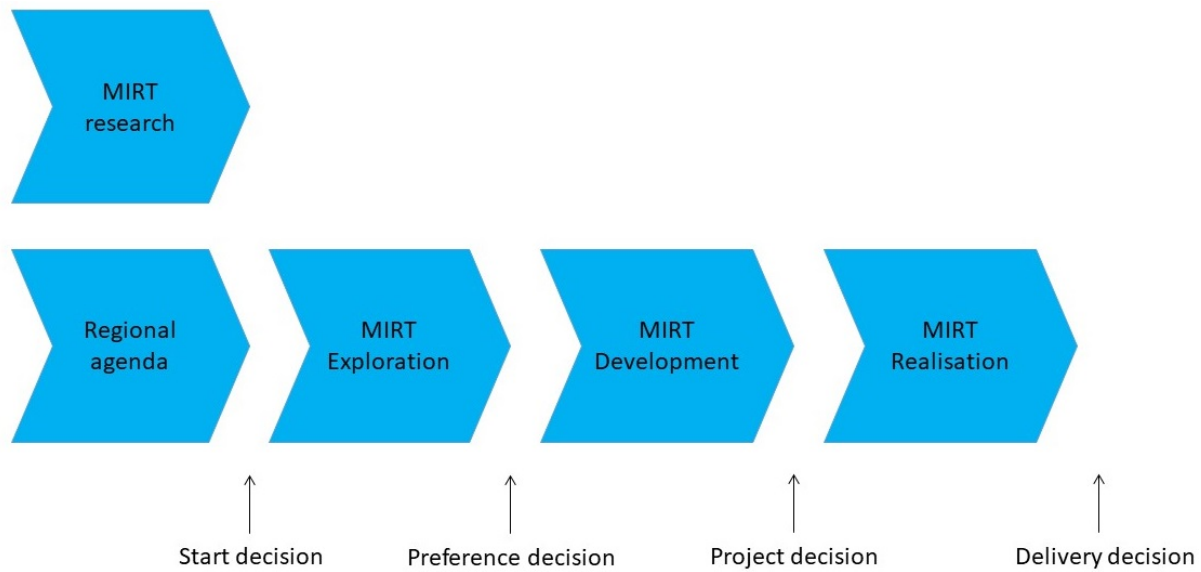


Figure 4.1: The main steps of the MIRT process consist of five necessary steps and one optional, namely the MIRT research. After every step, a decision is made by a decision-maker before the next step can start. Every step and decision has its own guidelines on what should be included, as well as necessities such as acceptance by parliament.

the MIRT starts with the goal of mapping different solutions. Its goal is to give different alternatives as well as the pros and cons per alternative, summarized in a CBA. The minister will then, after a debate with parliament, choose a preferred alternative in the preference decision. After the exploration phase, the plan development phase will continue the process and make the chosen alternative more concrete, creating a plan for how to realize the project. After the plan is created, the specific project decision will be taken and the realization phase starts, meaning the execution of the project will start.

#### 4.1.2 The current position of CBA in the Netherlands

The goal of the CBA within the MIRT is to substantiate the usefulness and necessity of the costs and benefits of the MIRT exploration. This is done by analysing the cases in compliance with the Overzicht Effecten Infrastructuur (OEI, Summary Effects Infrastructure in English), guide (Eigenraam et al., 2000), and the CBA frame when using in MIRT cases (Milieu, 2012). The creation and usage of a CBA are mandatory in the exploration phase of the MIRT process. decision-makers are obliged to use the CBA in their motivation to get to the decision of preference. It is common to have multiple CBAs throughout the process, the formal one in the MIRT exploration phase and one later in the plan development phase for optimization purposes. However, only one CBA, in the exploration phase, is mandatory to be executed. This is illustrated in Figure 4.2.

In the exploration phase, CBA is used to assess the feasibility of several possible projects in order to inform the decision-makers on taking a decision of preference. These projects can vary from no action necessary to adding new infrastructure, altering existing infrastructure, or a combination of both. A non-infrastructure option is mandatory to be included. Furthermore, decision-makers are obligated to include the results of the CBA and all evaluated alternatives in their rationale for the preference decision (Ministerie van Infrastructuur en Milieu, 2016). The rules dictated around the MIRT state that “The results of a CBA are an important element in the decision-making process next to the m.e.r. (Milieu Effect Report, environmental impact analysis), results from participation etc.” (Ministerie van Infrastructuur en Milieu, 2016:page 24).

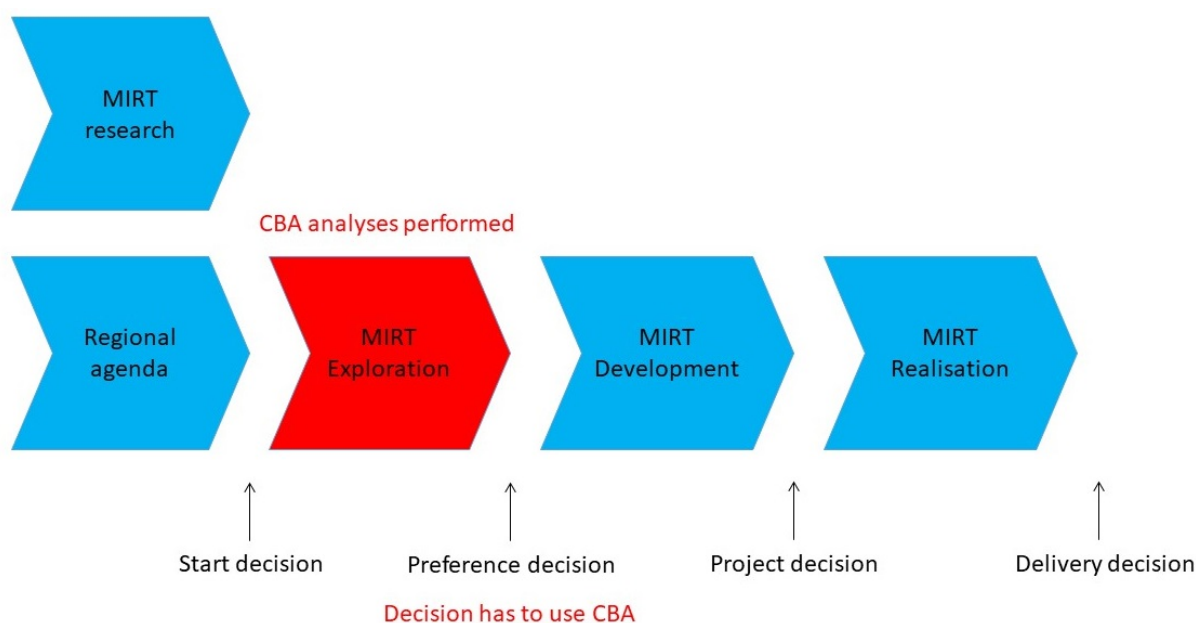


Figure 4.2: The red steps indicate where CBA is necessary to incorporate in the appraisal process. Only within the MIRT exploration and the preference decision is it necessary to perform and include the CBA in the rationale.

### 4.1.3 Other appraisal tools

Several tools are used to generate the input for the CBA. The most important inputs are the m.e.r. and traffic studies. These tools have specific goals and are designed to be compatible with the CBA. The goal of the m.e.r. is to create an overview of the environmental and health impact of the area of interest. The traffic studies have the goal to analyse the changes in the traffic flows and road capacity because of the new project. This includes the changes in PT.

The m.e.r. has an independent third-party committee which assesses if the m.e.r. has been conducted properly. This is the only step within the whole appraisal process that has an independent third party to assess whether or not the analyses are done correctly and are useful for decision-makers. While the most output of the m.e.r. will be an input of the CBA, but not all will be. Therefore, the m.e.r. has an interesting position next to the CBA. Several interviews have shown that the m.e.r. does have an important position in the decision-making process (Van der Aa, 2022; Bremer, 2022). The m.e.r. is often seen as a legal risk when not properly conducted, therefore having a spotlight on its creation.

### 4.1.4 Social and process equity in the MIRT process

This subsection will delineate how the MIRT process incorporates social impact and process analysis, and where it lacks several steps in comparison to literature.

How CBAs are performed, is dependent on what kind of infrastructure is being created. Formats for the CBA differ per category in the road, rail, water, major regional PT projects and infrastructure & water as part of area development (Milieu, 2012). Because the chosen cases are road and rail, only road and rail will be analysed in this thesis. Furthermore, the majority of MIRT projects are either road or rail projects. An elaborate explanation of the OEI-guidelines for road and rail can be found in appendix A.2. A summary of the results in terms of social and process equity within the Levinson framework can be found in the sections below. For both road and rail, there is a difference made between with and without the extra module. This extra module is a module which can be initiated by the decision-maker to investigate further effects such as quality of water, quality of the ground and wider economic impacts.



#### 4.1.4.1 Social impact analysis

Within the MIRT and the CBA, several social impact elements are incorporated. This paragraph will highlight the parts which are incorporated and to what extent. First, the specifications for road and rail will be discussed. Finally, a general conclusion on the guidelines will be given.

In Figure 3.2, the legend can be found for all Levinson framework tables following in this thesis. In chapter 3.4.4, a detailed explanation on how the different levels within the legend have been created.

#### Road

In Figure 4.5, the Levinson framework is applied to the road guidelines within the MIRT and the OEI.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 4.3: MIRT guidelines road with extra modules within Levinson framework. These are the guidelines which are used the most for appraising roads in the Netherlands.

It is instantly clear that many of the stratifications are not analysed and therefore not taken into account. There is a clear focus on the impact it has on the population as well as the spatial implications. Temporal still has some scores due to the so-called ‘zichtjaren’, the amount of time the impact has been modelled for. Only for the economy and health of the population, enough information is gathered to make an equitable decision. The other dimensions do provide some information but often deliver the bare minimum.

Several interesting features can be found. The road guideline differentiates itself from the other modalities by having specific road tax benefits. These benefits are only applicable for roads and are counted as costs for the other modalities. Every new road user adds tax benefits through road taxes and petrol taxes, while every other modality user does not pay these taxes. The rail guidelines have a form of gained benefits through users, which can somewhat be seen as the equivalent of the road taxes. However, the rail equivalent is not seen as a cost for the road. Therefore, it results in a bias in favour of road projects. It is not incorrect to compensate for road taxes as the taxes are not present at the rail and are thus missed benefits for the government, but when only compensating for missed road taxes and not for rail revenue, it is skewed and does steer the outcome towards road projects. This means that, if traffic gains and environmental impact are exactly the same for a rail and road case, road will take the upper hand in terms of the CBA due to these taxes. Another example is that this enables that if rail has a better environmental impact and the same travel time gains and direct costs for deployment, it can still result in a lower CBA due to the road taxes.

Figure 4.4 shows the road guidelines when the extra module is applied. There are some minor differences visible in economic and environmental for the population and spatial. This is because of the extra module, as discussed in Chapter 4.1.4. For economic, distributional effects for other regions as well as international are added by providing a percentage of economic growth due to the project. This addition bumps the level up from sufficient to good.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 4.4: The MIRT guidelines for the road with the extra modules used. The main difference with the module is the extra analyses of economic and environmental impact for population and spatial.

## Rail

Figure 4.5 shows the Levinson framework applied to the rail guidelines within the MIRT and the OEL. Rail has lots of overlap with the road. Therefore, only the differences will be discussed.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 4.5: The MIRT guidelines for rail without the extra modules used. This is the most used way that CBA is rail appraisal processes.

Rail has more unique calculations that need to be made and is only applicable to rail projects. First of all, the full travel time is incorporated, instead of merely the gains from the specifically added infrastructure part. This means that if a new rail line is built, the average travel time from the city to the station is incorporated as well. Furthermore, rail projects must also incorporate the negative effects it has on other forms of PT. If the rail project results in a shift from bus to train users instead of car to train users, this is seen as a positive effect for the rail project and a negative effect for the bus company, therefore resulting in a smaller net economic gain. Furthermore, a Return on Investment is included in the rail appraisal. Therefore, the economic value of temporal as well as a slight increase for generational information is given in comparison to the road.

Figure 4.6 shows the rail when the extra modules are included. The extra module is almost the same as the roads. Therefore, no significant differences can be found.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 4.6: The MIRT guidelines for rail with extra modules. The main difference because of the modules is in extra research for ground and water, as well as some wider economic impacts.

It can be stated that the guidelines steer the direction of the outcome of the CBA and has a lack of social equity values which should have been taken into account. Even though the guideline OEI itself states that “CBA provides an insight into distributional effects, alternatives, and uncertainties” (Eigenraam et al., 2000:page ii), when applying the framework of D. Levinson (2002), it becomes clear that the current guidelines do not incorporate a wide variety of equity values. Currently, it can be stated that the focus is laid on the economic value of a project. How much travel time can be won and how reliable the journey is are major if not even the only significant benefit factors in a CBA. For projects which involve busy routes, this will easily overshadow negative environmental or health impacts. Looking at stratifications, the focus lies on the population as well as the spatial distribution. It is interesting to see that categories such as income differences, temporal benefits and costs, and ability of transportation are not taken into account at all. There is a mismatch in the depth of the distributional effects, which is deemed necessary by the leidraad OEI (Eigenraam et al., 2000) and the current literature on CBA. Furthermore, it is interesting to see that rail projects have a disadvantage over road projects due to the fact that the economic gains are made smaller because of lower tax incomes. The checks and balances build in the guidelines for rail are in general smaller than those of road, therefore resulting in a skewed guideline. When applied to the Levinson framework, this is a clear hit for equity with regard to the modality criteria.

In its current theoretical form, the CBA should not lead to social equitable outcomes because many criteria are not taken into account. Even though the CBA is merely a supportive tool, it is a tool which is central in the decision-making process, as stated in the guidelines (Milieu, 2012). It has the input of all different tools that contribute to social equity (such as the MER) and adds some points itself. Therefore, when this tool is failing its task on measuring impact, it will not be repaired at a later moment.

#### 4.1.4.2 Process equity

Within the MIRT, participation is one of the pillars which decision-makers should take into account during all different phases. The national government has created a guideline to help steer public participation in the right direction (Rijksoverheid, 2014). It is a general guideline with tips and tricks that are important to keep in mind when using participation. Interesting to mention is the discrepancy between the guidelines. Where the OEI first states that “all initiatives should be considered with care” and “participation will take place before every decision-taking moment”, the MIRT states that “per project, the participation plan describes how, when and to what extent participation will be influencing the project

as a whole”. This indicates that the participation plan can be created to fill the plan with desires of the decision-maker rather than the needs for a process equitable plan. It is obligated to argue why participation is or is not present. Therefore, conducting participation is not mandatory if argued for. Furthermore, the level of influence given to different participators is open to interpretation, if any is present at all. This also gives the decision-makers the opportunity to choose whether or not input of participation is taken into account in the analysis part of the process.

The definition of participation is also broad, as stated during an interview (Zondervan, 2022). Including the opinion of municipalities is sometimes already seen as participation, since the municipality represents the residents. Therefore, there is no clear vision on what participation should entail or look like. The guideline provided (Rijksoverheid, 2014) is generic, and all other tools leave the implementation of participation to the decision-maker. Furthermore, there are no checks and balances present to discuss whether or not participation could be worthwhile or even necessary for better results. It is now only used when it is favourable for the decision-maker. And even then, it is only performed as wide as budget and time allow, instead of what is necessary.

#### **4.1.5 Mentionable legislation of appraisal process**

Legislation is not a major part of this thesis, but will help to add context to the cases and why the appraisal system is in its current shape. Therefore, not all laws which are applicable will be analysed or mentioned, only several are often mentioned in policy documents or interviews. All findings and their descriptions of legislation in the Netherlands can be found in Table 4.1.

Table 4.1: Mentionable legislation is present with its year of introduction, the name of the law and a short description of how it has affected the appraisal process. The legislation provides the general context for the appraisal process.

Year	Name of law	Description of the law & most important impact
1985	European guideline for appraisal of environmental impact of projects	This is the first and most important guideline for EIA in Europe. The m.e.r. is based on this document (European Parliament, 2014).
1987	Implementation of m.e.r. for decisions	The Dutch law and interpretation on how EIA should be included in the decision-making of projects (Rijkswaterstaat, 2020b).
1993	Structuurschema Groene Ruimte – Structural plan Green Environment	The impact infrastructure has on nature has to be compensated to a certain minimal level (Rijksoverheid, 2004).
1993	Tracewet – trace law	The Tracelaw introduces the necessity for starting decisions and explorations for major infrastructure projects. This law still forms the core of appraisal processes and is a core part of the MIT and MIRT (Rijksoverheid, 2021a).
1994	Change in m.e.r. law	Addition of several appendices with activities, decisions and specific cases where a m.e.r. is mandatory to be conducted (Rijkswaterstaat, 2020b).
1998–2008	Usage of the MIT	The MIT is introduced as the main policy trajectory for infrastructure processes (Lever, 2006).
2001	Europe guidelines for EIA on plans	European guideline for how EIA should be conducted in plans, next to projects (European Parliament, 2014).
2006	Implementation m.e.r. for plans <sup>1</sup>	Dutch interpretation of how EIA should be included in plans. The extra appendices made for projects in 2006 is also added to the plan law (Rijkswaterstaat, 2020b).
2006	Wet Ruimtelijke Ordening – Law spatial planning	Decision-making is decentralized to its maximum extent. “Central what is necessary, decentral what is possible” (Rijksoverheid, 2021b).
2007	Introduction MIRT, MIT becomes MIRT	The MIT is changed for the MIRT, adding a spatial component in the process (Ministerie van Infrastructuur en Milieu, 2016).
2008–now	Usage of the MIRT	The MIRT has a play book to provide guidance on how to execute appraisal projects (Rijkswaterstaat, 2016).
2010	Change in Wet Milieubeheer and the MER	Change lead to more customization for EIA in cases and less overarching guidelines. The differentiation between plans and projects has been deleted (Overheid, 2017; Rijkswaterstaat, 2020b).
2014	Code maatschappelijke participatie	This document provides pillars for public participation in major projects. It is provided as a guidance for project managers on how to execute proper public participation (Rijksoverheid, 2014).
2014	Change in European guidelines for the MER	European guidelines are changed to have more focus on the different alternatives within projects and how they affect the environment. Also, the outcome of the EIA is required to be checked on quality. Demolition works as well as use of resources during construction and operation must be taken into account in the EIA (European Parliament, 2014).
2016	Change of Dutch m.e.r. due to European law	Dutch implementation is meant to make the m.e.r. procedure more clear and to improve the quality. There are some changes in the obligatory nature of m.e.r. reports for projects and plans (Rijkswaterstaat, 2016).
2016	Update of the MIRT guidelines	There is more focus on the exploration phase instead of the research phase. Furthermore, the 75% reserved funding can be given before a decision has been made. Also, more emphasis on sustainability is introduced. It is now possible to set sustainability goals within the MIRT tasks (Rijkswaterstaat, 2016).
2020	The National environment vision, NOVI	The national environment vision, provides overarching policy goals for projects to adhere to the bigger picture nationwide (Ministerie van Binnenlandse zaken en Koninkrijksrelaties, 2020).
2023	Omgevingswet – Environment act	Starting January 2023, a new law, the Omgevingswet, will be incorporated. This will change several focus points of the m.e.r. and appraisal projects in general. Through interviews, it is said that it will have more focus on health and broader environmental impact. However, there are concerns on a potential decrease of transparency (Rijksoverheid, 2022a).

### 4.1.6 Conclusion the Netherlands

The CBA has a central role within the MIRT when looking through a decision-making scope. The CBA is mandatory to be concluded as a rationale for the decision of preference. The end of the MIRT exploration is the last point in the process where major changes to the project can be made. After the decision of preference and its acceptance by parliament, only minor tweaks can be done to fulfil the needs of specific actors for embedding purposes and support of local governments and residents. The CBA has to be used to create and support the preference decision, therefore giving the CBA a central role.

When looking at social equity criteria, social equity needs to be incorporated and analysed before the preference decision, otherwise, it will not be possible to include major equity aspects further into the process, resulting in a higher chance of a social inequitable outcome and unfair distribution of costs and benefits. The current guidelines on the criteria of choosing the preference decision state that the CBA is the only mandatory tool to perform, therefore making the CBA indirectly an important factor to include social equity factors in. However, the CBA is not good at assessing social equity factors, as seen in the analyses above. Other tools such as the m.e.r. and participation are not always mandatory and can therefore not fundamentally fill this gap. However, the m.e.r. does have a lot of the social factors currently in place and does have influence as being a legal risk when not performed properly.

When looking at process equity, almost all moving parts are incorporated in the overarching MIRT process. CBA and other appraisal tools have little to no influence with regard to process equity. There are systems in the MIRT which should incorporate process equity to a certain degree. For starters, the problems are created in the regional agenda, meaning that it originates from local municipalities who will have a saying in the outcome later on. Within the MIRT guidelines, it states that participation is an important source of information. However, since there is no obligation to perform participation, it is up to the decision-maker if this is included. Therefore, the MIRT is really dependent on political games to acquire process equity. This is a problem seen more often by appraisal projects, as discussed by Mackie, Worsley, and Eliasson (2014).

Looking at the guidelines per the mode of transport, the differences that arise can be seen as exemplary for the problems as described in process and social equity. The mere fact that rail projects need to be compensated for road taxes and this should be gained back through ROI rates for companies as well as the gains in environmental gains, exemplifies the focus that is laid on the economic gains on projects instead of other social equity factors.

In general, it can be stated that, when looking at the whole appraisal process timeline in the Netherlands, the position of the CBA is centralized and its goal is to summarize the differently used tools into a single useful analysis to gain insights into the project at hand. Because of the position of the mandatory CBA, being in the exploration phase and being used for the rationale of the go or no-go decision, it has the theoretical power to inform and guide decision-makers towards a certain pathway. When looking at the whole appraisal process, it can be stated that the preference decision is the only/last place to include social equity before major decisions for a project are made. If it is not included in the CBA which is used in this decision, no other tools will look into social equity factors after this point. The fact that the outcome of the CBA is open to interpretation of decision-makers and does not have any real guidance on how to interpret such complex analyses (Annema, Frenken, et al., 2017), makes that appraisal projects in the Netherlands are bound to have social inequitable outcomes due to the fact that it is simply not taken into account. The current guidelines have the potential to result in passionate politically driven decision-making, which can downplay the power of the information given by CBA within the appraisal process, something which is seen more often in the appraisal process (Mackie, Worsley, and Eliasson, 2014).

## 4.2 The appraisal process in the United Kingdom

This section will delineate the formal process of the appraisal of infrastructure projects, from the creation of the idea up until the opening of the new infrastructural unit. It is necessary to understand how the formal process of appraisal is used to be able to delineate the value of CBA within the whole appraisal process, as well as all other tools combined. This section will show the current level of process and social equity within the process guidelines for the United Kingdom.

### 4.2.1 Timeline of infrastructure projects

The United Kingdom does not have such a clear policy trajectory for their transportation infrastructure as the Netherlands has. Therefore, this will be a recreation, made through documents and interviews gathered. It can occur that there are small steps missing in the process since there is no formal easy-to-find total trajectory available (Interview-UK, 2022). Figure 4.7 shows the policy trajectory as depicted by the Department for Transport (Transport, 2014).

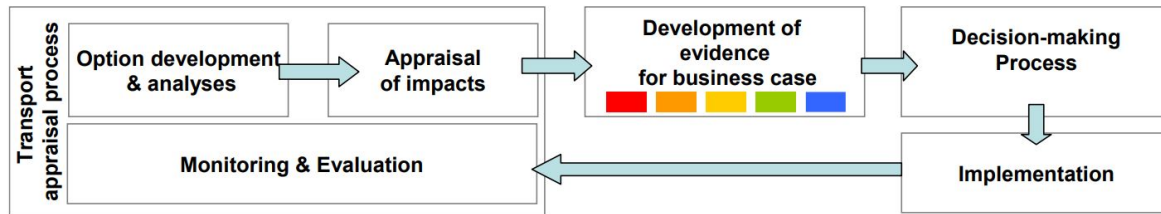


Figure 4.7: An overview of the policy trajectory of infrastructure projects. CBA is present in the business case section and sometimes during the appraisal of the impact phase.

First and foremost, to start a trajectory, the Road, or Rail authority identifies a problem on the network at hand. This will trigger an investigation of potential solution directions, done by the Department for Transport (DfT) and in cooperation with local governments. When deemed as a potential issue that needs to be solved, further analyses will be done to investigate the impact solutions may have. It is rather unclear at which point in the process a decision is made that leads towards the filtering of the different alternatives and the choice of an alternative that will be further analysed. However, it is clear that it happens before the appraisal of impacts and the development of the Transport Business Case (TBC) model. The option development and basis option analyses result in a single case which is further appraised and analysed. This decision is made by local governments in combination with the DfT. The TBC consists of five different cases to help structure and formalize the process in the United Kingdom (Worsley and Mackie, 2015). The five cases are:

- **A strategic case**, which provides a rationale for the proposed intervention
- **An economic case**, following the economic appraisal model as described by webTAG (Transport, 2019). This includes a CBA.
- **A financial case** to see whether or not the project is affordable and how it will be funded.
- **A management case** to see which governance risks are present.
- **A commercial case** to start procurement and other similar risks.

