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## Incentives and politics

### The perverse incentives paradox: root cause of many other paradoxes; the case of the Dutch Betuweroute

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#### DOI

[10.4324/9781003257172-6](https://doi.org/10.4324/9781003257172-6)

#### Publication date

2022

#### Document Version

Final published version

#### Published in

The Front-end of Large Public Projects

#### Citation (APA)

van Wee, G. P. (2022). Incentives and politics: The perverse incentives paradox: root cause of many other paradoxes; the case of the Dutch Betuweroute. In T. M. Williams, K. Samset, & G. H. Volden (Eds.), *The Front-end of Large Public Projects : Paradoxes and Ways Ahead* (1 ed., pp. 130-157). Taylor & Francis. <https://doi.org/10.4324/9781003257172-6>

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## 6 Incentives and politics

The perverse incentives paradox:  
root cause of many other  
paradoxes; the case of the Dutch  
Betuweroute

*Bert van Wee*

### 6.1 Introduction

The transport system in general, and, more specifically, transport infrastructure projects as part of that system, has major impacts on society. On the positive side, it allows people to carry out activities in different places, and companies to transport goods. Without an adequate transport system, people could not easily reach jobs several (tens of) kilometres away from their place of residence; they could not easily reach hospitals, recreational facilities and many other destinations. In other words, the transport system provides access to destinations. That access contributes to the economy, and also to the well-being of people. Without an adequate transport system, goods transport costs (in terms of money, time and effort) would be way higher, negatively influencing the economy and strongly affecting the arrangement of production stages and trade patterns.

On the downside, building infrastructure networks or projects, such as motorways or railways, costs a lot of money – in Western countries often in the order of magnitude of £10–30 million per kilometre – with added costs for maintenance and repairs. In addition, line infrastructures are barriers to animals and people, the use of infrastructures causing environmental impacts ranging from climate change due to greenhouse gas emissions to local noise and air pollution. It is also important to note that the pros and cons of transport infrastructure projects are not equally distributed across population groups and other actors. In general terms, the users of projects tend to benefit, while the non-users face disadvantages such as noise, exposure to pollution and barrier effects. Zooming out, the general taxpayer pays for the costs, whereas not all taxpayers benefit equally from transport infrastructure. Not only is the distinction between users and non-users relevant, but there is also a distinction between categories of users, for instance by income group or region. For example, high income segments of the population generally drive more by car, and fly more than low income segments.

Consequently it is understandable that decisions on such projects often induce fierce debates, and it makes a lot of sense that many countries have a

ministry for transport, responsible not only for preparing decisions on investments and maintenance of transport infrastructures but also for dealing with the downsides.

On the face of it, one would expect decision-making processes in general, and on transport infrastructure in particular to follow a logical line of reasoning, such as (1) assessing what the problem or challenge is, (2) listing candidate solutions, (3) evaluating the pros and cons of candidate solutions and, finally, (4) making decisions. To support such a line of reasoning, several tools are available to assess the pros and cons of policy options (see Mouter 2020, for a recent handbook on the most common evaluation tools). Cost-Benefit Analysis (CBA) and Multi-Criteria Analysis (MCA) are the most commonly applied methods, other methods being Environmental Impact Assessment, Strategic Environmental Assessment and Cost-Effectiveness Analysis. However, decision-making processes often do not follow the line of reasoning as presented above. Literature shows that the outcomes of CBAs on transport projects are poorly correlated with the final political decisions (Annema et al. 2017; Eliasson et al. 2015; Odeck 2010). I do not want to argue that this definition is problematic per se. There could be good reasons for politicians to have preferences other than those implicitly suggested in a CBA. For example, a Green party may value environmental impacts more highly than assumed in a CBA. So the question of when a project is considered to be a success can be answered in multiple ways, depending on a person (politician or other) or organisation's perspective and priorities. (See Chapter 2 of this book and the A303 example for a further discussion on what is 'success' in the case of transport infrastructure projects). As long as the problem of the challenge is clear, the candidate solutions are listed clearly, and the pros and cons are clearly assessed, politicians can choose the solution they prefer, or decide to do nothing at all. This process allows for a mature and reasoned debate.