Somewhere before or simultaneous to the creation of the different cases, consultation is done with local residents who are affected by the new scheme (the United Kingdom uses scheme as the term for infrastructure projects). When consultation, as well as the TBC model, is complete, all gathered results are combined into the Final Business Case (FBC). The FBC is presented to the local government as well as to various national institutes such as Her Majesties Treasury (HM Treasury, or The Treasury) and, when approved, the construction of the scheme will start. After construction, an evaluation will happen

at two points in time, one year after opening and five years after opening. The mechanism used is the POPE (Post Opening Project Evaluation). POPE does not fully recreate the FBC but checks if the main goals of the scheme have been achieved, together with several basic elements such as cost estimation and travel time gains.

### 4.2.2 The current position of CBA in the UK

The United Kingdom uses the TAG (Transport Appraisal Guidance) system from the DfT for their appraisal analyses. CBA is one of the TAG units, namely TAG A1 (Transport, 2021). TAG unit A1 is mostly used twice in the whole appraisal process. The first time as a quick scan in the option development and analyse phase. It is meant to give a quick indication if a project could become feasible. Therefore, it is not a full CBA. There is a focus on the travel time gains and the construction costs to see if, when quickly estimated, the project could lead towards having value for money. The second time, a CBA is used within the TBC. Within the TBC, CBA is necessary to include in the economic case and is also used in financial and commercial cases as support for statements and decisions. Executing the CBA is mandatory due to its position within the economic case as well as for being input in the financial and commercial cases. There is no need for specific rationales based on the created CBA, but it is likely that the CBA shall be explicitly mentioned in arguments.

### 4.2.3 Other appraisal tools

The United Kingdom acknowledges some deficits of CBA and therefore has a wide array of other appraisal tools ready to fill the information gaps created by CBA. All of these are also described in the TAG and split into four different units which are applicable for almost all cases. TAG Unit A1 focuses on the CBA, unit A2 on other economic impacts such as employment changes, unit A3 on environmental impacts and unit A4 on social and distributional impacts. These tools together are all the information that will be gathered in terms of appraisal analyses.

### 4.2.4 Social and process equity in the United Kingdom

In this subsection, two forms of the Levinson framework will be discussed. One with only the CBA webTAG unit incorporated, and one with all webTAG units incorporated. This division is made because, even though all different webTAG analyses must be performed, the CBA has an important role in the process.

#### 4.2.4.1 Social impact analysis

In general, it can be stated that the United Kingdom has an elaborate social impact analysis for infrastructure projects. The distributional information which is missing in the CBA when looking at the Levinson framework (Figure 4.8) is compensated by the other TAG units (Figure 4.9).

When only incorporating the CBA, many stratifications such as are not taken into account. Only population, spatial and temporal, have some form of analysis incorporated. The framework shows a clear focus on population-wide impacts, as well as a relatively high focus on temporal impact. The temporal impact can be explained by the European guideline necessity to include the hinder caused by construction. The CBA focuses on economic impact and some environmental impacts. The goal of the CBA results in this focus on general economic gains en costs, therefore using only monetizable values. Other values, which are deemed as impossible or hard to monetize, are covered by the other TAG units and summarized in the Appraisal Summary Table (AST). This table can be found in Appendix ?? in the Final Business Case (FBC).

When incorporating the whole TAG system, almost all stratifications are taken into account to some extent. Most of the information added is non-monetizable. The most information is added on the mobility possibilities per stratification. This entails the analyses of how the new project would impact the mobility possibilities for youngsters and the elderly, for men and women in terms of safety, for people



Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 4.8: The stratifications which are taken into account by the United Kingdom in its execution of the CBA, TAG Unit A1.1.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 4.9: The stratifications which are taken into account when applying All TAG units.

with disabilities and for low and high-income groups. Furthermore, special attention is given to the health impact of the scheme for the different stratifications.

Where there are some major differences between road and rail in the Netherlands, this is not the case in the UK. The TAG system incorporates modality changes and forces the appraisers to compensate, no matter what the core form of transport will be on the project. If only one modality will be affected by the project, a specific TAG unit (unit A5) is used per modality. However, these units are not often used because some form of modality shift is likely to occur in all projects.

There are also guidelines for decision-makers on how to incorporate and assess the information provided by the TAG units. This helps politicians and decision-makers to interpret the policy documents and better understand the impact of the different results, even if they are not monetized.

When looking at the five-case model, of Section 4.2.1, from a social- and process equity perspective, it is interesting to see that three of the five cases, the financial, economic and commercial cases, are directly related to the financial viability and impact of the scheme, setting a tone on the amount of focus

and emphasis of the economic viability of schemes. Furthermore, the CBA and more specifically the Benefit-Cost Ratio (BCR), is one of the few numbers within all appraisal tools that specifically influence the continuation of a project. To receive funding for a project, The Treasury must approve the economic case. The Treasury analyses whether or not a project has value for money, meaning that the BCR must be positive. If the Treasury accepts the project, the project will receive its funding. HM Treasury uses two categories for standard approval, a BCR over one being a low value for money and a BCR over two as a high value for money. The Treasury states that the target is to have a high value for money in order to get funding (Her Majesties Treasury, 2015). Negative BCRs are not automatically denied, but must have a strong strategic case to compensate for the negative value for money. This system can create focus on economic gains, since this is the only specific case within the TBC model which needs specific approval on a single number. Other things such as environmental impact or distributional effects are only limited by legislation but are open for interpretation of how much impact it should be for the rest.

#### 4.2.4.2 Process equity

The United Kingdom also has guidelines on how to execute a consultation process (Transport, 2018; HM Government, 2008a). The code of practice delineates seven criteria which are recommended for consultation reports. The use of this code is not mandatory and only a strong recommendation to use. The code is focused on transparency and maximum effectiveness of the consultation process, providing guidelines on how consultation exercises should be designed as well as how to minimize the burden for consultees and how to handle the responses given. An important mention in the consultation process is the strong advice to have a consultation manager who oversees and handles all the different steps in the consultation process and is responsible for the processing of the consultation report.

The consultation takes place in the first stage of appraisal, during the option development and analyse phase, as seen in Figure 4.7. In this stage, participation is encouraged to discuss with the local residents what type of options would work for them and what kind of problems they would see arise. Through a Statement of Community Consultation, it is delineated how and when the community will be able to participate in the scheme, as well as what the impact of the consultation will be.

Efforts are made to include all different kinds of actors, and it is tried to make clear what kind of role the actors play within the process, as well as what will be done with the input they give. A clear example of this is the elaborate consultation reports which are created for infrastructure schemes. Even though it is not mandatory for the consultations to take place, the guidelines show that it is strongly advised and evaluations show that this advice is followed. However, looking at the dimensions given by Levinson, there are still several problems that arise. Firstly, the amount of influence consultation has is variable per scheme. Even though there are guidelines and advice, it differs per project and therefore per decision-maker what the output will be of consultation. This is tempered by the expectation management that takes place at all consultations, therefore not being a big deal. Secondly, consultation is only done before appraisal analyses happen. This does not give the residents the possibility to weigh trade-offs.

#### 4.2.5 Mentionable legislation of appraisal process

Legislation is not a major part of this thesis, but will help to add context to the cases and why the appraisal system is in its current shape. Therefore, not all laws which are applicable will be analysed or mentioned, only several are mentioned often in policy documents or interviews. All findings and their descriptions of legislation in the United Kingdom can be found in Table 4.2.

Table 4.2: An overview of the most important legislative changes throughout the years.

Year	Name of law	Description of the law & most important impact	
1985	European guideline for appraisal of environmental impact of projects	This is the first and most important guideline for EIA in Europe (European Parliament, 2014).	4.2. The appraisal process in the United Kingdom
1995	Environment Act	The environment act was the basis of the creation of the Environment Agency and SEPA and was meant to control pollution as well as the conservation of the environment (HM Government, 1995).	
2000	Transportation Act	This act changed the privatized railway system and centralized it somewhat. The director of passenger rail, as well as the British railway board, were abolished and transferred to a public function in the Strategic Rail authority. Furthermore, Road user charges and workplace parking levies were introduced, enabling various road pricing schemes to control the traffic flow (HM Government, 2000).	
2000	Code for Consultation	This code, made by HM Treasury, sets out seven criteria which should be taken into account when conducting consultation. It is a guideline for project owners what proper consultation should look like (HM Government, 2008a).	
2001	Europe guidelines for EIA on plans	European guideline for how EIA should be conducted in plans, next to projects (European Parliament, 2014).	
2008	Local transport act	This act shifted the power of the PT system towards local governments, enabling them to improve local transport planning and quality. It was intended to create a more consistent local approach, 'putting the passenger first' (HM Government, 2008b).	
2008	Planning act	The planning act was meant to reduce the amount of time taken for approving major new infrastructure projects. It introduced the Infrastructure Planning Commission (IPC), a body which would make decisions on new national policy statements (HM Government, 2008c).	
2010	Equality Act	The equality act protects people from discrimination at work and in society as a whole. This act has led to the creation of TAG A1.2 to A1.4 (Equality and Commission, 2010).	
2011	Localism Act	The localism act abolishes the IPC and restores the responsibilities towards the ministers, just as it was before the planning act of 2011. Furthermore, it ensures that national policy statements can be voted on by parliament (Queen's Printer of Acts of Parliament, 2011).	Chapter 4.
2013	Growth and infrastructure act	This act abolishes several planning and consenting processes, aimed to speed up the infrastructure projects by reducing unnecessary bureaucracy (Queen's Printer of Acts of Parliament, 2013b).	
2013	Active travel act Wales / North Ireland	This act forces Wales and Northern Ireland to focus on forms of active travel, walking and cycling, in the infrastructure system. They are now obligated to enable more facilities for active travel (Queen's Printer of Acts of Parliament, 2013a).	Positioning of CBA Previous
2014	Change in European guidelines for the EIA	European guidelines are changed to have more focus on the different alternatives within projects and how they affect the environment. Also, the outcome of the EIA is required to be checked on quality. Demolition works as well as use of resources during construction and operation must be taken into account in the EIA (European Parliament, 2014).	
2021	Environment act	This is an addition to the earlier environment act of 1995. It allows the United Kingdom to set binding targets for various environmental impacts such as air quality, water, biodiversity and waste reduction. It is meant to substitute some European laws after Brexit (Queen's Printer of Acts of Parliament, 2022).	

### 4.2.6 Conclusion United Kingdom

The United Kingdom has extensive guidelines with regard to social and process equity within the appraisal process. Where the CBA is focused on a small part of the whole equation, all things left out of the CBA are handled by the other TAG units. The United Kingdom scores well in terms of analysis. All TAG units together cover almost all dimensions discussed by Levinson. However, the general process and the missing obligation to use all the different analyses result in the possibility of interpretation and inequitable outcomes. The design of the process and specifically the option development and analyses result in the choice of an alternative before it is clear what the impact of these options is for society. The appraisal of impacts for multiple alternatives are focusing on a quick scan, neglecting all other dimensions. Only the single case that comes out of the filtering will receive a full business case with all impacts included. However, this does not lead to an optimal solution because there is no proper comparison. Furthermore, while the CBA is used as direct input for multiple cases of the FBC, other TAG units such as the distributional effects are not necessarily direct input for a single case. This results in the fact that those analyses are not necessarily incorporated in the process, even when they are performed. Furthermore, the process as sketched in Figure 4.7 indicates that the process does not lead towards optimization of the chosen alternative, but supports why the chosen solution will solve the problem. This kind of solution-oriented decision-making instead of problem-oriented does not directly lead toward inequitable outcomes but does contribute to suboptimal outcomes, enabling the possibility that other alternatives could have been more equitable.

Concluding, the United Kingdom appraisal process has all analyses present to form a socially equitable outcome of a process. Process equity could be improved, but has a proper fundament for further steps. However, due to how the different analyses are incorporated into the appraisal process of the five-case model as well as the filtering of alternatives before in-depth analyses, there is a narrow view of potential solutions as well as a focus on the economic side of the scheme.

# Chapter 5

## Cases of NL

This chapter contains the analyses of the Dutch cases, the A4 Delft-Schiedam and the Betuweroute. The goal of this chapter is to determine how CBA is used, what the impact is of CBA on these cases, how social and process equitable those cases are and why. Furthermore, a comparison will be made between the guidelines and the practice of the appraisal process.

### 5.1 A4 Delft-Schiedam

The A4 Delft-Schiedam is a new road which has been constructed between 2012 and 2015. It has a rich policy history, going back to the 1970s. For this study, only the last policy cycle which resulted in the actual construction of the road will be taken into account, starting around 2002. The road is build between the Dutch cities of Delft and Schiedam, meant to help increase traffic flow between the cities of Rotterdam and The Hague. It is a new road and has gone through the area called ‘Midden-Delfland’. A map of the new road can be seen in Figure 5.1.



Figure 5.1: A map showing where the A4 has been constructed. The orange colour is buildings, yellow is nature, blue is water. The bold red line is the new road.

#### 5.1.1 General process timeline

The timeline of the A4 can be found in Figure 5.2. The process started officially in 1953. That was the first time the mentioning of the A4 Delft-Schiedam happened. However, due to several reasons, it was

never executed, and the project was abandoned. A new policy trajectory is started in 2002. This will be the starting point in this thesis.

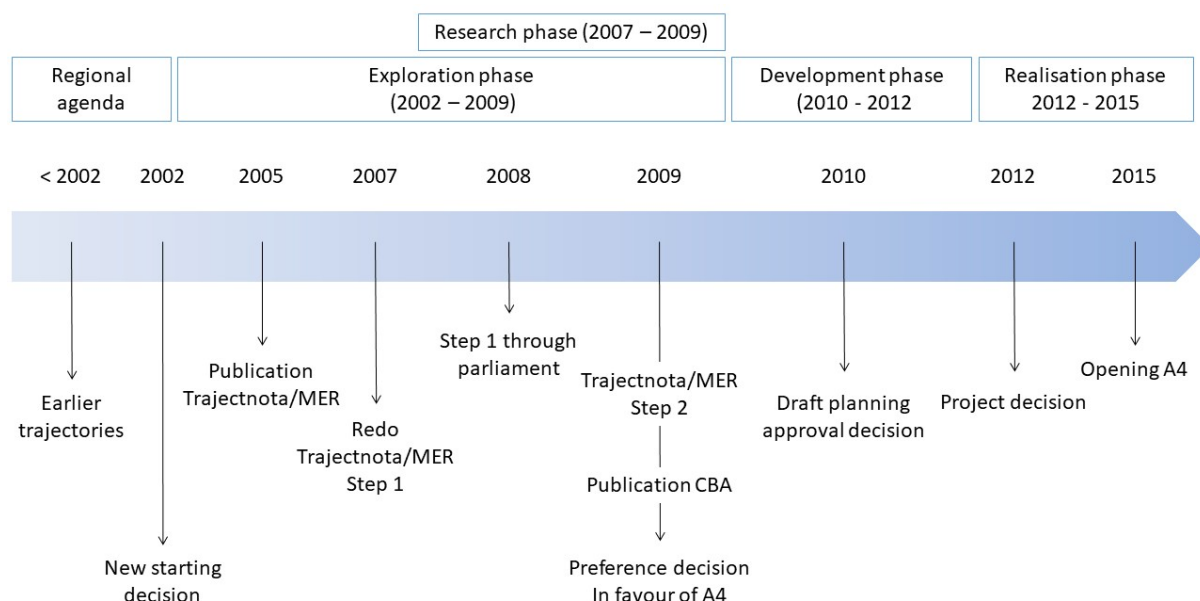


Figure 5.2: The timeline of the A4 case within the MIRT trajectory. It can be seen that the Trajectnota(TN)/MER is split into two steps and has had a rebuttal in 2007 due to a mistake found in the traffic study.

### 5.1.2 Usage of CBA in timeline

Within the timeline of the A4 case, two CBAs are used. The first one is used during the Traject-Nota/MER (TN/MER) step 1 in 2005 (Zuid-Holland, 2007). The CBA is used in this step to filter the different alternatives in terms of effectiveness. The remaining options will be appraised further to understand better what the precise impact is. This way, appraisal is not wasted due to already known ineffective alternatives which take a lot of time. The CBA in this first step is not a full analysis, but has a lot of characteristics of the full CBA already. It is called an ‘exploratory CBA’.

The first TN/MER had a rebuttal in 2007 (Zuid-Holland, 2007). A mistake was found in the traffic analyses of the A13 variant, making a rebuttal necessary. This has been split into two steps to be able to keep the process to continue without too much delay.

The second time CBA comes around is at the decision of preference in 2010. Here, a full CBA is performed on the remaining two alternatives and on multiple options per alternative. The outcome of the preference decision was in favour of the A4. The rationale given by Minister Eurlings (Eurlings, 2009) shows that the most important factors for the tradeoff between the variants were the monetized values and the BCR. The BCR was higher in the case of the A4 and specific subsections where the other variant, the A13, scored better were compensated by the average travel time gains of the A4.

### 5.1.3 Impact of usage CBA

The CBA plays a central role in the given rationale of the decision, and it shows that a lot of the arguments given in the rationale of the minister to parliament (Eurlings and Huizinga, 2009) are based on subsections of the CBA. However, it has to be mentioned that the CBA is clearly an informative piece

of information. This can be concluded from several paragraphs in the rationale as well (Eurlings, 2009). For instance, the impact on nature is worse at the A4 than at the A13, but due to the high quality of integration, the A4 is still preferable (Rijkswaterstaat, 2009). This indicates that the decision in the end is made by a person and is based on information, but not directly guided by.

An analysis has been made using the Levinson framework. The analysis can be found in Figure 5.3.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 5.3: The Levinson framework applied to the A4 case, based on found documentation and reports.

The analysis shows that a lot of stratifications are not incorporated into the analysis for the A4 case. A lot of emphasis is laid on the general population and spatial equity, with a focus on economic and environmental factors. Furthermore, it can be stated that there is a push towards a road solution next to other possibilities such as public transport as an option. This is also underlined by the main goal of the project, namely reducing congestion on the connection between Rotterdam and The Hague, not reducing the travel time between both cities (Rijkswaterstaat, 2004). It must be stated that economic goals seem to be more important than health and environmental impact. The quality of life and the quality of the environment is decreasing in all alternatives (Rijkswaterstaat, 2009), with a difference per region whether or not it is much worse or slightly better. Several known problems around the A13 and A20 will be fixed with the new project, but other problems such as the decrease of the quality of life around the newly created road arise. Even with the implementation of so called ‘above-legal’ measures, the overall impact is still negative.

Interesting to mention is the inclusion of economical distributional effects throughout the country. Estimations have been made on travel time gains because of the road on other major highways to the edges of the country, resulting in a percentage per province which has to estimate the gained benefits due to the new road (Rijkswaterstaat, 2009). However, there is no such equivalent for environmental impact. There are regulations which state how far off the road impact should be measured. The fact that these economical distribution effects result in some extra benefits in the CBA is an emphasis on the economical focus within the CBA.

### 5.1.3.1 Social equity

When looking at the checklist from Levinson, only the view of spatial equity is considered in the performed CBA. This is in line with the study of (Niek Mouder, Cranenburgh, and Wee, 2017), where it seems that spatial equity is an important factor, if not the most important factor, to Dutch citizens. It is logical to see that the appraisal method is in line with what citizens see as an important part of the appraisal process. However, it can be stated that the project is not spatially equitable. There are differences in how costs and benefits in the project are distributed over the different cities.

All different towns and cities have had the opportunity to give their opinion and try to reason with the decision-makers which variant or alternative would have their preference (Eurlings, 2009). However, most parts of the engagement were about choosing between alternatives rather than having an input in what the process should look like, as well as no possibility to have a major impact in other alternatives rather than the ones given by the decision-maker, the minister.

Furthermore, whereas the mobility and economic goals are quite well distributed over the different stratifications, the health, and environment effects are skewed (Rijkswaterstaat, 2009). It is logical that creating new infrastructure will by definition have costs and benefits, and cannot be beneficial for all parties. However, looking at the alternatives in this specific case, all options score negative on environmental impact. In all alternatives, there are little spatial benefits, and it is even stated that for all areas the quality of life will decrease for the residents. This is a clear example of creating benefits through economic gains for people who are not having any of the costs. The main benefits are given towards the residents who are already living above the allowed threshold for emissions and commuters who do have little to none of the costs.

There is a clear focus on economic values within the rationale of the ministry, (Eurlings, 2009; Rijkswaterstaat, 2004) as well as in the formal explanation of the preference decision (Arcadis, 2010). The current focus of the CBA contributes to this because it significantly helps the gains of travel time as a major gaining point, whereas several environmental or health factors are not monetized or the key Figures for monetization do not weigh up to the travel time gains, becoming insignificant. This gives a biased vision on how much a project will add towards the economy. Interesting to cite is Camiel Eurlings, minister of transport in 2009. When asked a question in parliament if the minister would be willing to invest differently in road infrastructure, he answered: “In short, the MIRT has been chosen for the really useful road projects. When constructing roads, proper integration needs to be cared for, with a focus on simplicity and efficiency”. (Eurlings and Huizinga, 2009:page 6). This is an indication how the whole MIRT process can be seen in the greater scheme of things. Its focus is of an economical perspective and the main goal is to achieve an efficient road rather than an equitable project.

An interesting mention goes to the advice from the Committee m.e.r. given in the letter to parliament (Eurlings, 2009) about choosing the 1B variant of the A4. The Committee advises that, during the Trajectnota in 2006 (Zuid-Holland, 2007), research should have been done towards the connection of PT facilities and the quality of life on district level. If this had been researched, it could have positively effected the Levinson checklist in terms of income and modal stratifications, making a more complete assessment of the project’s impact, as well as potentially altering the outcome of the project.

### 5.1.3.2 Process equity

There was little participation present for the A4 case. Participation meetings were only held in some affected cities, not all. Even though the meetings were open for everyone, it makes it more difficult for people to travel to towns to let their voice be heard. Another way of participation that was used was enabling residents to send a letter with their findings towards the ministry to inform them which case they supported and why. The choices they had were between the final alternatives and variants, the A4 and A13, or no highway at all. It is good that people could have a voice within the process to let the decision-maker know what they supported. It was unclear at that moment in time what the impact would be of the participation. Looking back at the participation meetings, no evidence can be found that it lead to changes within the outcome. The letters have been used in the rationale of the minister (Eurlings, 2009) and were mostly in favour of the A4 variant.

Furthermore, it is unclear what the influence of local municipalities was in the decision-making. Schiedam for instance states that the preference decision was not in line with an earlier signed covenant, the Integrale Ontwikkeling Delft Schiedam (Integral Development Delft Schiedam, IODS) covenant (Infrastructuur, 2006). However, this is overruled by the minister, stating that the whole project is more important than not obligating to specific small parts of the covenant. Schiedam is one of the cities that is affected greatly by the new road and has also been the only city that was against the preference decision.



Interesting to mention is a bias found within the TN/MER step 1. The study of Rijkswaterstaat (Rijkswaterstaat, 2009) states that there was a minimal advantage of the A4 over the A13/16 alternative. However, it also states that the A4 is more preferable to realize. Therefore, a bias towards the A4 is given early in the process.

## 5.2 Betuweroute

The Betuweroute is a railroad constructed to support the transportation of cargo from the Port of Rotterdam to the rest of Europe. The construction took place between 1998 en 2007. A map of the rail can be found in Figure 5.4. The railroad is a high-profile case, receiving much attention from media as well as local residents. The policy cycle, depicted in Figure 5.5, took quite a while before construction has started due to lots of criticisms.



Figure 5.4: This map indicates where the new Betuweroute will be constructed. The red line is within the Netherlands, the blue line is in Germany. The case entails only the red line.

### 5.2.1 General process timeline

The abbreviation PKB (Planologische Kern Beslissing), Core planning decision, is used in the Betuweroute case but is not present in the MIRT. The PKB is a policy document made by the national government and shows what the plans are for the coming years in terms of spatial planning. The PKB is used till 2008. Several bills and eventually the Nationale Omgevingsvisie (National Strategy on Spatial Planning and the Environment, NOVI) have replaced the PKB. The timeline shows the volatile nature of the policy trajectory of the Betuweroute. The government position on the Betuweroute has changed several times due to resistance and mistakes found in the analyses. A lack of information provided by the analyses eventually resulted in additional analysis in 1995 and 2000.

### 5.2.2 Usage of CBA in timeline

During the timeline of the Betuweroute appraisal process, CBA was not part of the mandatory appraisal system in the Netherlands. Therefore, no formal CBAs have been used in this appraisal process. Instead, a variety of loose analyses have been performed to understand the impact of the project. dozens of different economic analyses (Rekenkamer, 2000) have been used in the process, as well as a several environmental impact analyses and some others. However, there has not been an analysis similar to the CBA which tries to combine these different studies.

Furthermore, the MIRT process was only introduced in 2007. Before the MIRT, the MIT was the way to go. Appendix B has a more elaborate explanation of the MIT. The relevant differences between the MIT and the MIRT are transparency on how processes are being set-up, as well as some legislation

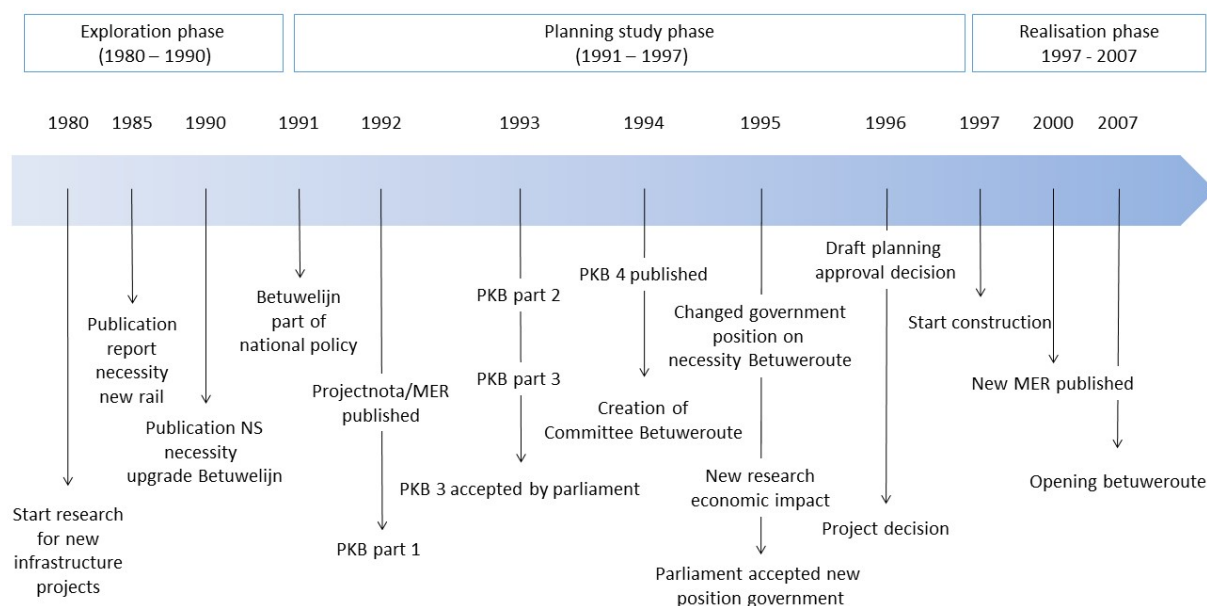


Figure 5.5: The timeline of the Betuweroute. The MIRT Trajectory was not yet present. Interesting to see is the extra impact assessments done late in the planning study phase, as well as the general length of the appraisal process.

on how standard appraisal should look like. Some examples of the process set-up are that the regional agenda has been made more transparent, the introduction of mandatory CBA usage and mandatory discussion in parliament every year on MIRT projects.

### 5.2.3 Impact of not using CBA

In the case of the Betuweroute, no CBA has been created. Without the usage of a CBA, it is difficult to give a clear overview of which criteria have been taken into account during the process. This subsection will entail how the process was being handled before the introduction of the mandatory CBA in the process and how this affected the outcome of the process in social and process equity terms. Therefore, the title of this subsection is different in comparison to the other cases.

The MIT program lacked structure and transparency, which were both introduced or updated later in the MIRT and OEI guidelines (Ministerie van Infrastructuur en Milieu, 2016). These deficits resulted in a clutter of many policy documents and information provided to make a decision. This is also seen as one of the main problems with the appraisal process of the Betuweroute and why CBA is later introduced as a necessity of the appraisal project (Weening, 2008). Especially, the lack of structure has had its impact on the process. Where CBA summarizes and structures all different monetizable effects and informs the decision-maker what the effects will be, the lack of such structure results in incomplete information on parts of the appraisal process and decisions made on this information. An example is given by the Algemene Rekenkamer: “The Court of Auditors finds that too little use was made of policy information on other environmental aspects, such as (noise) nuisance, external safety and use of space. The information available on these aspects was incomplete” (Rekenkamer, 2000:page 7).

#### 5.2.3.1 Social equity

When looking at the Levinson checklist in Figure 5.6, it can be seen that the performed analyses are not taking many stratifications into account. There is a distinct focus on economical gains, some information

on spatial equity and no information on other impacts. When looking at one of the few stratifications that is analysed, spatial impact, it can be seen that there are significant differences of impact in the different affected areas. First of all, the route is meant to move through as little high-residential areas as possible to minimize the amount of affected residents. Still, the noise and vibration nuisance around the residential areas increases significantly because of the route. The benefits are only noticeable for the whole population and has little local benefits, as the Betuweroute contributes mainly to the hub function for cargo at the Port of Rotterdam. This hub function increases the overall attraction of the Netherlands for freight transport, combined with a small economic increase for Rotterdam because of increased employment necessities with the growing demand for cargo.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 5.6: The Levinson Framework applied to the Betuweroute. Interesting to see is that there are less incorporated stratifications and dimensions in comparison to the MIRT guidelines.

In terms of modality, the appraisal of the Betuweroute can be called biased towards the rail solution. There are differences in how other modalities have been appraised in comparison to the rail alternative. As mentioned by the Algemene Rekenkamer (2000), the solutions of other PT combined with road are not taken seriously and were taken off the table for the wrong reasons. A combination of modalities (rail, road, water) has not been assessed, even though a combination of the current infrastructures could suffice the expected cargo demand. This would make the creation of the whole route unnecessary. Unfortunately, the combination of different infrastructures was never thought of as a potential solution, and is therefore never assessed.

Furthermore, a major part of the argumentation of the ministry to choose the rail solution over the others is the environmental impact argument. The rail solution should contribute significantly towards lower greenhouse emissions and an increase in the air quality. However, when comparing the alternatives, almost no information is available on the environmental impact of the alternatives, making worthwhile comparison impossible. The same applies for health impact due to the new route. Information on noise nuisance, external safety and soil degradation were not available on alternatives at the point when the preferred alternative was chosen. Even though analyses were still performed after the chosen preferred alternative, the new analyses lacked quality, making a proper comparison still hard to do (Rekenkamer, 2000). A clear example is the argumentation of the government that the Betuweroute would be responsible for a reduction of harmful emissions such as  $CO_2$  and  $NO_x$ . However, in part 3 of the PKB where this is mentioned, there is no information given what the reduction of those emissions will be (ordening, 1993).

### 5.2.3.2 Process equity

The process equity of the Betuweroute has not been up to par. One core problem is the rigid stance of the government. All other problems with regard to process equity can be traced back to this core

problem. The report of the Algemene Rekenkamer gives a fitting conclusion on how the process unfolded throughout the years: “Thus, putting the Betuweroute on the agenda quickly acquired the character of a ‘solutions search for problems’, which is also referred to in the literature on public administration, and which dominated the decision-making process surrounding the Betuweroute and also clearly had an impact on the quality of the policy information” (Rekenkamer, 2000:page 394). There was no possibility for participation to have a significant impact in the outcome of the new route. Initially, the plans already had a lot of resistance from residents and local governments. The pledge of basic embedding measurements to decrease potential nuisance was deemed as not sufficient by the affected. However, all further complaints have not led towards more changes in the plans. Further discussions were deemed impossible, as it was governmental policy to avoid further discussion. Local critics were shut off with the Not-In-My-Back-Yard (NIMBY) argument, and local municipalities who raised problems were deemed as “troublesome persons who did not take their social responsibility” (Rekenkamer, 2000:page 394).

### 5.3 Differences before and after the introduction of a mandatory CBA

This section will only be discussed in the Dutch cases because of the late implementation of CBA in the Dutch system. The Betuweroute case enables to give insights in some differences in appraisal before and after the introduction of mandatory CBA.

It can be stated that the analysis in terms of social equity have improved due to the mandatory introduction of CBA in infrastructure projects. The quality of the analyses and the width of the analyses have increased. Especially the spatial and environmental analyses have seen significant improvements. In terms of spatial equity, local influences gained a bigger part in the appraisal process. There is more attention towards the impact it has on residents in the area. Next, the introduction of the Committee m.e.r. has lead to the necessity of delivering complete information up to the guideline standards for all alternatives at an early stage in the process. When looking at the Betuweroute, the lack of consistent, high-quality information was one of the main issues when looking back at the environmental impact assessments. Lastly, the introduction of CBA has lead to better transparency in the whole appraisal process. The increase of transparency is partly due to the introduction of the MIRT, but also because the mandatory CBA works as a summary for decision-makers as well as a layman to see where the decision is based on. This helps to increase the ease on finding the information where decision are based on and how this information can be put into the bigger picture of the whole scheme.

The improvements in terms of social and process equity due to the introduction of CBA have resulted in the outcome being more equitable when comparing the A4 and the Betuweroute case. The A4 case has considered spatial impact more than the Betuweroute and has more measures in place to try to minimize the impact. Furthermore, the introduction of the mandatory feedback of the Committee m.e.r. as well as the increase of transparency, it can be stated that the general equitability level has increased due to the introduction of CBA as being mandatory in combination with the introduction of the MIRT trajectory. However, that does not mean that the outcomes can be seen as equitable. Therefore, too many dimensions and stratifications are not taken into account in the appraisal and are neglected in the outcome.

Interesting to mention is that the Betuweroute can be seen as one of the key points for the later introduction of the Committee m.e.r. and more validity checks in the MIRT process. A concrete recommendation of the Algemene Rekenkamer stated that “If policy information is drawn up by external research agencies, supervisory committees should always be set up to monitor the quality of research. to monitor the quality of the research” (Rekenkamer, 2000:page 54). The Betuweroute is a clear example where the lack of structured information lead to a mismatch or even bad policy information provision, especially in terms of environmental impact. Therefore, an extra mandatory check by a third-party committee is a logical follow-up to defend these values. Combined with the high-profile of the Betuweroute, it is seen as an important key in the chain of events that has led to the coming of the MIRT as well as the Committee m.e.r..

## 5.4 Differences between guidelines and practice – how are analyses used

The analyses and guidelines show that there are discrepancies between the guidelines and the execution of projects. The analyses are performed technically correct as far as could be found. However, when looking at the formal role of the CBA as described in the MIRT guidelines, CBA should play a significant role in the decision-making process. However, as already studied by many authors (Annema, Frenken, et al., 2017; Mouter, 2012; Niek Mouter, 2017b; Annema, Carl Koopmans, and Van Wee, 2007) and as said during all interviews (Bremer, 2022; Van der Aa, 2022; Zondervan, 2022), there is no relation between the output of a CBA and the outcome of a project. Other studies (Niek Mouter, 2017b; Rienstra, 2008) have answered the question of how CBA is used in practice, being mainly as political ammunition, as symbolic use for the decision-maker or to see whether or not the project would receive local support.

Another simple example is the possibility to research more distributional effects if necessary. The MIRT guidelines state that it is possible to extend the basic guidelines if necessary. The problem owner has to ask for the extensive research, or it has to be strongly advised by the Committee m.e.r., but it cannot be made mandatory. This extension entails a more thorough environmental impact assessment on water and ground quality, as well as some extra economical distributional effects, mainly on province / major city level of detail. However, in practice, these extensive research methods are almost never done.

## 5.5 Discussion of the Netherlands

This section will discuss the results found from the cases as well as the guidelines from the Netherlands. First, general results, found problems and explanations why these problems arise are discussed. Secondly, several strengths and weaknesses from the appraisal process from the Netherlands are discussed. The strengths and weaknesses are currently not ranked on importance, but on flow. In the discussion in Chapter 8.1, the most impactful strengths and weaknesses are shortly revisited and the comparison to literature will be discussed.

### 5.5.1 Strengths

All points will have a reference to the pillar in literature they are linked with as mentioned in Chapter 3.5, if any. For the social equity pillars, the reference ‘SEP X’ will be used to refer to the specific item, for the process equity pillars, ‘PEP X’ will be used. For items which have been specifically mentioned by interviewees, INT will be used.

- **Near perfect transparency of policy decisions and documents – PEP 1**

One of the strong points, if not the strongest point, of the Dutch appraisal system is the near-perfect transparency of policy decisions and documents. This has been acknowledged as well by some interviews Van der Aa (2022); Bremer (2022). There are several systems in place to make every bit of the appraisal system publicly available. If the documents cannot be found openly, it is still possible to apply through the Wet Openbare Overheid (Law for transparent government, WOO) (Rijksoverheid, 2022b). This makes it possible for every person to look into the different applied analyses, as well as the rationales on why different choices are made.

- **Possibility to debate on projects – PEP 2**

The Dutch system forces decision-makers to have a debate in parliament on the proposed solution, resulting in the possibility to alter the outcome and add or emphasize different parts of a project. There are no criteria which have to be met in terms of BCR and the legal limits for the Environmental Impact Assessment (EIA) are already covered through the m.e.r. and their advice. Therefore, in theory, this debate enables the possibility for negative BCRs with a high positive impact on society to continue. On the other hand, it enables the opposition or affected residents to lobby and discuss alternatives which seem to be better and try to alter the outcome. However, in practice, the debate mainly results in a box check rather than a change of the outcome. But the fact that there is a possibility for a discussion is a plus in terms of process equity (Lee Jr, 1978).

- **Third-party committee that checks EIA on consistency and correctness – SEP 7, INT**  
The Committee m.e.r. can be seen as a strength of the Dutch system for several reasons. First of all, it improves the transparency level of the whole process. Every document is made publicly available, since the Committee m.e.r. should be able to access them (Bremer, 2022). Secondly, it is more difficult for decision-makers to cut corners. The Committee m.e.r. cannot be influenced, and the report created by the Committee can make or break a case (Bremer, 2022; Van der Aa, 2022). Thirdly, the Committee m.e.r. does not only look at the environmental impact, but also at the process itself. For instance, if alternatives have not been taken into account properly, this is added in the report and can cause legal issues if an objection is made. Both interviewees of the Committee state that the function of the Committee m.e.r., making sure that environmental aspects will be given a proper place within the decision-making process, works as it should be most of the time. No system is perfect, but the Committee m.e.r. works currently as it should.
- **Mandatory rationale of alternatives based on CBA – PEP 1**  
decision-makers are legally bound to explain the chosen alternative based on the CBA. This rationale is then used for the debate in parliament, and is therefore publicly available. This system helps to understand why decision-makers have chosen for a certain alternative and which trade-offs have been made, as well as forced transparency. The added value of specifically the mandatory rationale is that decision-makers are not only forced to publish the reports, but also to argue on which grounds the decision has been made.
- **Clear appraisal trajectory – PEP 1**  
Another addition to the transparency strength of the Dutch system, is the clarity of the MIRT trajectory. The excessive document in which the MIRT trajectory spells out every single step along the way, what can be expected and what is necessary to execute, while leaving room for customization for projects.
- **Addition of mandatory PT option in solution space – SEP 1,2 and 3**  
The Netherlands have legally added the necessity that a public transport option has to be assessed as a possible alternative, widening the solution space and trying to optimize the outcome. However, it must be stated that this PT option is almost never taken seriously (Van der Aa, 2022). PT options are often much harder to achieve due to sunk costs and the different stakeholders, which are seen as more difficult to align than for road cases. This is in line with the earlier finding of the MIRT guidelines where roads are favoured over PT options.

### 5.5.2 Weaknesses

- **Performed analyses are narrow – SEP 2 till 7, PEP 2**  
The mandatory analyses do not cover a wide variety of social factors. There are little to none other stratifications that are taken into account next to population and spatial. Furthermore, there are no systems in place to see what the specific impact is of a project on different parts of society. Therefore, the current analyses cannot answer the question of who wins and loses due to a project. The current guidelines focus more on economic impact than other dimensions. This is not malicious intent, it is just not taken into account, as depicted by Van der Aa (2022): “Taking social justice into account is something we never do in the Netherlands. When looking specifically at the A4 case, there are certain neighbourhoods located near the A13 with low incomes which would benefit a lot in terms of health, pleasure of living and the price level of their house if the A13 would become less crowded and cars would use the A13/A16 alternative. However, this has never been calculated, taken into account or even thought of.”
- **Political play more important than analyses – PEP 2, INT**  
A major part of the flaws within the Dutch appraisal system lies in the political decision-making. Almost every decision is made by a politician rather than by analyses. This does not result in bad decision-making by definition. Most policy documents such as the m.e.r. and CBA are meant to support the decision-making process and to help form a choice, rather than making it. However, there is a downside to political play. An objectively better alternative can be skipped due to too

little political support or politicians who see that another alternative is easier to achieve. Both cases show that the political will to solve the problem at hand was more influential than the different analyses, resulting in resistance and policy failure (Rekenkamer, 2000) at the Betuweroute and a sub-optimal decision at the A4.

- **Participation often not present – PEP 2**

One of the key points in process equity, is enabling civilians in participating in the decision-making process, often through a participation trajectory. The Netherlands do not have a mandatory system in place for participation. While the guidelines mention participation as ‘an important tool for decision-making’ (Ministerie van Infrastructuur en Milieu, 2016), it is not used often and consistently. When looking at the cases, it shows that the Betuweroute has had no participation at all, whereas the A4 case had some participation. When participation is present, the types of participation vary as well.

- **Not clear what the impact is of participation – PEP 3**

To continue on the issue of participation in the Dutch system, it is unclear what the impact of participation is in most projects. If participation is present, there is often not a clear goal or described level of impact for the outcome of participation. It is ‘just taken into account for the whole decision’ (Rijksoverheid, 2014). Without expectation management, participation can be used for gaining support rather than optimizing the solution.

- **The m.e.r. is seen as a legal risk - SEP 8 and,9 PEP 1**

Several interviewees (Van der Aa, 2022; Bremer, 2022) state that the output of the Committee m.e.r., the MER, is more often than not seen as a legal risk instead of an opportunity to create a better project. This results in a strategy to fill out the m.e.r. in the best possible way to get a positive review, instead of it being a check if the project is done properly. The Committee m.e.r. can only test what has been provided and can only talk about certain parameters. Therefore, it is possible to conduct as minimal effort as possible to still receive positive advice.

- **No clear winners and losers for schemes depicted or taken into account in the decision-making – SEP 1,3,4,5, PEP1,2**

A clear example can be seen at the A4 case. The CBA as well as the rationale state that the new road will add a lot of economic value, but to whom is unclear. When looking at the purpose of the road in combination with a study on travel behaviours, it can be concluded that the travel time gains are mainly created for high-income commuters, while the costs go to the residents, mostly low to medium income households. The discussion, whether or not this is fair, is not the point of this weakness. The fact that this is unknown and is not taken into account which parts of society are winners and which are losers and what the effects are because of this, is the problem.

- **MIRT appraisal guidelines favouring road over rail – Other**

An interesting finding is the fact that the appraisal guidelines on how the CBA within the MIRT process should be made favours road projects over rail projects. Within the MIRT guidelines on the CBA (Ministerie van Infrastructuur en Milieu, 2016), it can be seen that one of the benefits for road projects is taxes paid by cars. Where this is a benefit for road projects, it is a cost for rail projects. Therefore, rail projects have to compensate through other means such as positive environmental impacts or faster travel times to get the same outcome of the CBA.

- **Impacts are rated differently when something is a ‘hot topic’ – INT**

Several interviews and literature (Van der Aa, 2022; Niek Mouter, 2017a; Zondervan, 2022) mentioned that there is a difference in the impact some topics have due to the ‘hotness’ of the topic in national politics. Where the interviewees mentioned that climate change and sustainability are becoming more and more hot topics and are therefore gaining attention and importance within the decision-making process, Niek Mouter (2017b) mentions that politicians will see economic gains as more important in times of a financial crisis. This indicates that the focus of appraisal can differ per year. Combined with the fact that the appraisal process revolves around political play, it becomes more difficult to make consistent policies on projects.



- **Objecting to a project is difficult for laymen or low-income groups – PEP 2, INT, Other**

It is currently difficult for people to properly object to a new project by which they are affected. Even though the level of transparency for documents is very high, understanding what it means and making a proper case for objection is a whole other level. An example given through an interview (Wooning, 2022) is the case of the A27 Heemnesweerd versus the S112 through Amsterdam Bijlmer. The A27 currently has a lot of resistance and will probably not continue due to a lot of resistance of local residents. The main arguments are that the new highway would be too close to their homes and affecting their way of life. The S112 in Amsterdam is similar in its effects, but has had almost no objections and resistance. The main difference that can be spotted between both roads is that the Bijlmer is a low-income area with a low level of political trust, whereas the area next to the proposed A27 is a high-income neighbourhood where there are several experts who know their rights and the ways to object and make a case. This can be tied with the found lack of participation in infrastructure projects. Consistent participation could help different groups in society to understand and object to major unfair changes in their lives.

- **Economic gains and costs, most important factor of all – SEP 8,9**

The Dutch system favours economic gains over other impacts such as environment or health. This can be seen in the guidelines as well as in practice. When looking at the A4 case, the cost of the significant impact on the environment and health for local residents are only 7% in comparison to the total economic gains. This indicates how skewed the current models are in favour of economic gains. Furthermore, the rationales provided in the cases indicate that the economic gains can be a dealbreaker for decision-makers, while other impacts can only be a dealbreaker through formal legislative norms.

### 5.5.3 Motives

Two reasons can be found for the impact of political play as well as why economic gains are the most important factors currently. The first reason is the funding reason. The MIRT trajectory starts at the regional agenda, where the problems surrounding infrastructure or transport are discussed. During this regional agenda meeting, most of the outlines of the solution will be created before the official MIRT trajectory starts (Zondervan, 2022). The reason this happens can be traced back towards the MIRT guidelines regarding funding. There is a paragraph in these guidelines which states, "... In the case of a national project, an indication is given whether sufficient budget is available for the envisaged years of realization. Substantiation and proposal for allocation of necessary resources and personnel to carry out the exploration phase. There should be a view on 75% funding for the most obvious option. The Exploration will look broadly at solution options" (Ministerie van Infrastructuur en Milieu, 2016:page 34). In other words, funding will be reserved for up to 75% of the most obvious alternative, which is chosen before the MIRT exploration phase has been executed. When the most obvious alternative is not chosen and funding is not reserved, the project will have delays or even cancellations due to no funding being available. It is therefore worthwhile for decision-makers to decide which option will most likely become the decision of preference, create a cost estimation for this solution and reserve the budget. Since there has been no analyses yet on the problem with regard to exploring the full solution space, a possible solution which looks favourable at front becomes the most obvious alternative, given that this alternative will fix the problem up to some regard. If the most obvious alternative does not solve the problem at hand, delay is inevitable due to lack of funding. Furthermore, other alternatives must be similar in terms of costs, otherwise they will also result in delay. Therefore, it is worthwhile for decision-makers to push the most obvious alternative. This results in the main output of a project, formally known as the preference decision, already being determined before the MIRT trajectory even starts with the start decision (Zondervan, 2022). All other steps and instruments, meant to explore the solution space and analyse the impact of solutions, can be seen as a mere legal necessity. The funding problem materializes in the starting decisions. When comparing the guidelines of the MIRT for the starting decision and the decision of preference with some cases, it shows that there is a discrepancy. The MIRT guidelines state that the starting decision should include a "description of the scope of solution directions that will be considered" (Ministerie van Infrastructuur en Milieu, 2016:page 33). However, this scope is already steer-

ing towards a certain solution, therefore resulting in solution-oriented decision-making. This can also be seen at the starting decision of the A4 Delft-Schiedam case. The scope is set to ‘improve the traffic flow between Rotterdam and The Hague’ and ‘improve the robustness of the link between Rotterdam and The Hague’ (Rijkswaterstaat, 2004). Increasing the robustness of a link directly favours a new road due to having more alternatives if congestion happens on a road, maintaining a more consistent traffic flow. Other starting decisions, such as the A4 Burgerveen (Schultz van Haegen, 2017), A58 Tilburg-Breda (Van Nieuwehuizen Wijbenga, 2018) and A58 Eindhoven-Tilburg (Schultz van Haegen, 2013) all show similar findings and outcomes.

The second reason is the lack of concrete national policy. Infrastructure projects must comply with national policy goals for infrastructure, currently put in a document called the NOVI. Every project must comply to these goals. The problem as described during an interview (Zondervan, 2022) and also mentioned in reports (MER, 2020) is that these goals have become vague, resulting in the possibility to always meet these goals when argued for. The quality of national policy on this specific spot has decreased over the past years, with the predecessors of the NOVI having more concrete examples. This lack of national policy has lead to decision-makers being able to freestyle policy goals, focusing more on short-term local gains than nation-wide growth.