On the other hand, a less explicit line of reasoning leaves room for perverse incentives. Samset and Volden (2016) refer to the paradox of perverse incentives as follows:

public investments with no financial obligations for the target group may cause perverse incentives and result in counterproductive projects". They further explain: "The state often appears as a generous donor on behalf of taxpayers when financing projects that benefit specific groups or geographical regions. [...] When a project does not entail financial obligations for recipients, there is no incentive to opt for the most socially beneficial or cost-effective alternative. Different actors may have a vested interest in certain projects being chosen. [...] The term perverse incentives refers to the situation where one or more actors are motivated to make choices resulting in a project that is a complete failure seen in retrospect.

(p. 308)

This chapter discusses the process leading to a positive decision to construct a controversial rail freight line connecting Rotterdam Harbour to the hinterland, mainly the German Ruhrgebiet: the Betuweroute (also labelled as the Betuweline).

It is not easy to be crystal clear in selecting the proponents of the Betuweroute, but key players are the Port of Rotterdam authorities, the (rail) goods transport division of the former Ministry of Transport, and interested groups of companies active in the transport sector. The Port of Rotterdam would undoubtedly benefit from the Betuweroute, because the connection between the port and the hinterland would improve, as a result of which the Port of Rotterdam would become more competitive relative to other harbours (Antwerp, Le Havre and North German harbours). However, the Port of Rotterdam would not have to pay for the line, so it is understandable that they wanted the Betuweroute to be built. For the same reason, it is understandable that interested groups of transport companies wanted the line: it would reduce their generalised transport costs (if not, they would not use it), whereas they would not have to pay for the line. Note that the tariffs for using rail infrastructure do not cover all costs. EU regulations imply that the variable costs should be paid by the users, but not the fixed costs. The position of the goods transport division of the Ministry of Transport is a bit more difficult to understand. At the time, there were quite close relationships between that division and the goods transport sector. Of course the civil servants would not have to pay for the Betuweroute themselves. In the Netherlands, as in many other countries, there is competition not only between ministries in their claims for state money but also within ministries. My impression is that the goods transport division had an interest in attracting more money for goods transport infrastructure, in this case the Betuweroute, to increase the importance of that division.

The methodology used for this chapter lies mainly in presenting a structured impression based on long-term involvement of the author in debates related to the Betuweroute, research on its environmental impacts, and many contacts with politicians, interested groups, academics and others. Examples of this involvement include: a Dutch language article in a professional journal forecasting that the costs would be about four times higher than announced in the policy documents (Van Wee 1994); a study on the expected environmental impacts of the Betuweroute (Van Wee et al. 1994); supervising a PhD student studying cost overruns of large infrastructure projects in the Netherlands in general, and making detailed analyses of informal and formal decisions and related cost estimates of the Betuweroute (and also the High Speed Rail line from the Netherlands via Belgium to Paris) (Cantarelli et al. 2010a); academic support of a committee advising on the role of parliament in decision-making on large transport infrastructure projects; and numerous contacts with the media.

Section 6.2 describes the Betuweroute. The following section, 6.3, explains what went ‘wrong’ in the process leading to a positive decision. This

section discusses the key issues in main lines. Section 6.4 elaborates on how this process can be explained, followed by Section 6.5, which zooms out, comparing the results with other projects and the literature. Section 6.6 links the perverse incentives paradox to other paradoxes presented by Samset and Volden (2016), arguing that the perverse incentives paradox helps to explain several other paradoxes. Some of the issues that went wrong, already introduced in Section 6.3, will be discussed in more detail, from the perspective of the additional paradoxes. Section 6.7 suggests what we can learn from the Betuweroute experience. Finally, Section 6.8 summarises the most important conclusions of this chapter.