## 5.6 Conclusion of the Netherlands

The Dutch tools used in the appraisal process for infrastructure projects do not contribute towards a social and process equitable country. The tools used are too narrow in comparison to literature. The checks and balances in place through the Committee m.e.r. and the mandatory parliamentary discussion work up to a certain degree. However, the influence these checks and balances have is merely getting rid of extremes rather than making the outcome equitable. The system exudes ignorance due to political play, economic focus and decisions made before analyses are performed, making analyses insignificant. However, the system does not result in inequitable outcomes by definition. If the outcome is socially equitable, it is more often the case of luck than a conscious choice of decision-makers.

# Chapter 6

## Cases of UK

This chapter contains the analyses of the United Kingdom cases, the St Austell to A30 link road and the Highspeed 1 line, also known as the Channel Tunnel Rail Link (CTRL). The goal of this chapter is to determine how CBA is used, what the impact is of CBA on these cases, how social and process equitable those cases are and why. Furthermore, a comparison will be made between the guidelines and the practice of the appraisal process.

### 6.1 St Austell to A30 link road

The city of St Austell is located in the south-west of England, around 60 kilometres to the west of Plymouth. St Austell is a rural city with a rich clay industry. The proposed scheme is a linking road from the city of St Austell to the A30, a main road connecting the south-west of England to the center through a highway, as can be seen in Figure 6.1 and 6.2. The goal of the road is to decrease the travel time towards neighbouring cities as well as lower the amount of Heavy-Good Vehicles (HGVs) travelling through the town centres.

#### 6.1.1 General process timeline

The St Austell Link road case has had a ‘standard’ appraisal timeline. The timeline can be seen in Figure 6.3 and is in line with the trajectory as described in Chapter 4.2.1. The only thing that is different from the standard practice, is the extra consultation in 2021 due to some resistance from local landowners. An extra consultation round has been implemented to solve all problems at hand, resulting in the continuation of the scheme.

#### 6.1.2 Usage of CBA in timeline

The final business case (Limited, 2020) together with general policy documents (Transport, 2019) can be used to pinpoint where CBA has been used in the appraisal for the link road. The documents gathered only mention a single use of CBA, within the FBC. While looking at the overarching policy trajectory, it is expected that another exploratory CBA has been performed earlier. However, there is no evidence that this second CBA has been created, nor can the output of a second CBA be found.

#### 6.1.3 Impact of usage CBA

The CBA has had an impact in the outcome of the case. This can be stated by looking at the executive summary of the FBC as well as the applied Levinson framework in Figure 6.4. When looking at the FBC, it can be seen that two out of the four pages of the executive summary are filled with direct information about the CBA. When analysing the different cases within the FBC, it can be seen that even the strategic case can be solved by using solely the CBA. Normally, the strategic case is one of the few if not the only case which does not directly ask for input of the CBA and is meant to broaden the scope outside the economic gains. Knowing that the FBC and especially the executive summary are

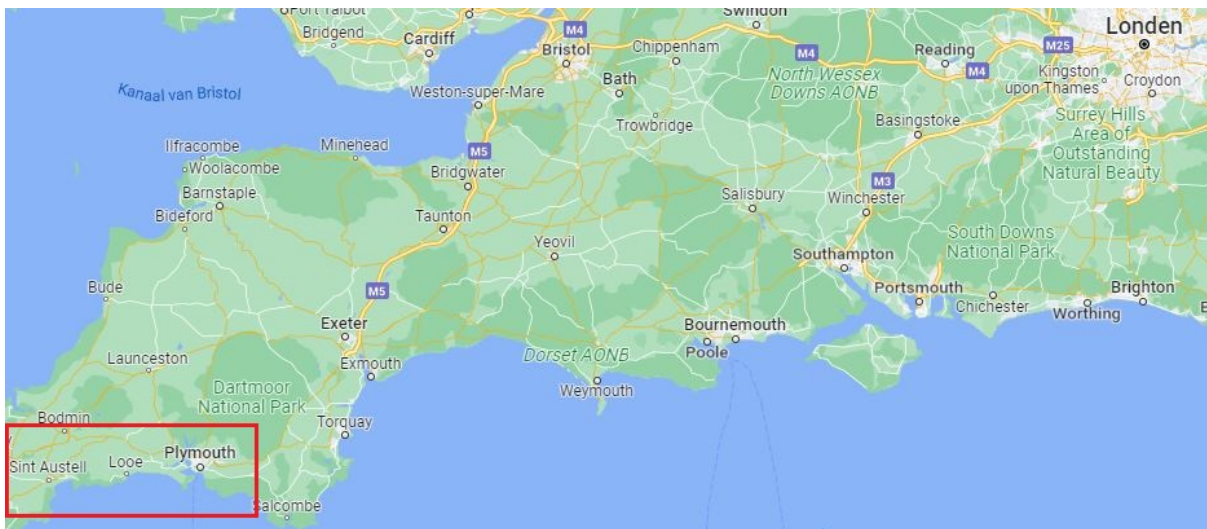


Figure 6.1: A map displaying the location of St Austell within the United Kingdom.

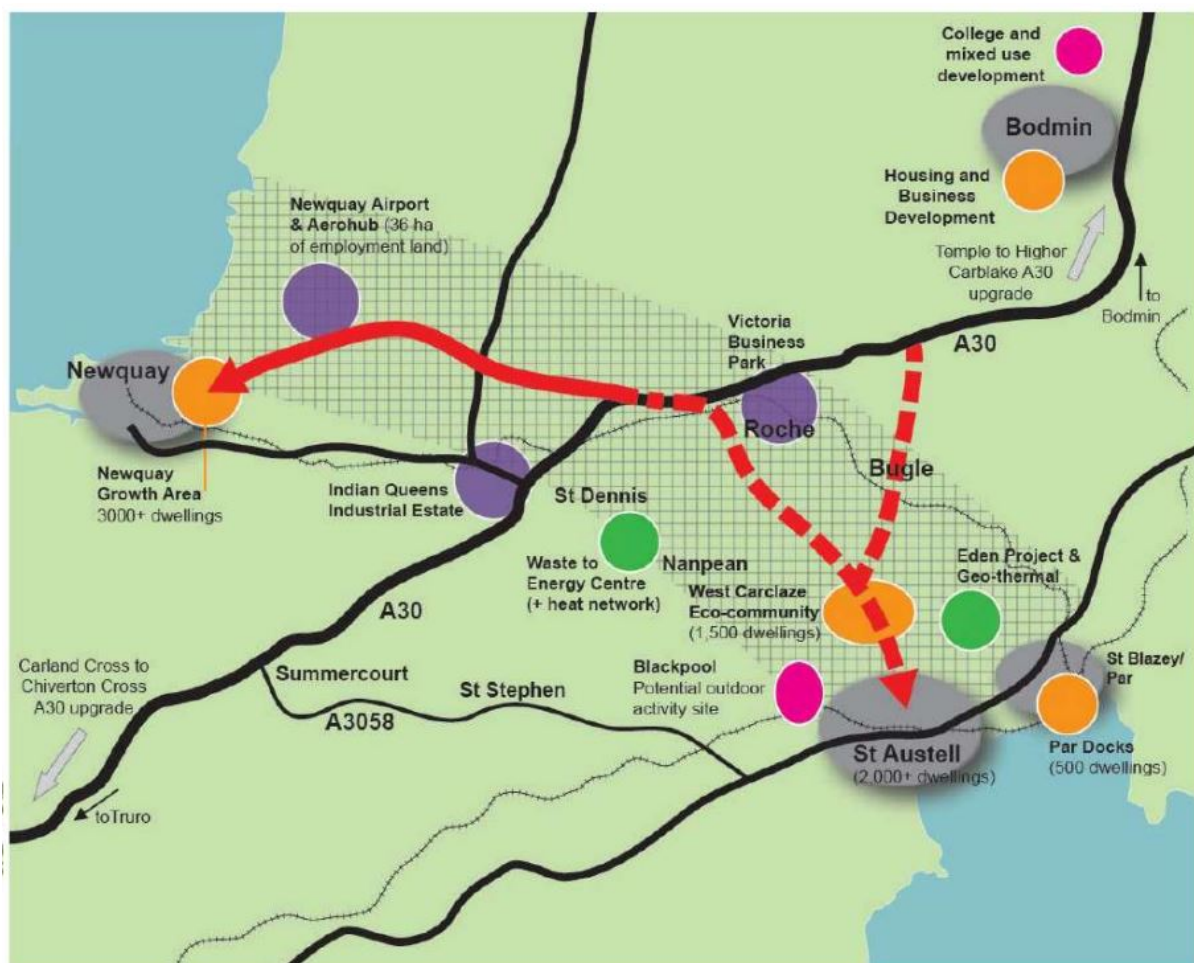


Figure 6.2: A map displaying the new link road, which can be seen as the dotted red line.

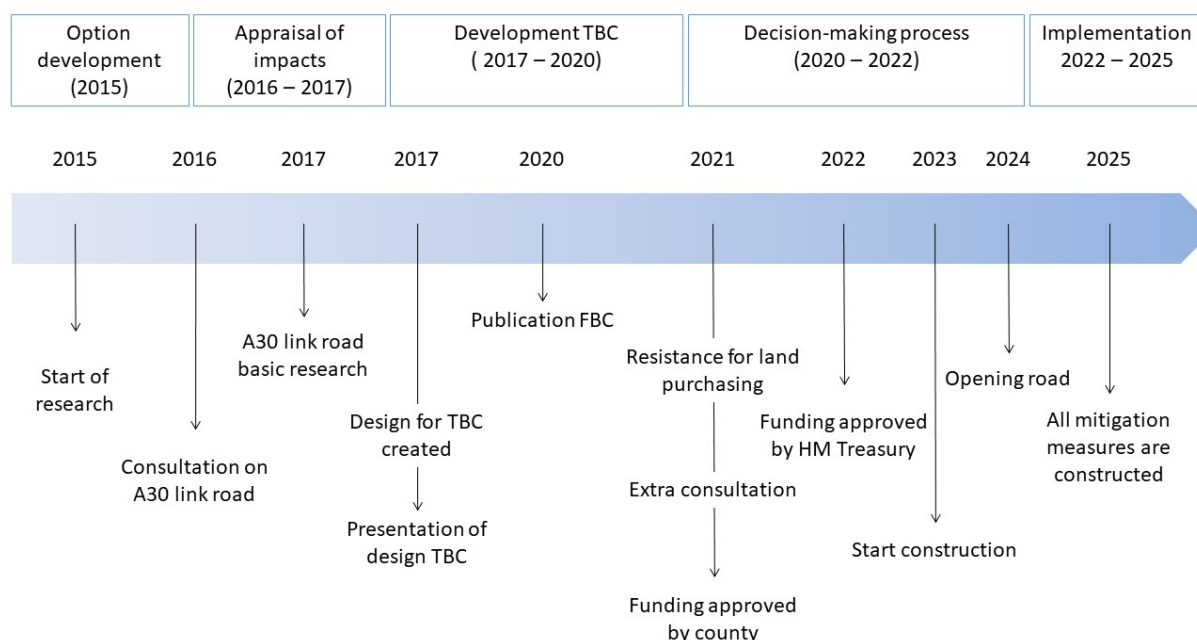


Figure 6.3: The process timeline of St Austell to A30 link road. It has followed the scheme as depicted in Chapter 4.2.1. The only thing out of line is the extra consultation round in 2021 due to resistance from local landowners.

of great importance to decision-makers (Interview-UK, 2022; H. Treasury, 2020), it can be stated that CBA has played a significant role within this process.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 6.4: The Levinson framework applied to the St Austell case, based on the CBA. Interesting to see is the relatively high focus of other sources than the economy.

When looking at the applied framework in Figure 6.5, it can be seen that the CBA is quite narrow, but of okay quality. The main focus in the CBA is on population and spatial level, with some temporal impacts incorporated. This focus is in line with the strategic goal as described in the FBC, generating a decrease in travel time, an increase in travel reliability and increasing the economic power of St Austell and the surrounding towns. This is a focus on several spatial factors, as well as mobility and economic impact. Looking at Figure 6.5, this is nearly perfect aligned with the described goals. The quality of

the incorporated cells is relatively high. When specifically comparing the extent of the CBA to the guidelines, it can be seen that this case is more elaborate than the guidelines prescribe, adding several options which the guidelines state to be optional or not easy to be monetized.

It is important to mention that not all policy documents have been able to retrieve. Information not found are other considered alternatives and rationales on decisions which are made. Therefore, it was not possible to use all information that would help the analysis, creating a potential bias in the outcome.

### 6.1.3.1 Social equity

Figure 6.5 shows the Levinson framework applied to the St Austell case when all TAG units are incorporated. Overall, not all analyses as depicted in the TAG system can be traced back to this FBC. The reason provided is that some analyses were not applicable enough to be executed.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 6.5: The Levinson framework applied to the St Austell case, based on the FBC. A significant increase in incorporated stratifications and dimensions can be seen

In general, the scheme has low impacts in terms of health, modality changes as well as environmental impact. There are clear winners and losers in place, which can be depicted through the analyses. The losers are the low income group, specifically the zero to twenty % income group, living directly next to the scheme. This group is affected negatively through an increase of noise nuisance and a moderate adverse effect in the affordability for their transport, but positively through an increase of the air quality due to lower congestion on the road as well as some mitigating measurements taken to decrease harmful emissions. The main winners are the top 20% income group. This group has almost no costs or nuisance increases, while gaining a lot of benefits due to travel time gains. There is a small group of specific winners present as well, namely residents of smaller ‘clay’ villages next to St Austell, which will see a decrease in their travel time towards employment and key facilities. The general population of these smaller villages has a low income.

Furthermore, there is an increase in the overall security for women, disabled and elderly people due to several small tweaks to the scheme. Examples are the addition of proper lighting next to the road as well as wider bike lanes which are not directly located next to the road but have a green patch between them. Overall, it can be stated that the scheme is quite equitable, with some clear winners and losers in place. The noise nuisance increase for the losers group is significant. It is harmful, and the scheme is skewed to harming lower income groups. However, the high improvement in air quality for the loser group helps to try to balance some losing points. Furthermore, the increase of accessibility for the clay villages is a major plus. On the other hand, high-income groups experience relatively more benefits while having almost no costs, thus being the true winners in this case. It is interesting to note about these social distribution effects that this information was known but was never used in a key point in the

FBC. This distributional information was only mentioned in the distributional impact report, not in the executive summary, other business cases or even the AST. The resurrection of the clay villages was part of the strategic case, but is not mentioned elaborately in the distributional effects report nor the output of the economic case. Important to repeat is the fact that the goals of the different cases could already be answered by solely using the CBA and its output, therefore diminishing the importance of the other TAG units. The difference between Figure 6.4 and Figure 6.5 are significant, but this cannot be traced back to the different cases. This can be seen as a clear indication of the big impact CBA has had in this project.

Looking at the executive summary (Limited, 2020), it can be read that the Wider Economic Impacts (WEI) has had a significant contribution to the BCR, raising it from 1.6 to above two, making the scheme a high value-for-money scheme. When diving deeper into this WEI, the main part of the benefits consists of an increase in employment, specifically a raise of 6300 jobs in the work area of St Austell. These jobs would be created due to the reduction in travel time and better accessibility for the industry in the area. However, when analysing the reduction in travel time mentioned within the business case and the traffic models, it can be seen that the travel time gains for cars are around 90 seconds per trip, with peaks to 120 seconds for people driving from further away. The biggest impact stated in the traffic model is the reduction of Heavy Good vehicles (HGVs) through small towns such as Roche, which should result in higher reliability of the travel time. The amount of HGVs can be reduced up to 100%, because these HGVs will not use the inner route through towns, but the link road. The travel time gains for these HGVs are similar to the 90 seconds as mentioned before. Even though the travel time is reduced, it is not a huge amount. The part that makes this analyses fishy, is that when looking at the employment numbers in total of St Austell' travel to work area, it consists of around 30k employees (Network, 2021). The increase sketched in these wider economic benefits entails for a labour increase of up to 21%, which is huge. Even though there is no doubt that the accessibility will increase as well as the travel time will decrease by around 90 seconds, a labour increase of 21% for a single road can be seen as doubtful. Similar cases of rural areas which did not have a strong industry and lacked accessibility have not seen such an enormous amount of economic growth. However, there is no clear evidence that the numbers are boosted and as far as can be found, all models seem to be executed properly. Nevertheless, it is at least a reason to evaluate if such employment gain estimations will become true in a couple of years.

### 6.1.3.2 Process equity

The consultation of the new scheme is done properly. A lot of residents as well as local businesses have been contacted. However, consultation only took place before any appraisal techniques have been used, therefore people lack information about the effects of the scheme. It was clear what would be done with the consultation, and everyone was able to attend the consultation meetings. Furthermore, at the time of consultation, the ideas present were transparently shared. The split into residents and businesses has led to more different kinds of information, based on the needs of the stakeholder. This has given more insights into the desires and needs of different groups in society. The general process in terms of equity can be seen as quite okay. The main concern in this case is that there was no analysis available for residents at the time of the consultation, therefore making it harder to weigh different trade-offs.

In Figure 6.6, an example of a distributional impact table from the St Austell can be seen. This table is exemplary for informing decision-makers what the impact will be of the project per income group. Such a table can be seen as state-of-the-line. It does not state whether or not the scheme is good or bad, it discusses the different impacts per group.



	DISTRIBUTION IMPACT OF INCOME DEPRIVATION					ARE THE IMPACTS DISTRIBUTED EVENLY?	KEY IMPACTS – QUALITATIVE STATEMENTS
	0-20%	20-40%	40-60%	60-80%	80-100%		
User Benefits	✓✓	✓✓✓	✓✓	✓	✓✓	No	The results show that the transport user benefits are distributed across the population that are living in the different income groups. The second most deprived area (20-40%) sees, in proportional terms, the biggest benefit given the size of the population. All groups across the study area see a net benefit.
Noise	xxx	✓	-	-	-	No	The noise DI analysis shows that there are large adverse impacts that are experienced, in noise terms, by the households in the lowest income quintile within the impact area. The second most deprived quintile has a net benefit. For the one school identified within the study area (Roche County Primary School) a slight increase in noise level is predicted.
Air Quality (NO <sub>2</sub> )	✓✓✓	✓✓✓	✓	x	-	No	The results show that the overall impacts on local air quality vary by pollutant, with PM <sub>2.5</sub> being more beneficial than NO <sub>2</sub> . When assessing the distribution of benefits across the IMD quintiles, residents in the more deprived quintiles experience the greatest benefit. The pollutant NO <sub>2</sub> affects the population of the study area than PM <sub>2.5</sub> .
Air Quality (PM <sub>2.5</sub> )	✓✓✓	✓✓✓	✓	-	-		
Affordability	xx	xxx	x	x	✓✓✓	No	The results show that the affordability disbenefits are spread across the four zones within the IMD quintiles of 0% up to 80%, with the least deprived income group showing a benefit. Proportionally the disbenefits are mainly found in the 20-40% and 40-60% quintiles. From this it is clear to see that the majority of the population experience a net disbenefit.
Accessibility	-	-	-	-	-	Yes	The scheme does not provide any benefits or disbenefits regarding accessibility, as existing routes will remain accessible and buses will operate as they do now.

✓✓✓ = Large Beneficial | ✓✓ = Moderate Beneficial | ✓ = Slight Beneficial | xxx = Large Adverse | xx = Moderate Adverse | x = Slight Adverse | - neutral

Figure 6.6: matrix of collated distributional impacts. An example of FBC of the St Austell case, showing the distributional impact per income group.



## 6.2 Channel Tunnel Rail Link (CTRL), Highspeed line HS1

After the finishing of the Channel Tunnel from England towards France, plans arose to implement a high-speed rail connection between the two capitals. In 1989, four route proposals for the United Kingdom side of the railroad arose. After many years of consultation, political debate and measuring impacts, the current route was approved in 1997. Construction was done in 2007. In Figure 6.7, the location of the route can be found.

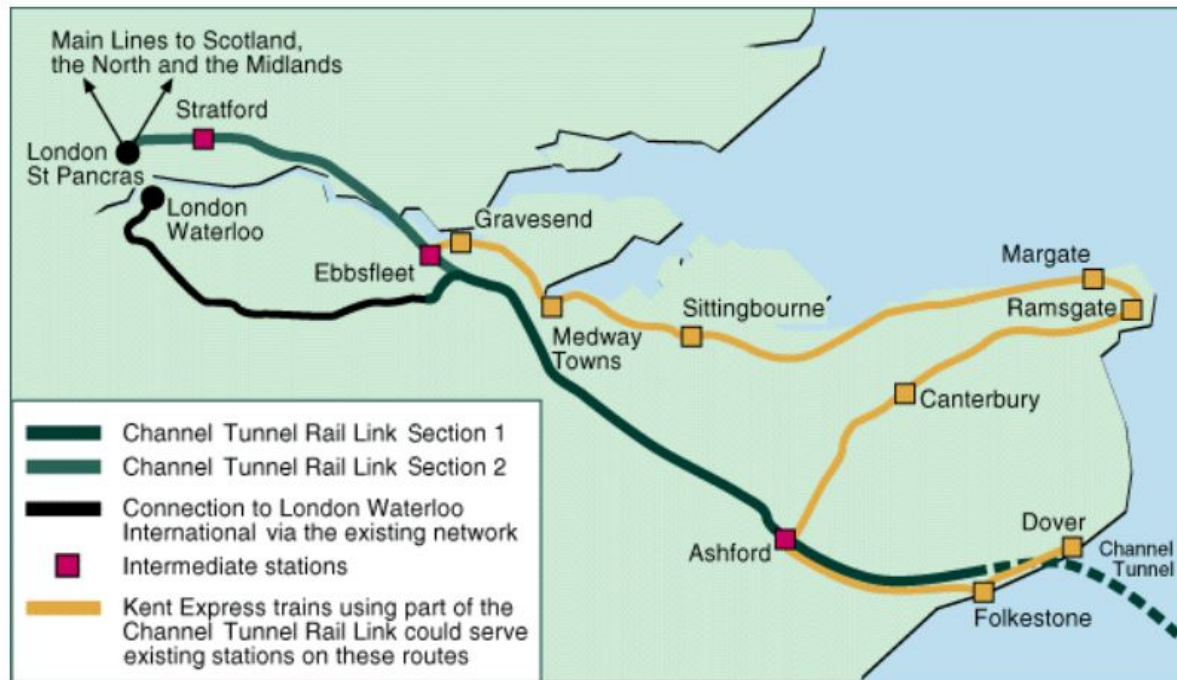


Figure 6.7: A map displaying the location of the new HS1 line (Transport, 1998). The case consists of both sections of the CTRL.

### 6.2.1 General process timeline

The timeline of the HS1 has been a long one, not in line with the trajectory as discussed in Section 4.2.1. The enormity of the project has increased the steps taken within the process. This can be seen in the three sifts which were present, as well as multiple elaborate consultation rounds. The full scheme has taken many years, but has resulted in little resistance to the construction because of it (Gambrill, 2003). The timeline can be seen in Figure 6.8.

### 6.2.2 Usage of CBA in timeline

It is important to mention that this case took place before the implementation of the transport business case model, described in Chapter 4.2.1. At this moment in time, there was no similar type of trajectory which was necessary to follow. Instead, several analyses steps were seen as necessary. It started with a broad consultation, followed by a CBA as well as something similar to the current commercial and financial case, namely seeing which market parties could execute the scheme.

The usage of CBA is limited in this case. The CBA is mentioned in the project profile (Centre, 2002) and is used as a basis for further decision-making. The rationale focused around economic viability, and it mentions that the rail was "... likely to be of marginal economic value in cost-benefit terms" (Centre, 2002:page 112). The final BCR ratio, published in 1998 was 1.5, stating that it had a positive

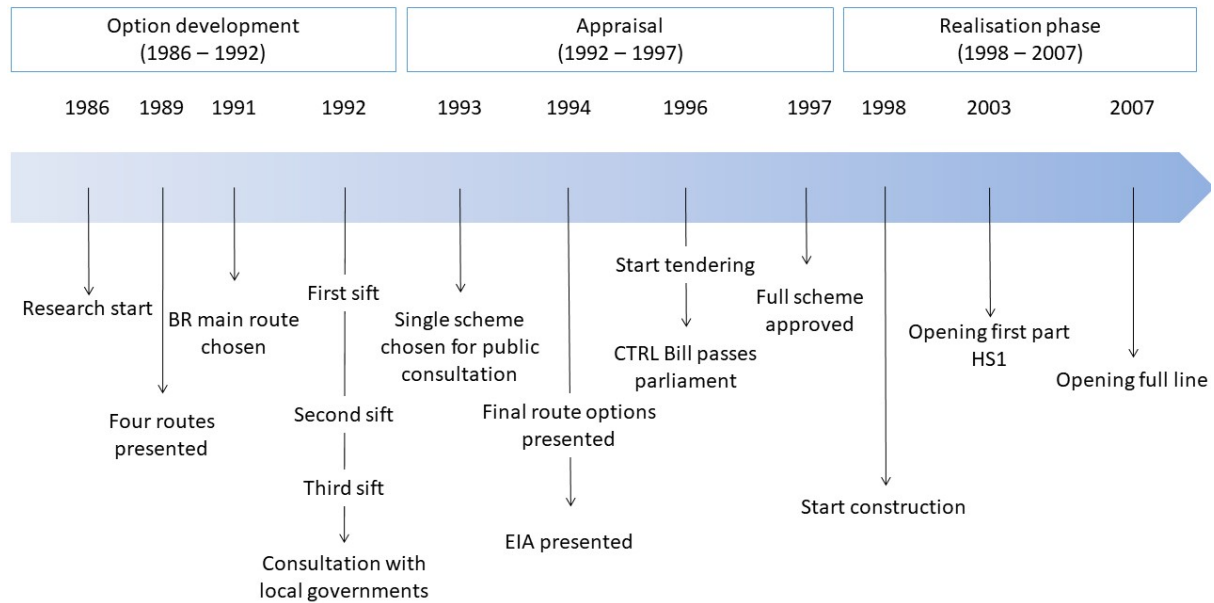


Figure 6.8: Process timeline of Channel Tunnel Rail Link Highspeed line 1.

value for money.

The whole financing of HS1 is complex, making the usage of CBA more cherry-picking than overarching. Specific parts of the CBA are used to strengthen the case of HS1, such as the BCR and WEI.

### 6.2.3 Impact of usage CBA

In Figure 6.9, the Levinson framework with only CBA incorporated can be found. It was difficult to find all documents necessary to fill the framework fully. The analyses performed are based on three documents, four reports (Atkins, 2013; Centre, 2002; Comptroller and general, 2001-03; Transport, 2001) and an article (Gambrill, 2003). The original CBA could not be found. However, by using the evaluation report (Transport, 2001) which consists of almost all original values, the effects of the CBA have been recreated.

The CBA has been used as a supportive tool in the decision-making process. Looking at the rationales and different reports (Centre, 2002; Transport, 2001; Gambrill, 2003), it can be stated that the main attribution of the CBA in the decision-making process was the BCR, specifically the level of Value for Money (VfM) of this project. Two quotes can support the importance of the CBA and specifically the BCR: "... the Department was clear that it could back the Link, provided that the estimated benefits could be expected to outweigh the financial contributions made to the project by the government." (Comptroller and general, 2001-03:page 6) and "The Government Downside Case was also shown to be justified, but the Department recognized that this was very marginal with a benefit cost ratio of only 1.1:1", (Centre, 2002:page 116), page 116. Both quotes show that it was important that the CBA should at least be above one. It was seen as a necessity to have some value for money, otherwise the government would not support funding. It can be stated that CBA has had an important role within the project.

Figure 6.9 shows that several stratifications have not been taken into account in this case. The opportunity to engage in decision-making, economic impacts and economic viability assessments have been modelled to the most extent in comparison to the other stratifications. Furthermore, mainly the population and spatial dimensions are incorporated. There has been interest in modality shifts and some analyses on the impact for high and low income groups. However, the latter is not taken into the CBA,

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 6.9: The Levinson framework applied to the HS1 case, only incorporating the CBA. Interesting to see is the major focus on opportunity to engage in the decision-making, as well as some minor inclusions of dimensions throughout all the different stratifications.

Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population					
Spatial					
Temporal					
Modal					
Generational					
Gender					
Racial					
Ability					
Cultural					
Income					

Figure 6.10: The Levinson framework applied to the HS1 case. Interesting to see is the major focus on opportunity to engage in the decision-making, as well as some minor inclusions of dimensions throughout all the different stratifications.

but is only mentioned in the appraisal process for ticket pricing, a subsection of the commercialization and financing of the scheme. This can be seen in Figure 6.10.

Figure 6.10 shows the framework when all different appraisal information is taken into account. The difference lays in the inclusion of the mobility dimension in multiple stratifications.

### 6.2.3.1 Social equity

The Levinson framework shows that several stratifications are not taken into account. There is a clear focus on the economic viability visible as this has been modelled to the most extent. There are some small environmental effects taken into account, but the impact on the analysis tools is negligible. The cost of construction has not been included on the environmental impact, solely noise nuisance, air quality and emissions. Within the stratifications, spatial impact has had the most attention. The economic growth for towns which will have significantly increased accessibility, as well as the spatial environmental impact

for residents living nearby the new rail, are taken into account. Furthermore, there has been interest in modality shifts due to the high capacity and speed of the new high-speed line. There are some mentions of the distributional effects for high and low income groups. This is outed indirectly by mentioning the ticket prices. There is special attention to high-economic areas such as London, Paris, and Brussels.

Overall, it can be stated that the case can be seen as not socially equitable. Many stratifications are not taken into account. Furthermore, even though this has not been analysed, winners and losers can be depicted quite easily. Due to the focus on economic viability, trade-offs have been made in terms of accessibility and affordability. While the average travel time from the countryside to London will decrease and the frequency of trains will increase, it is only the users of the high-speed trains that get these benefits. The tickets for high-speed trains are high, and it is deemed not realistic for low to medium income groups to be able to afford such tickets and be able to use it as an advantage to future employment (Comptroller and general, 2001-03). Therefore, the main benefactors are the high-income group. The addition of new stations and the upgrade of currently existing stations does lead towards a positive influence for many groups in society in terms of accessibility for local industries and safety for travellers. The fact that this helped other income groups as well as local communities were not mentioned in the policy documents found, and can therefore be called a lucky extra investment instead of conscious policymaking.

The necessity for the HS1 due to the bilateral agreements with France as well as the focus on economic viability have lead to the unequal treatment of other stratifications, such as spatial, affordability, environmental and health impacts. The analyses performed can be seen as negligible in the light of the CBA and the impact it has had on the whole decision-making process. Political necessity has had the biggest role in the creation of the HS1.

#### 6.2.3.2 Process equity

The consultation processes for the HS1 can be called proper. Multiple sources (Gambrill, 2003; Atkins, 2013) state that the many consultation rounds with different levels of government as well as with residents have resulted in the smooth implementation of the scheme, even though that the timeline is long. Due to the consultations rounds, there was massive support from local decision-makers to continue with the scheme. When analysing the consultation rounds, it can be seen that they had influence in the outcome of the scheme. There has been a filter on choices that were up to discussion. However, participators were able to add an item to the agenda which had been filtered earlier. This is an example of why the consultation was done well and has resulted in a lot of support. There has been no deviations from the plans discussed in the consultations and the final design. One point of critique is that there never was a question if the railway would be constructed. Due to bilateral agreements with France in 1987, the United Kingdom had to construct a high-speed line from the Channel Tunnel towards London. Therefore, it was not a question if the scheme would take place, but in what way. It was impossible to obstruct the complete construction of the rail. Such veto possibilities are seen as a necessity to achieve process equity. However, the whole process can still be seen as process equitable.

Interesting to mention is that most of the consultation is executed by private parties. The United Kingdom system entails that after a company is chosen to execute a project, they are responsible for practices such as consultation. Therefore, the British Railways (BR) have performed the public consultation rounds and have made the report on the results. The impact of the consultation is a cooperation between the private railway and the government. The railway has to implement the changes into the plans and the role of the government is to see if this is done properly, as well as the role of local governments to participate in the consultation process.

### 6.3 Differences between guidelines and practice

As far as can be found, all necessary webTAG units are conducted and the incorporated into the five-case model as intended. However, the case studies and the interviews have indicated that even though all analyses are conducted correctly, the impact of the TAG units differ from the guidelines. The biggest

differences lay in the strategic cases as well as the distributional impact analyses. As stated by the Green Book review (H. Treasury, 2020), an acknowledged problem is that the strategic cases are often poorly written and argued for, not adequately explaining the necessity of a scheme. The distributional impacts have been introduced due to legislation, but are currently not incorporated into the output of a TBC or mentioned in the executive summaries of the FBC. The St Austell case shows an example of a poorly written strategic case as well. The strategic case arguments do not lead towards the necessity for implementation of distributional analyses results, resulting in the negligence of these impacts on the FBC.

## 6.4 Discussion of the United Kingdom

This section will discuss the results found from the cases as well as the guidelines from the United Kingdom. First, general results, found problems and explanations why these problems arise are discussed. Secondly, several strengths and weaknesses from the appraisal process from the United Kingdom are discussed. In the discussion in Chapter 8.1, the most impactful strengths and weaknesses are shortly revisited and the comparison to literature will be discussed.

The United Kingdom appraisal process has a lot of strengths and weaknesses in comparison to literature. There are also major differences between the guidelines and how these guidelines are used in reality. This section will elaborate on the strengths and weaknesses of the United Kingdom appraisal process in the guidelines, as well as how it is used in practice. The strong and weak points mentioned are in comparison to literature.

The same referencing system applies, as used in Section 5.5.1, when evaluating the Netherlands.

### 6.4.1 Strengths

- **Elaborate analyses and inclusion of non-monetizable impacts – SEP 1 till 7**

A huge strength of the United Kingdom appraisal system is the TAG system. These guidelines dictate how projects must be appraised and provide the models to do so. These guidelines are broad enough to check almost every box in the Levinson framework, while still having lots of details included per section. Next to the basic economic gains and environmental impacts such as air quality and noise nuisance, there are elaborate models on environmental impacts such as bio-diversity, landscape, townscape as well as social distribution effects such as the impact on affordability per income group, the impact on different income groups per area, effect on safety feelings per age and gender and many more. Not all of these values are monetizable, but the TAG system solved this by creating the AST. The AST provides an overview of monetized and non-monetised impacts on a single page, enabling decision-makers and opposition to see the full impact a project will have on the different levels of society while not being overwhelmed by a huge amount of information. The whole TAG system and especially the AST are an important tool within the United Kingdom its appraisal process to increase social equitability into the process. These tools provide a quick view on the different impacts on society, increasing the decision-information for social factors significantly. When the AST is used for final decision-making, it should lead towards more equitable decision-making or at least force elaboration on the trade offs that are made.

- **Transport Business Case model is extensive – SEP 1 till 7, PEP 2 and 3**

The TBC used by the United Kingdom for appraisal of projects results in a single report which contains all information necessary for the decision-maker to base their decision on. The different cases argue for different parts of the project, covering not only the VfM results (economic case), but also an explanation on the project necessity (the strategic case), how to finance the project (financial case), how the different stakeholders and layers of government must collaborate (management case) and if it is possible to let the market take the project (commercial case). The funnelling of all these different aspects into one report makes it easier to find all information necessary for decision-makers to base their decision on. Even though most TBCs are hundreds of pages long, funnelling and summarizing all necessary information into one document is a strength. The strategic case is

the part of the TBC to force social equitability into the equation. The strategic case can entail the inclusion of societal goals, therefore enforcing equitability into the decision-making. When used in this way next to the economic and financial cases, it should provide a complete view on the impact of a scheme. Furthermore, the management case is a big plus for process equity when applied properly. This case helps to spot if all necessary actors are included and if actors have a proper amount of power within the scheme.

- **Civilian participation is well structured and consistently conducted – PEP 1 till 3**

The DfT has elaborate guidelines for consultation. Studies show that these consultations are done consistently (Worsley and Mackie, 2015). It is clear which groups will participate, there are multiple dates available for public participation, and it is communicated what will be done with the feedback given through the consultation. Also, the results of the consultation can have impact on the outcome of the case. In most cases, it is only an alteration of the scheme and not veto rights. but the alterations can be quite extensive. The HS1 case can be used here as an example (Atkins, 2013). It is important to mention that the HS1 case had a lot of political and societal attention, which could potentially have led to a higher influence than usual for the public consultation. Every consultation is written down in a consultation report, which is attached to the FBC. The extensive report and consultation rounds are a major plus for process equity and can be seen as an example on how to perform such consultation. The HS1 case is especially exemplary.

#### 6.4.2 Weaknesses

- **HM Treasury has (too) much power, which results in an extreme focus on the economic cases and BCR – SEP 2,3,6,7, INT**

HM Treasury is a key stakeholder within the whole appraisal process. They have the power to make or break a case, more than other stakeholders have. The Treasury gives funding mainly to projects with a strong economic case and high BCR. A main focus point of the Treasury is to evaluate if projects are worthwhile in terms of economic value. Therefore, the BCR receives an unequal amount of attention, forcing decision-makers to get the BCR up and above the threshold value of around 2.0, making it a ‘high value for money’ case (Interview-UK, 2022; Interview-UK, 2022; Worsley and Mackie, 2015). Since funding is deemed to be necessary to continue with the project and no project is often worse than a suboptimal project, decision-makers focus more on achieving a high BCR than having socially equitable outcomes. This weakness is made worse by some other weaknesses which will be discussed down below, specifically the lack of transparency, the complexity of the whole TAG system and the bad presentation of the analyses. However, it must be mentioned that changes are being made. The DfT has acknowledged that the focus on economic cases is problematic and that there should be more emphasis on the strategic cases (Interview-UK, 2022; Baldwin, 2021; H. Treasury, 2020). This is a major weakness in terms of social equity. As seen in the strength of the extensiveness of the TBC model above, the strategic case is the place to incorporate social equity into the main goals of a scheme. The power of HM Treasury has resulted in the decrease of the quality of the strategic case, diminishing the amount of social equitability mentioned in the main goals. Therefore, it is easier to leave out social impacts in the decision-making since there are no process obligations to include it.

- **The complexity of the whole TAG system results in narrow usage of information by decision-makers through bad presentation – PEP 1 and 2, INT**

A problem with the completeness of the TAG system is that it results in a complex web of systems. The guidelines consist of more than 1000 pages in total, resulting in a report of over 400+ pages in general. It is not realistic to expect from decision-makers to fully grasp the impact all different guidelines have and how they come together into the FBC. Therefore, the decision-makers are left to rely on talks with experts, the executive summaries, and conclusions of the FBC to base their decision on. Currently, the executive summary consists most of the time of a summary of all five cases, with the full CBA present as well. There are no guidelines on what the executive summary must entail. One of the strongest points in the United Kingdom appraisal system, the AST, is often not present in the executive summary and therefore not taken into account (Interview-UK, 2022).

- **Training to help understand the complexity, only given to high-level government officials – PEP 1 till 3, INT**

The necessary training or guidance to comprehend FBCs, CBAs and appraisal processes in general are not automatically given to low-level governmental decision-makers, but solely to high-level governmental figures. Due to the complexity of the TAG system, this results in lower-level decision-makers to not understand what is taken into account in appraisal processes in general. As mentioned in the weakness above, bad presentation limits the incorporation of social factors. When decision-makers are not aware that these analyses have been done, it is logical that these are not taken into account.

- **Lack of transparency – PEP 1**

A major weakness of the system of the United Kingdom is the lack of transparency in the appraisal process. It is not common to have access to TBC reports or to see the calculations behind the models for every scheme. This makes it difficult for critics, other politicians, researchers or interested persons in general to understand the analytical basis behind decisions. Trade-offs that are made are often unknown, and explanations why alternatives did not work out are based on the trustworthiness of a decision-maker. This enables the possibility to push certain agendas in the political world. The lack of transparency also disables a lot of checks and balances which are installed into the appraisal system. The lack of transparency is the biggest flaw in terms of process equity for the United Kingdom. Even though many of the analyses performed result in a broad social impact spectrum and that the consultation rounds are done extensively, the fact that it is unknown which trade offs have actually led towards the current output of the scheme really harms process equity. It is interesting to find this paradox of having every piece of the puzzle ready while not using it to complete it.

- **No clear policy trajectory, lack of consistency – PEP 1, INT**

The United Kingdom appraisal process is based on the five-case model and will follow this model. However, this model entails what kind of information is necessary to create a full FBC, not which steps should be taken at what point in the process. A consistent policy trajectory can help to create more efficient scheme appraisal, as well as easier evaluation of the appraisal process as a whole.

- **Appraisal process is solution-oriented rather than problem-oriented – PEP 1**

The TAG are centralized around appraising a single solution. FBCs and the CBAs are often only performed for a single case which has been chosen in an earlier stage in the process, before the FBC is used. Therefore, it is not a comparison tool between different alternatives, but a tool to choose between doing a scheme or not. The problem orientation is tried to be put in through the strategic case, where the decision-maker is forced to substantiate what the problem is. However, it often results in a justification why the solution solves the problem, rather than stating why the solution is the best solution in an array of possible solutions. In combination with the fact that the strategic cases are often not well argued for, it results in a solution-oriented appraisal system and often a sub-optimal solution because of unknown alternatives. A solution-oriented design indirectly harms social equity. By only assessing a single case, it is impossible to see if another alternative would result in a more socially equitable outcome. It does not mean that the outcome is per definition inequitable, but it does not provide proof that the chosen scheme is most optimal for society.

- **Consultation done at the wrong point in the process, lacks information for participants to really add value on certain topics – PEP 2,3**

The consultations that are performed are executed in an early stage within the process when there are no numbers available for participants to compare. Even though the execution of the consultation is of high quality in comparison to literature and has impact on the process, the comparison is not based on hard data or analyses. Consultation is done before the CBA and other webTAG units are ready to be incorporated. Therefore, the consultation is merely a tool to assess early input of local residents, but not used in further decision-making. This is a flaw in terms of process equity. To properly perform such a process, another round of consultation should be conducted at a later stage in the process when the impact on society is more clear. Currently, it mostly harms process equity by giving a false sense of influence in the process.

## 6.5 Conclusion United Kingdom on the theory and the cases

It can be stated that the United Kingdom appraisal system can in theory lead towards equitable outcomes. The TAG system gives insights into many effects, monetizable and non-monetizable. A lot of the different dimensions and stratifications of Levinson are incorporated, and the consistent use of consultation results can help the decision-maker make an equitable outcome or at least be aware of the impact the scheme has.

However, the process is designed in such a way that alternatives are shut down before it is clear what the real impacts are. This results in solution-oriented outcomes, which are per definition sub-optimal. Furthermore, the power of HM Treasury, the lack of necessity for alternatives in the TBC and lack of transparency weaken the strengths of the United Kingdom appraisal process. The strengths are overpowered by the impact and necessity of a high BCR, not needing alternatives for comparison and not having to account for the trade offs made in a public setting. This does not directly lead towards an inequitable outcome. In essence, the system does help to filter out the terrible cases by having a specific threshold, in most cases a high BCR, before projects are executed. These filters do their job as good as can be expected, resulting often in workable projects which are in essence not extremely inequitable. However, the problem lies in the fact that these schemes are often sub-optimal due to the solution-oriented way of thinking, as well as does not contribute towards more equitable infrastructure schemes, which is something that the TAG should contribute to (H. Treasury, 2020). The tools at hand could contribute consciously towards more socially equitable infrastructure projects, but now results in merely the filtering of extremes. If a project is socially equitable, it is currently the result of sheer luck instead of conscious decision-making.



# Chapter 7

## Comparison of cases

In this chapter, the appraisal processes of the Netherlands and the United Kingdom will be compared. This comparison will be made on two levels, namely on the CBA guidelines and the appraisal process as a whole. The goal of this chapter is to see where the similarities and differences between the systems lay, and how these have impacted the appraisal processes.

### 7.1 Comparison on appraisal guidelines

This section will elaborate on the differences between the CBA guidelines of the Netherlands and the United Kingdom, as well as the appraisal process as a whole. It will provide insights into the institutional differences in social and process equity.

#### 7.1.1 Differences between CBA guidelines

A comparison between the CBA guidelines of the countries is interesting and important to denote from the whole appraisal process. As mentioned by various authors from both countries (Annema, Frenken, et al., 2017; Niek Mouter, 2017b; Worsley and Mackie, 2015; Baldwin, 2021), the value given towards the CBA by decision-makers differs per country. Therefore, it is important to find differences within the CBA guidelines to understand why the value given differs per country. By doing two comparisons, a distinction can be made where differences with regard to social and process equity lie, as well as being able to understand the outcomes per country.

Table 7.1: The comparison of the CBA guidelines per country is shown. The incorporated dimensions per stratification are shown. It only shows which dimensions are considered, not to what extent they are incorporated.

	<b>The Netherlands</b>	<b>The United Kingdom</b>
<b>Population</b>	All	All
<b>Spatial</b>	All	Environment, Health
<b>Temporal</b>	Mobility, Economics	All
<b>Modal</b>	Mobility, Environment, Health	Mobility, Environment, Health
<b>Generational</b>	Economic	Economic
<b>Gender</b>	-	-
<b>Racial</b>	-	-
<b>Ability</b>	-	-
<b>Cultural</b>	-	-
<b>Income</b>	-	-

Table 7.1 shows a comparison between the guidelines of solely the CBA within the appraisal process. It is a simplified version of the framework of Levinson. The table indicates per stratification which criteria

are taken into account, resulting in a quick and easy-to-read summary per country where the focus of the analyses lay.

### Amount of stratifications incorporated

Interesting to see is that the Dutch CBA guidelines are broader in terms of analysis than the United Kingdom variant. This can be mostly credited to the spatial approach of the Dutch. On the other hand, the United Kingdom takes temporal effects more into account, incorporating construction and maintenance nuisance to a higher degree than the Dutch. The wider incorporation of dimensions on spatial compensates for the lack of width in the temporal field. Therefore, it can be stated that the Dutch guidelines provide more decision-making information for an equitable outcome in comparison to the United Kingdom. However, it still is lacking many stratifications in comparison to literature.

### Non-monetization

Both countries only incorporate monetizable values into the CBA. Therefore, all values incorporated are quantified in some way, resulting in solely quantitative comparison.

## 7.1.2 Differences in the whole appraisal processes

Table 7.2: The comparison of the full appraisal guidelines per country is shown. It can easily be seen that the full appraisal process of the United Kingdom provides much more information than the Dutch variant. The addition of the TAG units next to the CBA especially provides diverse information about all stratifications.

	The Netherlands	The United Kingdom
<b>Population</b>	All	All
<b>Spatial</b>	All	All
<b>Temporal</b>	Mobility, Economics	All
<b>Modal</b>	Economic, Environment, Health	Mobility, Environment, Health
<b>Generational</b>	Economic	Mobility, Health
<b>Gender</b>	-	Mobility, Health
<b>Racial</b>	-	Mobility, Health
<b>Ability</b>	-	Mobility, Health
<b>Cultural</b>	-	Environmental
<b>Income</b>	-	Mobility, Economic, Environment, Health

When taking all different analyses used in the process into the equation, as seen in Table 7.2, it is clear that the United Kingdom is more elaborate than the Dutch appraisal system. The complexity of all different TAG units comes forward in terms of the addition to the framework of Levinson. The main differences between the appraisal processes are listed below.

### Amount of stratifications incorporated

When taking all the appraisal tools into account, it is clear that the United Kingdom variant is more complete. Important to note is that almost all appraisal tools used in the Dutch variant are also incorporated into the CBA, while the United Kingdom variant has a lot of quantitative and qualitative (e.g. level of biodiversity, social distribution analyses) assessments which are not incorporated into the CBA.

### Non-monetization

As can be seen by comparing Tables 7.1 and 7.2, the whole appraisal process in the United Kingdom incorporates many more dimensions and stratifications than the Dutch. However, many TAG units are non-monetized and are added next to the CBA. Therefore, it is excluded from the BCR, which has much power within the United Kingdom its appraisal process. The Dutch system does not use any non-monetized values.

Several other differences arise in the appraisal process in comparison to only the CBA. However, these

cannot be spotted within tables 7.1 or 7.2. These differences are listed below.

### **Legislation**

The Netherlands have legislation that the CBA must be used within the rationale of the chosen alternative in infrastructure projects, therefore deliberately giving the CBA a position of power and interest for decision-makers. The Dutch legislation is mainly focused on streamlining the steps in the MIRT program, enhancing transparency and regulating how decisions are made.

In the UK, it is mandatory to follow the five-cases model. The United Kingdom legislation is similar in terms of output but is much broader because of several acts of diversity and transport, which require more detailed analyses of different groups and solution spaces.

### **Differences in participation**

The United Kingdom has a stronger system in place on how to contact and take the participation of local actors into account. Consultation has become standard practice in the infrastructure schemes of the United Kingdom. The Netherlands does not have a mandatory public consultation, only a ‘must use’ basis, which indicates that it should be mentioned why it is or is not applied (Ministerie van Infrastructuur en Milieu, 2016; Zondervan, 2022).

### **Different levels of government involved**

The Dutch system revolves around a combination of national and local governments. The threshold value for major projects where national government influence is necessary, is lower in the Netherlands than in the UK, resulting in the national government being involved more often in the Dutch decision-making process. Furthermore, where the Dutch government collaborates with market parties, the United Kingdom system is much more market-oriented, giving more responsibility in the execution to market parties.