## **6.2 The case of the Betuweroute**

The Betuweroute is a 160 km long, dedicated rail freight line connecting Rotterdam Harbour to the hinterland, mainly the German Ruhrgebiet, and opened in 2007. The discussion on the potential construction of the rail freight line started in the mid-1980s, in a context in which the share of rail in goods transport in the Netherlands was quite small and declining. Between 1970 and the mid-1990s, the share of rail freight had dropped from about 8% to below 5% of all goods transported in Dutch territory (KiM 2016). Rail also played a small role in the transport of goods to and from Rotterdam Harbour. Germany had plans to invest billions of euros (Marken at that time) to improve the rail infrastructure connecting North German harbours to the hinterlands. By then, Rotterdam Harbour was the largest harbour worldwide (expressed in tons of goods transshipped). The fear of Rotterdam Harbour not being as competitive any more relative to the Northern German harbours, and maybe also to those of Northern France (Le Havre) and Belgium (Antwerp), probably played an important role in the debate.

In addition, there were increasing concerns about the environment in general, both worldwide, as expressed by the Brundtland report, 'Our common future' (World Commission on Environment & Development 1987), as well as in the Netherlands. These concerns also applied to the environmental impacts of transport. Depending on the indicator used, the transport sector generally had (and still has) a large share in the emissions of substances such as  $\text{NO}_x$  and  $\text{CO}_2$  and was a major source of noise nuisance. Per ton kilometre, road freight emissions were way higher than those of rail (Van Wee et al. 1994), and a shift from road to rail was seen as an option to reduce the environmental pressure of freight transport. However, the rail transport system was generally considered to be not very mature, and on many tracks, rail freight was combined with passenger transport. This also applied to most of the rail to be transported from Rotterdam Harbour to the hinterland. The ambition of a strong increase in the volume of goods to be transported from Rotterdam Harbour to the hinterland raised concerns about the capacity and quality of the rail freight infrastructure.

Concerns about congestion also played a role. In the late 1980s and 1990s, congestion levels in the Netherlands were increasing (as in almost all Western and non-Western countries), and there were particular concerns about congestion levels on the motorways connecting Rotterdam Harbour to Germany. In the Dutch Second Transport Structure Plan (1990) specific corridors considered to be vital for the Dutch economy were prioritised, the connection between Rotterdam Harbour and Germany being one such prioritised corridor.

To summarise, for reasons of the economy (including congestion) and the environment, the quality of rail freight infrastructure connecting Rotterdam Harbour and Germany was considered to be problematic. The debate started with a solution, the Betuweline, without making clear as to what it was a solution for, other than in quite general terms, as explained above. The first argument used by proponents was an economic argument: the Dutch economy would benefit from building the Betuweroute. When the CPB, the Netherlands Bureau for Economic Policy Analysis, wrote a report that the Betuweroute would probably not be economically viable (CPB 1993), the argument that the environment would benefit became more important in the debates. However, a study on the environmental impacts of the Betuweroute (Van Wee et al. 1994) revealed that the impact of building the Betuweroute on Dutch freight emissions would be very low (1%–2.5%) or could even be absent if there was no high level connection to the German rail freight system (the decision of Germany to build their part of the line was not yet made). Emission reductions could only be realised when additional rail freight was mainly the result of a shift from road to rail. But in the economic underpinnings of the Betuweroute, proponents argued that the rail line would attract additional freight via the Netherlands, at the cost of Belgium and German harbours. It was argued that of the additional goods transported via the Netherlands (due to the Betuweroute), 50% would not be transported via the Netherlands (but via neighbouring countries), 40% would be transported via barge, and only 10% would be transported via road (Van Wee et al. 1994). This explains why the report on the environmental impacts of the Betuweroute argued that, in this case, the environmental benefits would be negligible: the substitution from road to rail would be very limited. So, either the Betuweroute was to some extent beneficial for the economy (mainly because more goods would be transported via the Netherlands), but then there were no environmental benefits, or vice versa. In addition, if there were environmental benefits, the cost-effectiveness of the Betuweroute would be extremely low (Van Wee 1994). Later it was argued that the Betuweroute would reduce congestion on the competing motorway (from Rotterdam to Germany), but traffic experts expected this reduction to be marginal. Note that the demarcation for all calculations was the Netherlands, both in the case of the economy and the environment. It could be that increased emissions on Dutch territory, because additional freight would be attracted, would lead to a reduction in emissions on German or Belgian

territory. Of course, comparable distribution effects apply to economic impacts, so the demarcation to focus on Dutch territory for both the environmental and economic effects was at least consistent.