### **Checks and balances**

An important difference to mention in the appraisal process is the number of built-in checks and balances. Where the United Kingdom analyses are more all-encompassing, the Dutch have more checks and balances in place. The Dutch system has several steps that must be approved by third parties or parliament, providing several checks before the final decision is made. The most important one in the Netherlands is the Committee m.e.r..

## **7.2 Comparison between the practice of countries**

This section will compare the complete appraisal processes between the United Kingdom and the Netherlands on how it is executed. This section will continue on the comparison made above, but will add the strengths and weaknesses as discussed in Sections 5.5 & 6.4.

### **7.2.1 Road**

The road cases of both countries are vastly different in terms of equity. Looking at both Levinson frameworks in Figure 7.1, clear differences can be spotted at both the stratification level and the dimension level. The A4 case primarily focuses on spatial impact, with an emphasis on mobility, economics, and the environment. There is a small step towards the economic impact on income, but this is negligible in the bigger picture. The St Austell case includes many dimensions in some form, but there is not a single stratification which has all dimensions incorporated. However, in comparison, much more equity information is present in the St Austell case.

The outcome of the cases is in line with the differences found between the incorporation of the different equity dimensions and stratifications. The outcome of the St Austell case can be seen as more equitable in comparison to the A4. The winners and losers are more spread out across different income groups, as well as a clear increase in the safety of different gender and age groups due to various implementations. The A4 case mainly benefits the commuters and harms low-income groups living next to the new highway. It is unclear to what extent the information has steered the outcome of St Austell or

Netherlands: A4 Midden-Delfland						United Kingdom: St Austell to A30 link road					
Stratification	Opportunity	Mobility	Economic	Environmental	Health	Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population						Population					
Spatial						Spatial					
Temporal						Temporal					
Modal						Modal					
Generational						Generational					
Gender						Gender					
Racial						Racial					
Ability						Ability					
Cultural						Cultural					
Income						Income					

Figure 7.1: Comparison of the A4 case and the St Austell case through the Levinson framework, incorporating the full appraisal process. It can be seen that the St Austell case incorporated more stratifications as well as overall dimensions.

the A4 case. Therefore, the more socially equitable outcome cannot be awarded to the more extensive appraisal process.

### 7.2.2 Rail

Betuweroute						Channel Tunnel Link Rail - HS1					
Stratification	Opportunity	Mobility	Economic	Environmental	Health	Stratification	Opportunity	Mobility	Economic	Environmental	Health
Population						Population					
Spatial						Spatial					
Temporal						Temporal					
Modal						Modal					
Generational						Generational					
Gender						Gender					
Racial						Racial					
Ability						Ability					
Cultural						Cultural					
Income						Income					

Figure 7.2: Comparison of the Betuweroute case and the Channel Tunnel Link Rail HS1 case through the Levinson framework, incorporating the full appraisal process. The main differences can be found in the slight modality incorporation in the Betuweroute and the mobility incorporation at the CTRL HS1 case.

The rail cases are quite similar in terms of equity. Looking at the frameworks in Figure 7.2, it can be seen that the main differences lay in the slight modality incorporation of the Betuweroute, the slight mobility incorporation at the HS1 line, and the opportunity in the decision-making process at the HS1.

This slight modality incorporation of the Betuweroute can be traced back to the core argument on why the Betuweroute was necessary. The current medium of transport, road and water, could not suffice in the estimated demand. Therefore, the analyses on the necessity of the Betuweroute has incorporated the change of modality to a slight extent, as it is part of the core argument in favour of the Betuweroute.

The slight mobility incorporation in the HS1 line can be traced back to the essential impact estimated by the HS1, namely the possibility for different groups of society to use the new railway for various purposes. This expectation is therefore analysed through several analyses, focusing on if different groups within society would really benefit from this new HS1.

The opportunity in the decision-making process has been a huge part of the HS1 project. This decision-making process has been state-of-the-art, especially in comparison to the Betuweroute. Where the HS1 line has had multiple rounds of consultation with various stakeholders, the Betuweroute has had an active policy on avoiding further consultation rounds when more resistance arose. The consultation rounds have altered the output and outcome of the HS1 line to some extent, whereas the Betuweroute has had no changes due to participation. The HS1 case is much more process equitable than the Betuweroute.

In terms of social equity, the HS1 also scores higher than the Betuweroute due to the wider incorporation of health and income impact over several stratifications.

### 7.2.3 Road versus rail

The last comparison that has to be made is the comparison between the road cases and the rail cases. This comparison is mainly done per country to highlight if there are differences present between the execution of both and to identify what the differences are. Figure 7.3 shows full appraisal incorporation of all cases.

It can be seen that the differences between both rail and road vary per country. The road and rail cases of the Netherlands are closer in terms of analysis width than the United Kingdom cases. This is

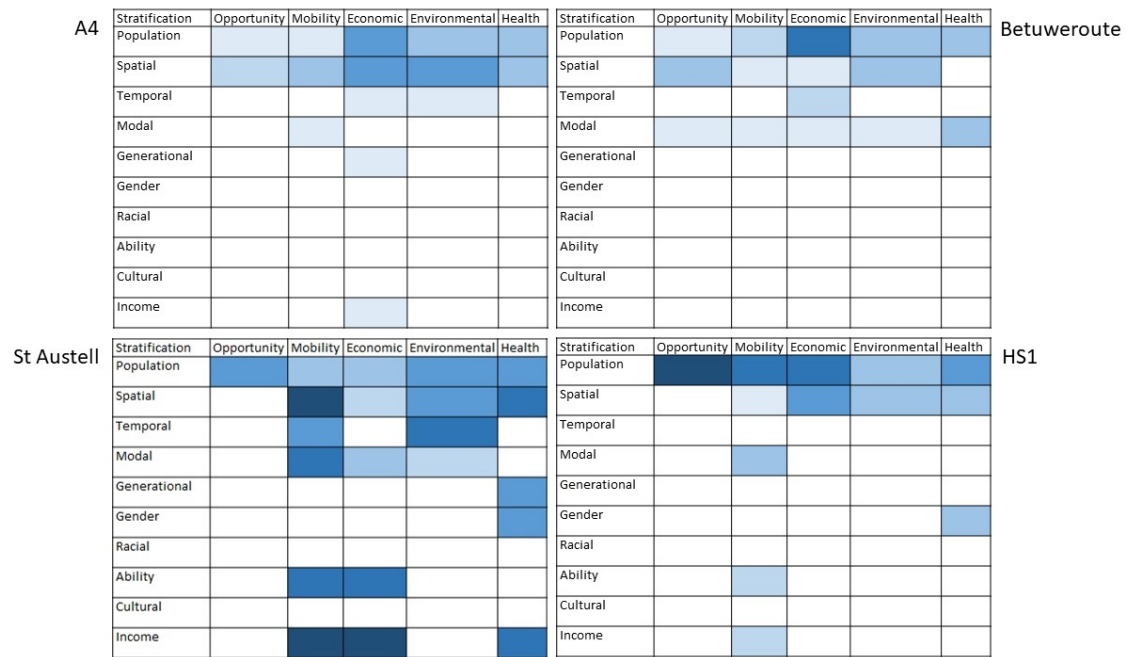


Figure 7.3: The figure shows the Levinson framework on all cases, with the road cases in the first column and the rail cases in the second. Interesting to see is that the differences per country are significantly visible through the darker shades of blue as well as the amount of coloured cells present. Furthermore, the rail cases show more focus on population than the other stratifications, while road has a more distributed analyses level.

a logical result. The CBA guidelines used in the A4 are more extensive than the guidelines used in the Betuweroute, but the level of extension is not significant. The United Kingdom on the other hand has seen a significant increase of analyses necessary through the creation of the Equality Act and the creation of the TAG system.

The differences per country are visible in Figure 7.3. The overall level of dimensions and stratifications included as well as the depth in which these are included is higher in the United Kingdom. Especially the road cases show much difference. The road cases can be found in the bottom row of Figure 7.3.

An interesting find is that both rail cases focus more on the population stratification than road cases. The overall level of depth on the population stratification is higher in the rail cases than in their road counterparts. This can be spotted by looking at the 'opportunity to join the decision-making' cell being higher in the rail cases, as well as the higher incorporation of mobility and economic impacts in the rail cases in comparison to road. On the other hand, the road cases incorporate a wider array of stratifications, while the rail cases do not or only slightly incorporate some.

The impact of the schemes are different per infrastructure method used. However, as literature shows (D. Levinson, 2002; D. Levinson, 2010; Liss, 2010; Centre, 2002), the dimensions, and stratifications do not change significantly per infrastructure method. Therefore, it should get a similar amount of analysis and emphasis. Since this is not present, it shows a different interest towards rail and road, favouring road for having more analyses present. The present difference between rail and road is interesting to see. This indicates that different values are given to different types of infrastructure transport. A lower amount of analyses results not only in less equitable outcomes, but also indicates that the scheme is of lesser importance due to less effort necessary to spend.

Important to mention is that both rail cases have been executed in the predecessor appraisal system

of the road cases. The differences present can be explained by this time difference. As seen in Section 4.1.4.1, the current guidelines have no significant differences in overall levels of appraisal between rail and road for the stratifications and dimensions.

## 7.3 Discussion of comparison

The comparisons have shown the differences between the Netherlands and the United Kingdom in guideline as well as practice levels. First, different patterns of similarity and differences will be discussed. Secondly, several reasons will be given on why these patterns could occur. Some patterns found could be used to understand how social and process equity could be improved. These will be discussed in Section 8.3.

### 7.3.1 Similarities

This section will discuss the main similarities found between the Netherlands and the United Kingdom. These are overarching similarities, with some differences present within the similarity. These differences are highlighted to understand how the similarities materialize within the different systems of both countries.

#### **Focus on economic impact**

Both countries have a focus on economic gains within the appraisal process, to the point that economic gains are the main focus of attention. The economic gains are more impactful in the United Kingdom cases due to the direct importance of the BCR, while the costs in the Dutch system receive more attention due to the funding problem. This can clearly be seen by the necessity of the BCR being above one in the HS1 case (Comptroller and general, 2001-03). The focus in the Netherlands can be spotted in the A4 case. The case shows that an alternative which should lead towards an overall better solution in the long run was not chosen due to having higher initial costs, amongst several other arguments given. This economic impact results in both countries towards less importance given to other dimensions within the framework of Levinson, increasing the chances of an inequitable outcome.

#### **Getting funding is an important factor for shaping the project**

Both countries have their own way of emphasizing the importance of finding proper funding in time. Where the United Kingdom targets the funding through the BCR and HM Treasury, the Dutch system has the 75% funding reservation system. This is an extension of the former notion of the economic impact focus. Both road cases however demonstrate the problems revolving around funding. The St Austell case is put over the BCR threshold of 2:1 by questionable wider economic impacts, and the A4 is chosen due to its lower costs and relatively same impacts within the measurements done. In both cases, it was important to match the requirements for funding rather than focus on an equitable outcome, directly harming social equity.

#### **Little to no coupling with national policy goals on lower level**

Both countries do not have a working system in place to couple national policies towards lower governments in terms of infrastructure. The Dutch NOVI does not work as it is supposed to due to being too vague (MER, 2020). The United Kingdom uses national bills, but these are often not working in practice. The lack of national policy in both countries results in lesser policy and socially equitable systems. Since there is no guidance from above, it lacks consistency in its output, resulting in various outcomes. Interesting to mention is the way the United Kingdom tries to enforce policies into the models. It is mentioned during an interview (Interview-UK, 2022) that the United Kingdom often couples policies by adjusting key numbers in models, resulting in different emphasis and therefore outcomes. This automatically leads to a strengthening of the first argument of having a high economic focus. By adjusting key numbers to alter the outcome, the focus is again applied on quantitative results, such as the CBA, while many of the TAG items which contribute to social equity have qualitative elements and are therefore still not incorporated.

### **Solution oriented instead of problem oriented**

Both systems are, to a certain degree, solution-oriented instead of problem-oriented. The United Kingdom system is more solution-oriented than the Dutch system due to the guidelines. The Dutch variant includes multiple alternatives in the main analyses, therefore being problem-oriented in theory, while the United Kingdom does not. However, in practice, both systems are solution-oriented due to the funding problem at the Dutch side and the way the process is shaped in the United Kingdom. This can also be seen within the cases. The Betuweroute is a prime example within the Netherlands where the solution is pushed rather than a problem is solved. The A4 case has this to a lesser extent as well. The CTRL HS1 and St Austell cases are similar to their Dutch counterparts. It can be argued that solution-oriented designs decrease the equitability of the appraisal process due to lacking optimisation. However, solution-oriented designs do not generate inequitable outcomes per definition, as can be seen through the analyses of the cases in both countries. Even though the St Austell case is solution-oriented, it can be stated to be more equitable than the A4.

### **7.3.2 Differences**

#### **The United Kingdom uses CBA and especially the BCR much more than the Netherlands**

The usage and impact of CBA and especially the BCR is higher in the United Kingdom than in the Netherlands. The United Kingdom system has a lot of focus due to HM Treasury, whereas the Netherlands does not give much power to the CBA in the appraisal process due to its high levels of political play. The HS1 argumentation from parliament states that it is necessary to have a positive BCR and the FBC of the St Austell case show the emphasis on CBA. The A4 case does have the CBA used within its rationale by the minister, but its importance is downplayed within the same policy document.

The high value given towards the CBA in the United Kingdom should have led to a more inequitable outcome in comparison to the Dutch case due to a focus on the narrow monetized impacts within the CBA, since the Dutch can include more social impacts due to the lower emphasis on CBA. However, due to the Netherlands not having an alternative for social impacts next to the CBA, the higher focus of the United Kingdom on CBA still results in a similar outcome in terms of social equity.

#### **The United Kingdom has more elaborate and complex models**

The TAG system of the United Kingdom is much more elaborate, in monetized and non-monetised impacts, in comparison to its Dutch counterpart. The extensive distributional analyses of the United Kingdom allows for much more equitable decision-making in the process. However, the analyses enables more equitable decision-making but does not lead necessarily towards more equitable outcomes, as can be seen in the cases. The difference between the A4 and the St Austell case is not due to including more social impact information provided by the TAG system. It is unclear if there is a specific reason for the outcome being more socially equitable, but it seems to be sheer luck rather than conscious decision-making. The more elaborate models do lead to a more complete level of information available in hindsight, enabling better evaluation of projects.

#### **The United Kingdom has less political bargaining**

Where the Dutch system revolves around political play and the final decision is always done by the minister in major MIRT processes, the United Kingdom system has more strict regulations and market play, resulting in more direct coupling towards the output of analyses. Interesting to mention is the paradox this finding raises. The Dutch system forces decision-makers to use the CBA within their rationale, making them include the output of appraisal analyses in their formal argumentation. The United Kingdom does not have such an obligation, but has more direct coupling towards the appraisal tools in the decision-making. The obligation increases the transparency greatly and therefore the process equity. However, in essence, it does seem that it does not result in more socially equitable outcomes in comparison to the United Kingdom and the Levinson framework. This is caused by the narrow level of depth of the CBA analyses in the Netherlands. Even if all stratifications and dimensions analysed are included properly, if not enough stratifications and dimensions are analysed, it will not result in more equitable outcomes.



**The Netherlands has a third-party validity check for EIA**

A difference in the validity of the appraisal process is the fact that the Netherlands have the Committee m.e.r. to validate their EIA with an independent third party, something that the United Kingdom does not have. This third-party checks automatically results in an emphasis on environmental impact, which can be seen as a plus for social equitability. This can be seen in the cases of the A4 and the Betuweroute, where the m.e.r. and EIA are mentioned specifically multiple times. The United Kingdom cases mention the environmental impact to a lesser level. The HS1 mentions merely that the new line will be environmentally better than a road or flight equivalent. The St Austell case only mentions environmental impact within the CBA outlining. This difference in emphasis and value given to the EIA can be seen as an equalizer for the Netherlands for social equitable outcomes. The lack of depth of the Dutch analyses is compensated by this extra check by the Committee m.e.r., resulting in a closer gap between both countries than should be expected when looking at the guidelines.

**The Netherlands have good transparency in the policy process as well as rationales and hiccups**

The Dutch transparency in the system is a major strength in comparison to the United Kingdom. Transparency is the key for critics and researchers to understand how complex systems work and how decisions are made, paving the way for improvement. The lack of transparency in the United Kingdom is a major flaw in the system and one of the main reasons that it results in problematic decision-making (Interview-UK, 2022). This can be highlighted by the amount of information which could be found for the whole appraisal process per case. The Dutch cases are easier to find all sorts of information for, while the United Kingdom cases are difficult to even find the FBC for, let alone notes from decision-maker meetings. Transparency is a major plus for process equity within the Netherlands. A clear example is the mandatory rationale the Netherlands have for choosing an alternative. The Dutch system forces decision-makers to elaborate on trade-offs made between alternatives, and to specifically argue why the chosen alternative is the best option at hand. This has helped the analyses of the A4 case significantly, enabling the understanding of the trade-offs at hand and helping to identify the importance of political play. This is also a key point missing within the United Kingdom cases. This mandatory rationale increases the opportunity to engage in decision-making and therefore increases the process equity for the Netherlands.

**7.3.3 Explanation for why these differences occur**

Some similarities and differences found can be explained by several reasons. This section will elaborate on some reasons which have been found to be the basis of the differences and similarities.

**Awareness of width and depth of appraisal tools**

A reason that can be given for the differences between both countries, is the awareness of the width and depth of appraisal tools. Both countries state within the guidelines that they deliver ‘enough information to provide information about distributional effects’ while there is an immense difference between the countries. An important insight is that practitioners in the Netherlands are aware that the analyses are incomplete and even sometimes doubt the neutrality of the analyses performed (Niek Mouter, 2017a). This gap between the guidelines and decision-makers in the Netherlands results in the undermining of the analyses present and the decision-makers taking on a more diverse role. When it is known that the analyses are not complete and cannot be trusted to deliver all the information necessary, decision-makers will use the information to support their own vision and goals, since there is no trustworthy information to convince them otherwise. Therefore, the decision-maker will not take the role of making trade-offs based on provided information by experts, but also by taking the role of an expert and trying to comprehend what the impact of the project will be on society. Especially the latter is in line with a study from Niek Mouter (2016), stating that so-called ‘regional MPs’ often try to lobby their projects into existence for either standing up for their own region or by making themselves memorable by helping the region. To be able to become memorable, a project needs to be beneficial for the region. The analyses show that such a statement cannot be done with the current analyses. Therefore, decision-makers have to assess the impact themselves rather than to be able to rely on expert information.

This also suits the result earlier found and discussed in the interview with Zondervan (2022) that decisions are made between decision-makers before appraisal takes place. When acting out of their own interest and vision and being aware that the performed analyses are incomplete, decision-makers will use their own knowledge on what the impact on equitability would be, resulting in the negligence of performed analyses, a personal bias for the outcome as well as an increased inequitable outcome in both social and process equity.

The United Kingdom does not have issues of incomplete analyses or being biased in any form. Reports on the appraisal process (Worsley and Mackie, 2015; Baldwin, 2021; H. Treasury, 2020) do not discuss any of these issues, merely the lack of usage for other reasons mentioned earlier, such as the power of HM treasury and the solution-oriented design.

Since the United Kingdom does have more complete information accessible in the appraisal process, it should result in less political play due to ignorance and more evidence-based policymaking. decision-makers can use the information for trade-off purposes. This can be seen in both the cases of St Austell and the HS1, where decisions are directly based on trade-offs, although being mainly economically focused. This can be seen as one of the reasons why the outcome in the United Kingdom cases is more socially equitable than its Dutch counterparts.

### **General mindset of the population**

A reason for the differences in the depth and width of the appraisal analyses can be tied back to the general mindset of both populations. During the interview with Zondervan (2022), he mentioned that the lack of analyses in the Netherlands occurs due to the Dutch mindset. The general mindset in the Netherlands is that everyone is equal. This fundamental principle is an argument against the inclusion of further distributional analyses. When, for example, different income groups are treated differently, this would mean that not everyone is equal. Even though it can be argued that this would be fairer, it does not fit within the current Dutch practice. This principle is not likely to change due to regulation or a political push as well. As mentioned in the paragraph above, heavy regulations are not fitting for the Netherlands.

This mindset does not seem to change in the near future. A reason for this is that a politician risks his own career when applying differentiation. The differentiation between groups in society can cause a loss of electoral support. However, due to not being able to have talked to a politician/decision-maker in this context, it is not possible to verify this. Therefore, the second reason must be acknowledged as speculation. Interesting to mention is that this Dutch mindset actually hurts the goal itself. By treating everyone as equal and therefore not considering social equity, inequity increases due to not knowing if everyone is treated equally, resulting in equitable outcomes due to ignorance.

### **Poldermodel versus Anglo-Saxic**

Another explanation can be given for the immense difference in the appraisal analyses of both countries. This explanation lies in the different mindsets between the Netherlands and the United Kingdom. Where the Netherlands is known for its 'poldermodel', having a lot of debate and focusing on getting consensus, the United Kingdom its approach is more Anglo-Saxic and rigorous in enforcing regulation by legislation. When looking at the legislation on the appraisal process in both countries (Tables 4.1 & 4.2), there are a lot of similarities present on a high-level view, namely having legislation on letting the minister and parliament having most of the power. However, an important difference is the obligatory nature of the United Kingdom bills in comparison to their Dutch counterparts.

The United Kingdom legislation forces the appraisal tools to include various different sources such as social equity (Equality act), increase efficiency (Planning act), Growth and infrastructure act), and environmental impact (Environmental act of 1995 and 2021). The mindset is to follow the guidelines and rules. This can be seen in the width and depth of the appraisal tools and through the application of these laws in the cases. The HS1 case had to specifically fit into the framework sketched by legislation for environmental impact. Even for such a high-profile necessary case as the HS1, exceptions could not be made.

The Netherlands on the other hand has far more focus on guidelines, customization and ‘poldering’. A clear example is a difference in the consultation legislation. The Dutch have a three-page document giving tips and tricks, while the Code for Consultation of the United Kingdom has concrete criteria which must be taken into account.

Furthermore, the Committee m.e.r. does not have to give positive advice for the project to be able to continue. The decision-maker has to make the trade-offs and is influenced by political play (Niek Mouter, 2016; Niek Mouter, 2017b) rather than restricted by heavy regulations. Therefore, it does not fit the Dutch system to enforce regulations and strict guidelines on what must be included in analyses and leave room for customization per project (De Vries, 2014). This can be seen in both of the Dutch cases as well, where multiple exceptions are made and known negative impacts are traded off consciously for political reasons rather than regulations. This has resulted in the elaborate TAG system of the United Kingdom and the narrow appraisal analyses present in the Netherlands.

The polder model also enables lobbying, as mentioned in the first paragraph of this section (De Vries, 2014). The design of the model increases the accessibility of a variety of stakeholders to the decision-makers, enabling lobbying toward decision-makers and increasing the political play of the system.

## 7.4 Conclusion

The comparison has shown that the guidelines of the appraisal analyses differ greatly between both countries, but the outcome in practice is much closer. Both show a significant focus on population and spatial stratifications, as well as the economic dimension. Interesting to see is that both countries have more narrow analysis output in the rail cases than in the road cases, resulting in a higher chance of less equitable outcomes. Furthermore, it can be seen that both countries have a significant economic focus present and a solution-oriented design in practice. The main differences lie in the amount of political play present, which is higher in the Netherlands, and the depth of analyses performed, which is higher in the United Kingdom. These differences can be explained by the different cultural and political settings. The Netherlands is based on the polder model, focusing on gaining consensus and having an aversion to too many regulations, whereas the Anglo-Saxic United Kingdom focuses more on regulations and standardized systems.

Furthermore, the Dutch are to a certain degree aware of the incompleteness of the used tools, especially on equity levels. The Dutch decision-makers use the tools as input for their own assessment on how equitable a project will be, rather than trusting models or experts’ advice. Dutch decision-makers think they are best to assess equity for projects, while the United Kingdom relies more on models. The last difference is the general mindset of the population. A telling quote from the interview with Zondervan (2022), “The word social equity is not used in our vocabulary”, indicates this difference. The Dutch mindset is stating that everyone is equal, therefore some distinctions are not necessary or not wanted to be made. The United Kingdom, however, relies more strongly on fair distribution, characterized through legislation such as the Equality act, which forces that distinctions are made for equity purposes.

## Chapter 8

# Discussion and Conclusion

### 8.1 Discussion

This section will discuss the most important findings and compare them to the literature. The goal of this section is to discuss the most important results of the analyses and combine these into lessons that can be learned.

The Netherlands distinguish itself by having a transparent appraisal process with multiple checks and balances in place to try to secure problem-oriented decision-making. The transparent process is found in the discussion with all interviewees, the ease in which a variety of policy documents could be found as well as specific legislation such as the WOO (Wet Openbare Overheid, Law transparent government) (Rijksoverheid, 2022b). This level of transparency can be seen as a significant plus for process equitable decision-making.

However, this is also the only plus that can be found with regard to process equity. Public participation is more often than not performed and if it is performed, the impact it has is unknown and cannot be tied back to the output or the outcome of the project. This can be seen in all cases, with a special mention to the Betuweroute where there has been a specific policy to avoid further participation or public consultation. The current system does not enable participation due to a lack of guidance as well as an incentive to include participation in the process for decision-makers and project owners. The Code Maatschappelijke Participatie (Rijksoverheid, 2014) does not provide concrete steps on how to perform participation, resulting in customization per project and often not performing participation.

Furthermore, the system also results in socially inequitable outcomes. The political play has more impact than performed analyses such as the CBA or the MER, leaving little room for equity analyses to be weighed in the decision-making and the outcome. This finding is in line with earlier studies from Annema, Carl Koopmans, and Van Wee (2007), Niek Mouter (2017b) and Niek Mouter (2016), and Rienstra (2008). The cases of the A4 and Betuweroute show that the decision-making process is not altered to a significant level by performed analyses, but rather by political play. The narrow depth of the performed analyses also contributes to the lesser importance of the analyses within the process.

The Levinson frameworks of Figures 4.2, 5.3 and 5.6 show the dimensions and stratifications which are not incorporated to any extent through appraisal tools. This lack of incorporation does not result in inequitable outcomes per definition, but does contribute significantly to an increased chance of inequitable decision-making. It can be stated that the current system does not provide enough information to make a conscious decision on the social impact of a project.

Attempts to make the appraisal process more efficient have resulted in the loss of importance for the problem-oriented approach of the Netherlands, resulting in further diminishing the impact of analysis tools. The funding argument describes the mechanism of how the problem-oriented design has turned

into a solution-oriented approach.

Common problems, as discussed by Van Wee (2012), about CBA and other appraisal tools have also been found in the Dutch cases and the guidelines. This study has contributed to these findings by showing the size of the problem in the current Dutch appraisal process as a whole, not only what the problems are for CBA. Not only are the tools too narrow to answer the question of ‘policy success for whom?’, but the appraisal process design also contributes directly to sub-optimal decisions.

In general, it can be said that the Dutch appraisal process results in socially and process inequitable outcomes. This is caused by ignorance rather than malicious intent.

The United Kingdom distinguishes itself by having elaborate analyses through the TAG system and consistent and extensive public consultation. This results in elaborate final business case reports which consist of a majority of the dimensions and stratifications as discussed by Levinson, enabling the possibility of answering the question of McConnell (2017) ‘policy success for whom?’. However, in practice, the analyses are often not used to their full extent in the decision-making due to three reasons.

First, the process design entails the focus on a single solution rather than being problem-oriented. This results in having the impact of only one alternative modelled, therefore not knowing if there are better solutions present.

Secondly, the timing of the modelling entails that the impact analyses cannot have much influence on the output of the project. This second reason goes hand in hand with the first. The full modelling is done at a later stage when only a single alternative is modelled, resulting in a choice between a go or a no-go for a project. This makes it more difficult for decision-makers to decide not to continue a scheme, since there are often many problems solved through schemes.

Thirdly, the cases show that mainly the CBA is important in the process due to the power of HM Treasury, resulting in a huge focus on economic gains. This is in line with other reports (Worsley and Mackie, 2015; Baldwin, 2021). The importance of a proper CBA and a high VfM results in the negligence of other impacts, decreasing the influence of social impacts. This is materialized through the focus on economic gains within the five-case model, with three out of the five cases focusing on the economic gains and using CBA as a main source of information. Also, the strategic case often has an economic focus as well, as can also be seen in the St Austell case. These findings are in line with the evaluation of the Green Book (H. Treasury, 2020).

Furthermore, a lack of transparency makes it difficult for the system to improve and to be able to discuss the trade-offs which have been made. It is difficult to find all (policy) documents which are used, as well as the trade-offs which have been made and have led to the current output and outcome. The lack of transparency can be seen as one of the biggest problems with the United Kingdom its appraisal system, directly contributing to solving problems with regard to equitable outcomes.

This study has shown how, even though all pieces for an equitable outcome are present, the tools are still not used to create an equitable outcome in the United Kingdom. The analyses of the CBA have shown what the impact is of the focus on CBA, how narrow its analyses are in the bigger picture, and how it contributes toward inequitable outcomes.

### 8.1.1 Policy lessons learned

The comparison of both countries has enabled several lessons to be learned on how policy decisions impact infrastructure projects. First of all, the analyses show that adding more information to the process does not solve the problem of equitability in the outcome. Results from the cases show that the Dutch projects do not generate significantly more inequitable outcomes due to a severe lack of analyses in comparison to the United Kingdom cases. The greater amount of analyses and results of the United Kingdom, in comparison to the Netherlands, are not included in the decision-making process of the United Kingdom.

This can be tied back to three main problems for the United Kingdom, namely the complexity of the TAG system, bad presentation within the FBC, and the power of HM Treasury. For the Netherlands, the lack of incorporation of more social impact analyses has a different reason. As discussed during the interview with Zondervan (2022), decision-makers only include the information that they deem to be necessary, rather than what they are handed. This is supported by the findings of analyses being ignored or not used. Therefore, it is important to incorporate a necessity to include social impact in the process. Only adding extra analyses does not result in better outcomes. Such incorporation should not only improve the social equitability of projects by enforcing equitability analyses in the decision-making, but it would also benefit the process equity by increasing the transparency of trade-offs that have been made.

Secondly, both countries have a huge economic focus established for a variety of reasons. One of the overlapping reasons which can be found is the drift for efficiency. Incorporating a variety of analyses will lead to a long policy process, which increases the costs of projects. The legislation of both countries, mentioned in Figures 4.1 and 4.2, show the several legislative attempts made to increase the efficiency throughout the years.

One of the causes for this drift of efficiency, revolves around the relationship between the government and businesses. Governments need to limit their spending while still adding value to society, while businesses involved need to generate profit rather than adding value to society. This results in a compromise, being a focus on economic viability and therefore negligence of other impacts. A key consequence of this drift is that projects become focused on economic viability rather than social impact.

This drift for efficiency materializes in different manners per country. The United Kingdom process has a major focus on CBA and especially the BCR to evaluate if a process will be economically worthwhile. The mere fact that a high VfM result in easier approval of funding without incorporating social impacts into the BCR is a clear example of said drift for the UK. The drift for efficiency in the Netherlands materializes in the funding problem, the 75% funding reservation system. This has resulted in the speed-up of projects due to funding being ready at an earlier stage in the process, therefore reducing the total time used for a project. However, this has led to solution-oriented outcomes, neglecting the importance of other impacts next to the economic costs.

Efficiency can help to reduce the costs, but comes at a price itself. This drift for efficiency directly harms social and process equitability by neglecting a variety of dimensions and stratifications and downplaying the impact of participation. It can be stated that the attempts to make the process more efficient will first and foremost harm social and process equity. These equities are difficult to measure or monetize, therefore also making it harder to notice during evaluation. If there are no regulations in place to force the inclusion of equity analysis in the decision-making, it is seen to be the first corner to cut when trying to speed up the process.

Thirdly, transparency can help the equitability of the outcome, for the process as well as social equitability. Transparency has an effect on the availability and impact of checks and balances. It is important to be able to understand which informed decisions and trade-offs are based. This can be seen as one of the reasons why the Dutch system is not resulting in significantly more socially inequitable projects in comparison to the United Kingdom. The immense transparency difference results in the acknowledging of multiple alternatives and how they are compared. This transparency also enables the work of the Committee m.e.r., setting a threshold for environmental impact assessments.

Furthermore, it makes it easier to identify key persons in projects. Within the Netherlands, it is fairly easy to pinpoint who has been in charge of performing the analyses and who have taken the decisions on the regional and national level. This helps to be able to later contact organizations or individuals for further explanation or evaluation. Currently, such possibilities are not present in the United Kingdom. It is difficult to even find FBCs, let alone contact details or names of people who have worked on analyses or have taken decisions.

Finally, a last explanation and lesson is based on studies from Niek Mouter (2016) and Baldwin (2021) giving insights into how decision-makers are influenced in the process and how they use evidence for decision-making. The Dutch system uses appraisal processes mainly for optimization purposes and as a normative check if the project complies with legislation. This can be seen through the output given by analyses and the MIRT trajectory. The Committee m.e.r. merely checks the information that it is handed by the problem owner, and give advice on the accuracy and completeness of the information handed. The Committee checks if, based on legislation, extra analyses or alterations to the current plans must be made. The CBA is used to provide decision-makers with all information on both alternatives, not giving any value to what the impact is. decision-makers have to decide what the best option will be on all different levels, from efficiency to equity. This indicates that these decision-makers have to assess the equity levels of the project, not trained professionals, while missing crucial information for proper assessment. As seen in the results of the cases in this study, this results in inequitable outcomes due to a lack of information and other motives such as political play and the funding reason. The main issue is not that decision-makers need to assess the equity of a project its outcome, but that they need to assess equity without having any understanding of what the impact of a project will be.

The United Kingdom has a different approach with a similar outcome. The Transportation Act (HM Government, 2000) forced the TAG system to include a broad variety of social equity factors to use within the decision-making. However, the design of the system does not include the necessity to incorporate the results of these analyses into the decision-making. This results in decision-makers focusing on other factors. The main difference with the Netherlands is that decision-makers in the United Kingdom do have all information present through analyses, but at a late point in the process, making the impact on the outcome low if there is any impact present. This can result in inequitable outcomes due to a lack of information at crucial decision-making points in the process.

### 8.1.2 Impact of results on appraisal processes

The results gained in this thesis and the policy lessons learned can be extrapolated to form an impact on appraisal processes in general. This subsection will discuss several overarching lessons on how to improve social and process equity in the outcome of infrastructure projects.

#### **Transparency is key**

Transparency is a huge asset for achieving process equity, as well as indirectly contributing to raising social equity. Making the used models, created reports, and minutes records of meetings publicly accessible enables opposing parties or critics to enter the discussion with an acceptable level of information asymmetry. It gives the population an extra possibility to check if the decision-makers have performed their job correctly and if they agree with the trade-offs made. Without such transparency, decision-makers are able to enforce policies for other gains than societal benefit. It is important to make such documents available during the process well before the decisions are made. Otherwise, the population is not possible to perform their check.

#### **Improvement of tools is insufficient, additional tools are necessary**

The results of this thesis, as well as other studies, show that CBA is not sufficient in improving the equitability of a project. The core of the CBA analyses is comparing costs and benefits in an easy, comparable single unit. This narrows the width of the analyses to specific monetizable values, leaving out other factors which are not compatible with monetization. Analyses show that this lack of incorporation also results in skewed results through absolute differences.

As can be seen in the A4 and St Austell cases, the absolute values of economic impact are much higher than the current estimated costs of environmental and health impact, therefore giving the perspective that it is 'worth the trade-off'. However, several dimensions are not compatible and therefore not put into the equation. Also, the absolute benefits of travel time are often incredibly high in comparison to environmental or health impact, therefore almost always outperforming most societal costs.

CBA as a tool itself is flawed and cannot be improved in manners that would increase social equitability

significantly. Improving CBA to include a wider spectrum of social factors would help, but would not lead to drastic changes due to the absolute numbers' problem just described. Therefore, improvement of this tool is not sufficient.

It is necessary to add extra tools which do justice to the essence of social equity. An example is a Distributional Impact from the TAG system. In Figure 6.6, an example can be seen in the St Austell case. This tool does not monetize or quantify the effects of a new project, making the comparison more difficult, but doing more justice to social equity. This also ensures that the modelling of equity is done by experts rather than decision-makers, ensuring that there is an expert vision included to a certain degree. The final trade-off if something will be just, will always be a political issue, therefore perfect for decision-makers. However, such a tool modelled by an expert provides information in a clear, easy-to-interpret overview, making it easier for non-trained decision-makers to interpret the impact correctly.

### **Third-party validation can significantly boost equity**

The current appraisal systems revolve around efficiency and the best value for money. This can be exemplified by the huge importance of the BCR in the United Kingdom, as well as the funding reason in the Netherlands. This focus forces the system to revolve around using easy comparable benefits and costs, often through a CBA. To tackle this, it is necessary to change the current mindset in the system, which is hard to do. The mindset needs to change to incorporate social factors as much as the economic impact currently has.

The United Kingdom learns that simply adding analyses which will measure social impact is not sufficient. Therefore, adding a third-party validity check could be the way to achieve the change within the system. As can be seen by the Committee m.e.r. in the Netherlands, it is possible to let a third party with experts check plans on completeness and accuracy. One of the major strengths of this approach is that it does provide advice on what would be just, it merely states if the information provided is correct and complete, enabling the decision-maker would be able to make an equitable decision. The Dutch system has proven to work, but is currently too narrow to achieve equitable results.

Furthermore, it can be made compatible with the style of governing per country. In countries such as the Netherlands, where consensus and discussion are important and strict regulations are avoided if possible, the current method of the Committee m.e.r. works. The Committee delivers a non-binding advice which is seen as highly important in court, if it ever goes to court. This enables decision-makers to make trade-offs on their own terms, while still having a check and balance in place if things turn out to be bad. For more regulatory countries such as the United Kingdom, it can be a must to get a piece of positive advice. This can be done similarly as HM Treasury, being that the project cannot continue when approval is not given.

### **Participation needs to be enforced in the process**

Where the advice on the impact of equity should not be enforced, the execution of participation should be enforced. Looking at the United Kingdom and the Netherlands, it can be seen that participation can increase the equitability or at least the consensus on the outcome tremendously. An example is given in the comparison of the HS1 line versus the Betuweroute. The Dutch cases learn that participation is an easy corner to cut when not made obligatory.

Participation is necessary for process equity, but it can help social equity significantly as well. Possible problems or negative impacts missed by analyses could be raised by local residents who have to deal with the project on a daily basis. It is important to take into account at which stages in the appraisal process participation will be made mandatory. It is necessary to include a round of participation before major decisions are made, such as the decisions of preference in the Netherlands, otherwise, the impact of participation is negligible.

### **Specific focus on social equity must be included in the decision-making**

In line with the third-party validation check, creating a specific part of the appraisal process that focuses on social impacts would help to enforce the inclusion of social and process equity in the process. This



can be done briefly by something similar to the strategic case in the TAG system, which it will help problem owners and decision-makers to think about equity factors before continuing the process. It also gives the third party an easy extra tool to validate if the made plans incorporate social equity sufficiently. Comparing the plans to their own strategic case is an easy way to spot corners that have been cut.

### 8.1.3 Generalisability

It must be mentioned that the results of this study are mainly applicable to the Netherlands and the United Kingdom. As depicted by Groth and Scholtens (2016) as well as the results found in this thesis, the appraisal processes per country differ immensely. Therefore, the results and reasons provided cannot be generalized directly to other countries. However, the results found can be used to identify patterns which can be useful for analyses on other countries.

The policy lessons are a basis to use as characteristics for comparison. For instance, the amount of focus on economic impacts through executive summaries or in key positions within the appraisal process can indicate the level of social equitability incorporated. Economic viability and social equitability are not opposites, but are often seen to negatively influence each other. Equitability measurements are expensive due to often not being the most economically efficient solution but a more total solution for society, making it a trade-off.

Furthermore, the transparency of a country its appraisal process can be an indicator to state if a country incorporates process equity. Transparency of (policy) documents indicates that, even though a variety of dimensions or stratifications are not directly considered, decision-makers can still be held accountable for these actions due to simple naming and shaming if necessary. Therefore, it automatically raises the standard of thinking about the wider impact of projects to some degree. As seen in this thesis, the number of analyses does not directly lead toward more equitable outcomes, while transparency can compensate for the lack of analyses to some degree. The possibilities of how to use these characteristics are elaborated on in section 8.3.

## 8.2 Conclusion

The concluding remarks will revolve around answering the main research question and the contribution to literature and society. A summary of the found results can be found in the discussion. First, the main research question will be answered by answering the question per country. Hereafter, the novelty of the contribution, as well as its impact on literature and society will be discussed.

### 8.2.1 Main Research Question

The main research question of this thesis is: “How do standardized ex-ante appraisal techniques affect the outcome of infrastructural projects with a focus on process and social equity in the Netherlands and the United Kingdom?”.

#### The Netherlands

Standardized ex ante appraisal techniques affect the outcome of infrastructure projects slightly. The main used techniques, CBA and m.e.r., do not have much influence on the outcome of a project. These techniques merely filter extreme ideas and tweak acceptable ideas, but do not change the main course of events. This can be attributed to the narrow analyses, a drift for efficiency, the amount of political play present in the system, and the current usage of appraisal analyses by decision-makers. Both the CBA and the m.e.r. do not contribute towards social equity due to a lack of incorporation of various stratifications and dimensions.

The Levinson framework shows that appraisal techniques are incomplete in the dimensions and stratifications they address, resulting in a biased outcome and incomplete perspective. The inequitable outcomes are not due to malicious intent, but plain ignorance. “The word social equity is not used in our vocabulary” is a telling quote from multiple interviews about the appraisal of infrastructure projects. The fact that untrained decision-makers need to assess the equity levels of a project while missing information is a clear indication of how inequity is the outcome of the system.

With regard to process equity, the Netherlands’ main issue is participation. Participation is not executed. When it is executed, it is unclear what the precise impact is on the process as well as the outcome.

### **The United Kingdom**

The United Kingdom system has a standard appraisal technique which has a lot of influence, namely the CBA and more specifically the BCR. The BCR has a lot of influence due to the necessity of receiving funding from HM Treasury, which is given almost only to BCRs of over two, which are seen as a ‘high value for money’. Even though all analyses necessary to indicate the social impact of a project have been present, they are not incorporated into the decision-making due to the high economic focus.

Secondly, the solution-oriented structure does not contribute toward social equity as well. The United Kingdom system fully assesses only a single scheme, resulting in a go or no-go decision instead of a comparison between alternatives to see which would turn out the best.

Thirdly, the current presentation and incorporation of social equity factors in the FBCs contribute toward a more inequitable outcome. The evaluation on the green book (H. Treasury, 2020) has already acknowledged that the focus on the economic case is problematic. Current policy changes are trying to solve this by laying more focus on the strategic case. However, such a fix would not suffice due to the design of the system for only assessing a single scheme. A combination of redesigning the system to be less solution-oriented in combination with a higher focus on the strategic case and therefore more emphasis on social impacts could do the trick.

With regard to process equity, the United Kingdom has a system for consultation which is executed up to par. However, the severe lack of transparency hurts the process equity. Lots of documents used within the appraisal system as well as rationales are not publicly available. This results in the lack of an opportunity for the public to object to inequitable parts of a process or outcome.

### **8.2.2 Novelty**

The novelty of this thesis is the new view of how currently used techniques affect outcomes in terms of social and process equity. Where earlier studies gave insights in how single tools are used in decision-making processes or what the general problems are in tools such as CBA, this study adds the impact current tools have and gives insights into the equity levels of the whole appraisal process. By using the Levinson framework, insights are given in the dimensions and stratifications analysed by the tools.

### **8.2.3 Contribution to literature**

The main contribution to the literature is the addition of an extra dimension on the current studies, namely the social and process equity dimension. This thesis shows how current systems result in inequitable outcomes and processes and gives reasons why these inequities occur.

Furthermore, the thesis gives explanations for findings of other studies such as Annema, Carl Koopmans, and Van Wee (2007) and Niek Mouter (2017b) on why CBA does not have influence in the general appraisal process, as well as adding pieces to the complex puzzle of improving transport appraisal to create more equitable infrastructure projects.

Also, the comparison between the United Kingdom and the Netherlands has given extra insights into how different types of analyses and processes affect social and process equity.

Furthermore, it can be used as a basis for further research on this topic in other countries, enabling cross-country and even cross-sector comparisons for equitability within policy decision-making.

### 8.2.4 Contribution to society

This study contributes to society by proving that the current system does not lead toward equitable outcomes and even favours specific groups in society. Understanding the complex problems within appraisal can help level the inequities which arise due to transport infrastructure. Transport is necessary for people to survive, can be a major contribution towards growing out of poverty, and is in general of major influence in the daily lives of everyone. Therefore, understanding what the impact is of the current system helps to improve for future use.

## 8.3 Future research

Several points which deserve more research in order to get a more complete understanding of the appraisal process or to support the findings of this study have been depicted throughout this study. This section will delineate several of these future research points.

### Values of decision-makers

First, it would be beneficial to continue this study by interviewing decision-makers to understand which values are the most important to them with regard to decision-making. This thesis and the study of Niek Mouter (2017b) can be used to further investigate what values are important to decision-makers when choosing between alternatives in cases of the Netherlands.

By using the results of this thesis with new interviews with decision-makers, a comparison can be made between the values used in practice versus the values incorporated by the guidelines and the tools. This can help to design or alter the current appraisal process to improve equitability by matching supply and demand between practitioners and literature through appraisal design.

### Applying the Levinson framework in a broader perspective

The Levinson Framework is originally created for infrastructure processes. The dimensions and stratifications are tailored to fit the transport sector. However, the high level of variability and interpretability of the framework enables the application of the framework in other sectors. The framework can form the backbone to assess the equitability levels of other sectors, including policy making.

The framework merely shows which groups within society are taken into account in what way, giving information about the completeness of a policy and its analyses. An example where it could be used is the current nitrogen crisis in the Netherlands. The Levinson Framework could contribute towards understanding if currently used analyses focus too much or too little on specific stakeholders, or how policy implementations are distributed amongst different societal groups. The framework could use some minor tweaks to fit other sectors, which should be based on literature. However, the current framework could already be used to gain insights. Future research on equitability within society could benefit the usage of the Levinson framework.

### Intercountry comparison

Several patterns can be found in the results of this study, such as the economic focus in both appraisal processes, the drift for efficiency and the devolution towards solution-oriented design. This research has tried to come up with several reasons why similarities and differences have been found. However, these reasons are not enough to fully understand and extrapolate these characteristics to other countries.

It would be interesting to perform similar research in other European countries as well as vastly different countries on economic power, governmental structure and development such as African, Asian or South-American countries to compare and gain insights into the similarities and differences that can

be found in the appraisal process and their outcomes. This would help to understand what kind of policy-making is beneficial for what kind of political system, as well as gain a more broad understanding of possible ways to incorporate equity into transport appraisal systems.

Furthermore, it can give insights into what variables are most explanatory for specific outcomes. Several studies next to this thesis can be used as a basis for this kind of research. A report from Baldwin (2021) states, a relationship between the level of centralized appraisal decision-making and the number of analyses that are assessed and incorporated into decision-making. Further exploration of this relationship could help to explain potential results found in different countries. Other studies from Eliasson and Lundberg (2012) and Eliasson, Börjesson, et al. (2015), Mouter (2014) and Worsley and Mackie (2015) provide more information on the use and importance of CBA in several European countries.

A first step can be based on this thesis and involves the Netherlands and the United Kingdom. The difference in the political systems, the polder model versus Anglo-Saxic, focusing on consensus versus regulation drift, could be further analysed to discuss what is necessary per country to improve equity incorporation into the decision-making. Understanding how a country works and combining this with the found results within this study could be a step forward to properly including equity within the appraisal processes of the Netherlands and the United Kingdom. Furthermore, this study could be used for extrapolation toward countries with similar characteristics for either the appraisal process or the political system to improve the systems in place or add general knowledge to the understanding of these systems.

#### **Problem versus solution oriented design**

An interesting result was the fact that both countries have drifted off into solution-oriented design for various reasons. This directly harms social and process equitability immensely. The reason found in this thesis is mainly the drift for efficiency as depicted earlier.

However, it would be worthwhile to compare appraisal processes of other, similar countries to understand if those systems are problem or solution driven as well and to learn how to build a system that will remain problem-driven. Solving this problem can be seen as a key insight toward more equitable appraisal processes and therefore outcomes.

#### **Incorporation of national policy**

Both countries have very different approaches to enforcing national policy, but neither seems to work. The Dutch NOVI is seen as a key check and balance for streamlining different policies into nationwide execution. The same goes for the United Kingdom bills. However, where the United Kingdom obligates experts to include social impact analyses but not how to include them in the decision-making, the Dutch NOVI merely states what kind of overarching subjects need to be considered.

Further research could investigate why the NOVI has been losing its power over the years and how this has impacted decision-making. The same goes for the bills of the United Kingdom. Why are the incorporations into the models so concrete and the guidelines on incorporating it non-existent? Investigating why these evolutions have happened as well as what is necessary to improve both systems will increase the knowledge on several points, which is necessary to the equitability of the process and the outcome. The knowledge will increase on how to steer nationwide policy decision-making, increasing the power of a check and balance and understanding how policies could be created. This will lead to understanding how to increase equitability not only in theory, but also in practice. The thesis shows that the NOVI and the bills have had and still have influence within the project, and is therefore a fairly easy policy mechanism to increase equitability.

#### **Balance of economic viability and equitability**

This thesis shows that the focus on economic impact harms the equitability of projects, and it seems to be a constant trade-off between economic efficiency or viability and the equitability of the outcome. The best of both worlds is hard to acquire, and having a solution which is best of the class for both is difficult if not impossible to achieve.

Currently, economic efficiency has the upper hand in this battle, resulting in economically efficient projects with a lack of equitability incorporated. Further research in psychology and understanding why economic efficiency is winning could help the future design of appraisal processes and how the balance can be restored between both. Research could help to identify the specific factors which influence the balance and can be used as a basis for future designs of appraisal processes.

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## Appendix A

# MIRT and OEI

### A.1 MIRT Trajectory

The MIRT is the backbone of all infrastructure, transport and spatial projects for the Netherlands. Its goal is to let the national government collaborate with local governments to solve problems and fulfil the needs of (local) residents. Rijkswaterstaat describes the MIRT process quite extensively Rijkswaterstaat (2020a). This subsection will elaborate on how a MIRT process works, which steps are taken at what point in time, and who makes the decisions. There will be a subsection dedicated to the positioning of CBA within the MIRT program.

#### A.1.1 MIRT Cycle

The MIRT Cycle entails the yearly policy cycle which the MIRT uses. Figure A.1 shows the cycle as well.

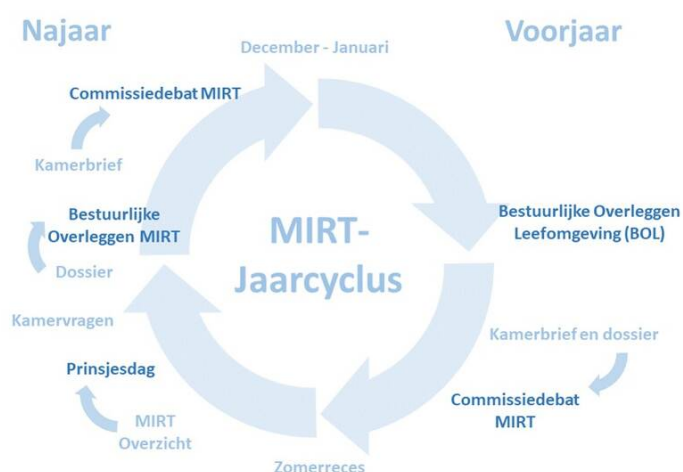


Figure A.1: The yearly MIRT cycle for projects. The cycle shows how projects are added and discussed each year within a repeating cycle.

The MIRT cycle starts every year with the BOs and the creation of the local agenda. Out of the local agenda, several projects arise which are sent towards parliament for a debate to see which cases are deemed to be most important and should be included in the MIRT of that year. After the summer recess, a MIRT overview is created which states which projects will be researched for solutions and what

the global planning is for these projects. Parliament will have another debate about the overview. After this debate, the committee MIRT will have more BOs with municipalities and come up with a final conclusion which projects will continue. The parliament is informed for a last time through a letter. After this, the final MIRT overview is delivered for that year and policy for coming years has been made. This cycle repeats itself every year.

### A.1.2 MIRT overview

The MIRT overview is a policy document which is created every year to give an update to the parliament on the status of current ongoing projects, as well as an introduction to newly added projects to the whole MIRT program. The overview has an overview of all changes to the MIRT from last year, all MIRT projects that have been realized this year, and an update on all ongoing projects. Ongoing projects have a summary of the goal of the project, how the goal will be realized, how it is financed, what the planning is and what policy decision have already been made or will be made in the close future.

#### A.1.2.1 Local agenda

"The primary role of the local agenda (Gebiedsagenda) is to identify the common ambitions of the national and local government" (Ministerie van Infrastructuur en Milieu, 2016:page 19). Before a project will enter the MIRT process, it has to be addressed by local municipalities. Municipalities will spot problems within their region which are seen as troublesome. The municipalities will discuss their ambitions for the region with the national government, and they discuss which of the proposed problems align the best with all ambitions. Which projects will continue to the MIRT process are chosen in policy consultations (Bestuurlijke Overleggen, BO). The local agenda is created by a collaboration of public and private actors. Important to note is that when the local agenda is based on existing and adopted policy, there is no need for a broad consultation. There are no mandatory procedures or guidelines present to create the local agenda. The 'omgevingswijzer' <sup>1</sup> is a guideline to help municipalities to structure the discussion to create a local agenda.

#### A.1.2.2 MIRT research

When there is a lack of understanding about the task, it may be decided to initiate MIRT research. When the area-based or theme task(s), scope, and stakeholders are not apparent, an investigation like this is used to map them out. Based on an initial decision, a MIRT research can result in an assignment for a MIRT investigation. The MIRT exploration phase begins with the Minister of Infrastructure and the Environment and the administration involved making the initial MIRT decision. It can also contain (parts of) a CBA. The MIRT research is formless and can therefore contain many elements. However, it is not obligation free. When performing the MIRT research, it is necessary to determine how the MIRT research will be financed, what the goal is of the research and how this is tried to be achieved.

#### A.1.2.3 MIRT Exploration phase

"The objective of the MIRT study is to arrive – on the basis of a thorough problem analysis – at a smart, sustainable and climate-proof problem analysis – to arrive at a smart, sustainable and climate-proof solution by examining a solution by examining a task in its entirety, detailing the objective and the problem analysis and making a problem analysis, and making an insightful assessment." Ministerie van Infrastructuur en Milieu (2016), page 22. The exploration phase of the MIRT is the place where, based on a variety of analyses and political debates, a decision is made if and if applicable, which plan is chosen to go into realization or further analyses. The core task of this phase is the funnel process: working from a broad variety of problem directions and possible solutions towards a single decision of preference.

The exploration phase will explore which direction a MIRT project will be taking. This includes who will finance the project, if a public-private partnership would be beneficial, if the problem must be solved by infrastructural processes or if it could be done without building new infrastructure.

<sup>1</sup>[www.omgevingswijzer.org](http://www.omgevingswijzer.org)

### A.1.2.4 Preference decision (Voorkeursbeslissing)

It is not a certainty that plans which arrive at the exploration phase will be realized. Plans which will continue to realization will be given a 'preference decision' (voorkeursbeslissing) which is supported by different political decision-making steps. The decision of preference has to be rationalized by a SCBA. It is mandatory to perform and use the SCBA as a motivation on why the decision is taken. Other tools such as the MER (Milieu effect report) are used for support and are almost always used as motivation, but are not mandatory to include in the rationale.

The preference decision consists of any different parts that summarize the goal and feasibility of the project. A rationale on how to finance the problem, up to the elaboration of what single solution or program of measures will be used to solve the initial problem-statement.

### A.1.2.5 MIRT Plan development

When a preference decision is accepted by the committee MIRT and parliament, a plan is developed to realize the given preferred alternative. Whereas the exploration phase and the preference decision are quite high-level, the plan development phase is to make the preference decision fit within the parameters set, such as time and financial resources.

### A.1.2.6 MIRT realization

The final step in the MIRT process is the execution of the developed plans. Several steps are taken in the realization phase for documentation purposes, such as a financial accountability report and an estimation of the yearly costs of maintenance.

## A.2 OEI guide per sector

All parts of all sectors are in combination with the plan MER (Milieu effect report) to calculate more numbers. For purposes of the study which focuses on the impact of the CBA on the process, there will be paid little to no attention to the MER, only on the things which are put into the CBA.

### A.2.1 Road

The core parts of the CBA analysis based on the OEI-guide on road projects are:

- Accessibility
- Environment
- Safety

#### Accessibility

Accessibility focuses on the costs and benefits of *all* road users. The costs and benefits are generalized to road users. The effects of estimated travel time differences, estimated reliability of the journey and variable travel costs.

#### Environment

The most basic format will take the following things into account:

- Greenhouse gasses
- Changes in air quality
- Changes in noise impact

If necessary (which can be the case for Natura 2000 areas), further analyses will be performed to measure the impact on the ground, the quality of the water, the impact on the nature and the impact on the landscape and cultural heritage. It is highly unlikely that the lastly mentioned factors will be monetized.

#### Safety

Safety focuses on the estimation of the amount of accidents that will happen, based on known numbers

for the type of road and how many travellers are using the road. The costs of a human life and the expected costs of material damage are used for these numbers for the CBA. Furthermore, an external safety analysis is performed. External safety analyses the possible impact if hazardous material is leaked into the environment. This is different for dense populated areas versus a polder.

Important to mention is the module "additional welfare effects". This module is not mandatory and can be asked to activate by decision-makers. This module will generate a more elaborate social impact analysis which takes a look at distributional effects between regions, the impact on housing prices in the area, how employment will change in the area, if extra taxes need to be raised and how the increase / decrease of knowledge in a city based on things as type of jobs will alter. This is not mandatory and is only executed when all main parties involved agree that this is necessary.

### A.2.2 Rail

The core parts of the CBA analysis based on the OEI-guide on rail projects are:

#### **Accessibility**

- Travel time
- Transport to station
- Waiting time at station
- Travel time in train
- Transfer time
- Post transport
- Value of time

#### **Reliability**

Chance on congestion or calculating less safety margin to make the trip.

#### **Quality effect**

- Increase of travel comfort
- Chance of people being able to sit down
- Social safety feelings
- Image of PT

#### **Effects changing on different modalities**

- More PT means less car users
- Involves costs because of losing taxes

#### **Safety**

- Effects on traffic security
- Social safety effects (is monetised, has no rules of thumb applied)
- Effects on external safety

#### **Environment**

Extra analysis options same as road.

### A.2.3 Major PT projects

There are no mandatory models to be used. The maker of the CBA is free to choose the model to their liking to perform the 'vervoersstudie'.

The performed analyses must be focused on areas. That means that effects that occur in a different area because of the project must be taken into account as well. The whole PT network effects are important to be aware of. Also, the effects on other modalities (car network, i.e.) must be taken into account as well. If the modal shift is big enough, it can also create a shift in safety and environmental aspects.

These need to be included in the corresponding pillars.

Specifically for major PT projects, one of the alternatives in the CBA must be the most cost-efficient alternative. To be exact, the alternative that solves the problem 'just enough' and has a rate of return of at least 80 percent of the performance of the preferred alternative.

Finally, effects happening because of the project need to be taken into account. If the flow of cars or PT is disrupted and delayed for a longer period of time, this can cause harm for travellers and should be taken into account.

**Accessibility**

Accessibility can be calculated by travel time, quality of travel and value of time. Also, it is necessary to involve the calculation of modal shifts. this can be positive (decrease of congestion on the main roads) or can be negative (decrease of taxes on gas).

**Safety**

PT is seen as more safe because of less different 'moving parts'. However, social safety effects do not have any monetisation methods yet. A qualitative inclusion in the MIRT / CBA is enough to include the shift in these settings.

**Environment**

Same as road and rail.



## Appendix B

# Elaboration in the MIT trajectory

The Multi-Year Programme Infrastructure and Transport (MIT) is a programme of infrastructure projects related to mobility policy (main roads, main waterways and railways). The programme covers the period up to and including 2020 and is subdivided into the following time periods that clearly differ from one another: up to and including 2010, extension 2011 up to and including 2014 and look-through 2015 up to and including 2020. The last period is much less concrete than the first two because it is not yet clear which projects will need to be implemented in that period. However, bottlenecks, for example, can be identified. Within the MIT procedure, the Tracéwet is an important aspect. The Wet Infrastructure Projects Spatial Framework (SNIP) is similar to the MIT and applies to all projects within the sub-programmes for the construction of main water systems (water management and water management).

The MIT procedure consists of the phases' exploration, planning study and realization and has six related decision moments within an infrastructure project. At each decision point, it is determined whether the procedure will continue or the project will be terminated. An overview of the various phases and decision moments is given in Figure 3.11.

### Exploration phase

The procedure is initiated when the Minister of Transport, Public Works and Water Management recognizes a problem or third-party initiative with added social value. The exploration phase is initiated by the Minister taking an Intake Decision (decision moment 1). During this phase, the issue is examined, solution directions are determined and insight into cost effects is obtained to enable decision-making. The latter consists of the decision to carry out a planning study (decision moment 2). In case of a positive decision, the project continues to the planning study phase. Other parties (regional authorities, market parties or other interested parties) can also start and perform a study. This can then be submitted to the Minister for a decision to carry out the planning study, after which the project follows the further MIT-procedure.

### Plan study phase

The plan study phase consists of two parts. Firstly, by means of planning, it is determined what must happen to solve the problem, resulting in the project decision. In doing so, consideration is given, for example, to integration, the environment, use of space, traffic safety and economic effects. The Start-up Memorandum is the beginning of the planning process for projects that fall under the Tracé Act. This is followed by the Trajectory Memorandum which, together with consultation and advice, leads to the Minister's position on the preferred trajectory. The Minister of Transport, Public Works and Water Management, together with the Minister of Housing, Spatial Planning and the Environment, ultimately takes the Tracébesluit (decision moment 3), which in this case replaces the project decision. The Minister of Transport, Public Works and Water Management and the Minister of Housing, Spatial Planning and the Environment ultimately take the Tracébesluit (decision moment 3), which in this case replaces the project decision. After taking the project decision or Tracébesluit in Rijkswaterstaat projects, develop-

ment of a framework for evaluation and advice 29 the technical and procedural preparation is completed in the plan study phase, resulting in "procedures complete" (decision moment 4).

### **Realization phase**

The start of the realization phase is formed by the implementation decision (decision moment 5). To be able to take this decision, all financial matters must also be settled; money must of course be available to carry out the plans. After realization, the process is concluded with the delivery decision (decision moment 6). After that, the property enters the management and maintenance phase." (Lever, 2006:page 28 - 29).

## Appendix C

### Appraisal summary table of the St Austell case

Appraisal Summary Table						Date produced:		1692019		Contact:				
Name of scheme:		A30 to St. Austell Link Road								Name				
Description of scheme:		The Proposed Development is a 6.2km single carriageway with a 3m cycling and walking lane (used in both directions) along one side of the carriageway.								Organisation				
										Role		Promoter/Official		
Impacts		Summary of key impacts				Quantitative		Assessment		Monetary £(NPV)		Distributional 7-pt scale/ vulnerable grp		
Economy	Business users & transport providers	The scheme will provide <b>journey time benefits of £45 million</b> for business users and transport providers, with the majority of benefits related to journey time savings of between 2 and 5 minutes. However, the additional distance travelled results in the dis-benefit of increased vehicle operating costs totalling <b>-£13 million</b> . Overall, business users and transport providers achieve a benefit of <b>nearly £32 million</b> .				Value of journey time changes(£)				31,812,000				
						45,406,000								
						Net journey time changes (£)								
						0 to 2min	2 to 5min							> 5min
						2,372,000	41,686,000	1,346,000						
	Reliability impact on Business users													
	Regeneration													
	Wider Impacts	The scheme will directly increase local productivity and increase employment; as well as unlock significant local development sites that will strengthen the regional economy.												
Environmental	Noise	The ES concluded that the Proposed Development is expected to result in significant beneficial effects for residents living close to the B3274 in Roche and, to a lesser extent, the A391 in Stenalees, Bugle, Bilberry and Lockengate. However, significant adverse effects were expected for properties in Stenalees close to the southern end of the Proposed Development, isolated properties to the south-west and west of Roche and some properties near the northern end of the Proposed Development in Victoria. These significant adverse effects were attributed to traffic on the proposed link road. Overall the Proposed Development was expected to reduce the number of residential properties exposed to traffic noise levels above the Significant Observed Adverse Effect Level (SOAEL) of 67.5 dB LA10,18h (façade) by more than 50% compared to the Do-Minimum situation.  The noise assessment for the FBC uses revised traffic data but the broad picture in terms of noise impacts aligns with the conclusions of the ES. The net present value of change in noise calculated by the WebTAG workbook is £23,220. The equivalent net present value of change in noise associated with results reported at the façade with the highest noise level in the opening year with the proposed development in place is £4,883,379., indicating a <b>net benefit</b> of noise reduction.				Noise levels are in terms of 3 dB bands between 45 dB and 81 dB LAeq, 16h (for daytime) or LAeq, 8h (for night-time).		Not applicable		The equivalent net present value is £4,883,379				
	Air Quality	Overall there is a <b>net improvement</b> in local air quality with the Scheme, but there is a negative impact on regional emissions for NOx and PM10. The Scheme does not result in any exceedances of NOx Emissions or PM2.5 or PM10 Concentrations.				Emissions: 7 tonnes  tonnes  NOx: + PM2.5: + 0.7		Not applicable		Value of change in NOx emissions: NPV: - £38,701 Value of change in PM2.5 emissions: NPV: £1,163,930 Total Value of change in local air quality: NPV: £1,125,229		Negligible to small beneficial for most vulnerable groups.		
	Greenhouse gases	The change in CO2e emissions over the 60-year appraisal period is +191,430 tonnes CO2e from the non-traded sector. The impact on CO2e emissions relative to the "without Scheme" case in the Proposed Development opening year is +2,671 tonnes CO2e from the non-traded sector. The upper estimate net present value of carbon dioxide emissions of proposal is £-13,155,467. The lower estimate net present value of carbon dioxide emissions of proposal is £-3,941,645. The total value of change in air quality is ENPV-8,547,445, indicating a <b>net dis-benefit</b> for Greenhouse Gases.				Change in non-traded carbon over 60y (CO2e)		2,671 tCO2e		The total value of change in air quality is ENPV-8,547,445				
		Change in traded carbon over 60y (CO2e)		13,953 tCO2e										
		Landscape	Overall, it is predicted that there will be an overall slight adverse effect on St Austell or Hensbarrow China Clay Area, Mid Cornwall Moors and Camel and Allen Valleys, until year 15 when the effect becomes <b>slight beneficial</b> or <b>neutral</b> . This results in the overall assessment score being <b>neutral</b> .				Not applicable		Neutral		Not applicable			
		Townscape	The Proposed Development will provide new links for non-motorised users, which will result in a reduction in traffic within the villages. This will make walking more attractive and will improve connectivity within the communities. The overall assessment score is therefore considered to be <b>slight beneficial</b> .				Not applicable		Slight beneficial		Not applicable			
		Historic Environment	The operational phase of the Proposed Development will have a <b>slight adverse</b> effect on the Coldreath Mill, however, the Church of St Gomonda and other listed buildings will experience a <b>slight beneficial</b> effect due to a reduction in traffic. Taking this into consideration, the overall assessment score is considered to be <b>slight adverse</b> on the historical environment.				Not applicable		Slight adverse		Not applicable			
		Biodiversity	It is predicted that there will be a neutral effect on all SACs, SSSI's and NNRs located within close proximity to the Proposed Development, with the exception of Hensbarrow CWS, which is expected to experience a moderate adverse effect due to habitat loss, fragmentation and degradation. It is also predicted that there will be a slight adverse effect on bryophytes, invertebrates, reptiles, breeding and wintering birds, bats and badgers, and a neutral effect on INNS and the hazel dormouse. Taking this into consideration, the overall assessment score is considered to be slight adverse.				Not applicable		Slight adverse		Not applicable			
		Groundwater Environment	All impacts from the Proposed Development are considered to be neutral with the exception of the potential impact to the Mid Cornwall Moors and Goss and Tregoss Moors SSSI/ SAC complex; water resource and biodiversity habitat and private potable water supplies identified a potential slight adverse impact. The overall effects are considered to be not significant except in the case of the Mid Cornwall Moors and Goss and Tregoss Moors SSSI/ SAC complex; water resource and biodiversity habitat identified the overall effect as low significance. Taking this into consideration, the overall assessment score for groundwater is deemed to be slight adverse.				Not applicable		Slight adverse		Not applicable			
		Waste	Excavated material generated during construction will be managed by Imerys and would not be sent to a local or regional landfill. The management of this material would therefore not cause a burden to the local and regional waste management infrastructure (no effect, not significant). The anticipated minor increase in construction waste arisings, of between 0.1% and 1.9%, will cause a minor burden to the local and regional waste management infrastructure, resulting in a <b>slight adverse</b> effect on landfill capacity. Taking both excavated material arisings and construction waste arisings into consideration, the overall assessment score is expected to be <b>slight adverse</b> .				Not applicable		Slight Adverse		Not applicable			
Social	Water Environment	On balance, a <b>slight adverse</b> summary assessment score is considered appropriate for the Proposed Development. This is because any potentially minor impacts from de-icing runoff, uncontrolled site run-off and spillages, run-off contaminated with fine sediment or risk of chemical spillage will be short-term and temporary during the construction phase. With appropriate mitigation included in the CEMP and SWMS and inclusion of SuDS systems, the majority of impacts will be minimized and reduced and will not be significant to the water environment.				Not applicable		Slight adverse		Not applicable				
	Commuting and Other users	Taking both excavated material arisings and construction waste arisings into consideration, the overall assessment score is expected to be <b>moderate adverse</b> . From year 15 onwards however, the overall assessment score is expected to be <b>slight beneficial</b> .						Not applicable		Not applicable				
		The scheme will provide journey time benefits of nearly <b>£70 million</b> for non-business and other users. However, the additional distance travelled results in the dis-benefit of increased vehicle operating costs totalling <b>-£16 million</b> . Overall, business users and transport providers achieve a benefit of nearly <b>£53 million</b> .				£	53,360,000	Not applicable		53,360,000				
		Not applicable				Not applicable		Not applicable		Not applicable				
		Not applicable				Not applicable		Not applicable		Not applicable				
	Reliability impact on Commuting and Other users	Not applicable				Not applicable		Not applicable		Not applicable				
	Physical activity	The scheme will provide new cycle routes through a shared pedestrian and cycle facilities, which could encourage physical activity. Physical activity has an important role to play in preventing weight gain and obesity, and improving mental health. Physical activity can be monetised in cases where significant numbers of active mode users are affected by an intervention. Whilst this scheme aims to improve the pedestrian and cyclist environment, it is unclear if the number of active mode users will significantly increase. However, the provision of pedestrian and cycle facilities can be expected to show some benefit, although this is expected to be slight.				Not applicable		Slight beneficial		Not applicable				
	Journey quality	The scheme will have no material impact on traveller care aspects of journey quality such as cleanliness, facilities, information and environment. The scheme will result in a neutral effect on traveller views. Improvements to the road and the new route are likely to have a positive effective on the frustration of travellers. The new shared pedestrian and cycling provision, as well as the improved lighting, roundabout splitters, traffic restrictions and footpath underpasses are expected to reduce driver stress and the fear of potential accidents.				Not applicable		Moderate beneficial		Not applicable				
	Accidents	The scheme provides monetised accident <b>benefits of £8 million</b> , arising from a forecast <b>4% reduction in accidents</b>				£	8,114,100	Not applicable		8,114,100				
	Security	Not applicable				Not applicable		Not applicable		Not applicable				
Public Account	Access to services	It is not expected that the proposed scheme would lead to any changes in routings or timings of public transport services within the impact area. The scheme improves access to services by enhancing connectivity and reducing congestion for the residents of Roche, Bugle and Stenalees. Therefore, facilitating the movement of buses resulting in a public transport enhancement. It is expected that the improved connectivity will allow increased access to community facilities located in St Austell and to local conveniences located in the surrounding villages.  Local residents are likely to have improved access to healthcare and education facilities located in St Austell and the surrounding villages. Residents of the surrounding villages will also have improved access to community facilities in the village of Roche. The scheme will enable the services listed above to become more accessible not only for vehicles but also for NMUs, whilst also improving access to skills training. The scheme will also improve accessibility for disabled people through improved crossings.				Not applicable		Slight beneficial		Not applicable				
	Affordability	Not applicable				Not applicable		Not applicable		Not applicable				
	Severance	The scheme will provide a shared pedestrian/cycle path which will run alongside the whole length of the Proposed Scheme. The new path will connect cycle routes from West Carlaze Garden Village south of Stenalees to Roche, Victoria and Goss Moor in the north, providing important links for sustainable travel. This provision includes an underpass south of Harmony Roundabout and another on Hensbarrow Common linking the proposed facilities for pedestrians, cyclists and equestrians. The additional provision will improve connectivity with the Goss Moor. The reduction of traffic within the villages will make walking and cycling a more attractive proposition. Connectivity within the communities will improve and complementary measures will further reduce traffic flows and improve pedestrian provision.				Not applicable		Moderate beneficial		Not applicable				
	Option and non-use values													
	Cost to Broad Transport Budget	The scheme cost to the broad transport budget (discounted to 2010 values) is forecast to be nearly <b>£62 million</b>				£	61,849,000	Not applicable		61,849,000				
	Indirect Tax Revenues	The impact of the scheme on indirect tax revenues is a <b>disbenefit of nearly £9 million</b>				-£	9,364,000	Not applicable		-9,364,000				