### **6.3 What went ‘wrong’?**

From the perspective of ‘rational decision-making’, several things went ‘wrong’, leading to a positive decision to build the Betuweroute. As argued above, I assume ‘rational decision-making’ to at least include the following steps (see also Chapter 3):

- a clear description of the problem or challenges
- a selection of candidate options
- an ex ante evaluation of the pros and cons of candidate options
- a decision including the rationale relative to the three previous points.

I realise there are many other, often more complicated, process models, but these four steps are, in my opinion, the minimum requirements.

Below I briefly list several violations of these four steps, returning to several of the points made in more depth in Section 6.6, where I compare the process leading to a positive decision to build the Betuweroute to several of the other paradoxes presented in Samset and Volden (2016).

#### 1 There was no clear debate on the problems/challenges/aims.

In informal debates, proponents argued that the capacity of the hinterland rail connection was simply too low to accommodate the forecasted demand, so more capacity was needed. The debate started with a solution, the Betuweroute, without a clear analysis of the challenges, problems or aims. As explained above, there were some notions with respect to the economy, the environment and congestion, but these were formulated in quite general terms. Moreover, the topics were considered specifically as far as they were relevant to the transport of goods from Rotterdam Harbour, but not in general terms. For example, there were no debates on the general performance of the Dutch economy, and its strengths and weaknesses, leading to the conclusion that lack of capacity in the rail infrastructure for the transport of goods from Rotterdam Harbour to the hinterland would play a significant role in the economic performance of the Netherlands, and that improving the rail freight system was to be prioritised over any other ‘solutions’.

Obviously key actors wanted the Betuweroute for whatever reason(s), and were not interested in the rationale of the aims, problems or challenges underpinning the project. From their perspective, this makes sense: if one wants something, a debate that could challenge that desire is not attractive because it could lead to other solutions, or even to not taking any action at all, because no solution could be a ‘good’ solution for

the problem or challenge. For a wider discussion on the front-end stage of projects: see Chapters 3 and 4 of this book.

- 2 No alternative solutions were considered.

Also as explained above, no alternative solutions were considered, such as inland shipping or road related solutions. This despite several claims in the debates that there was much surplus capacity in the barge system, and high quality waterway connections of Rotterdam Harbour to the hinterland. The Netherlands is located on the sea side of several large rivers, providing very good access by barge to many destinations in Northwestern Europe, especially in the Netherlands and Germany. Also the road network, particularly the motorway network, is very dense in the Netherlands, so several alternatives to rail transport already existed, and new infrastructure or the reduction of bottlenecks in existing infrastructure would increase access via roads or waterways considerably because of the availability of already existing high level networks.

In addition, for the dedicated rail freight line, only one alternative was proposed: the line as it was built. There was only one additional option: a split of the line on Dutch territory, including a rail freight line to the north of Germany. However, that option was considered to be not realistic, and was soon abandoned.

Again, as for topic 1, this made sense from the perspective of those interested in the Betuweroute, because a debate on alternative solutions to the aims, problems or challenges could lead to alternatives such as measures in the area of inland shipping, which were considered to be not attractive by the proponents of the Betuweroute.

- 3 The cost estimates were unrealistically and deliberately low, and the demand forecasts were flawed.

In the Second Transport Structure Plan (STSP), published in 1990, the Betuweroute was announced at a cost of £1.1 billion (2.3 billion guilders at the time, the conversion rate being 2.2 guilders per euro). For a 160 km rail line, with many barriers such as a channel, in a densely populated country, this was a ridiculously low estimate, not only from hindsight but back in 1990. I made a back-of-the-envelope calculation based on the costs of a few other large transport infrastructure projects, and estimated the costs to be about £4.5 billion (10 billion guilders) (later published in Van Wee 1994). In 1990/1991, I needed a more adequate estimate for the development of long-term scenarios for Dutch society, published in 1992 by the CPB. On 'phoning a contact for the Betuweroute at the Ministry of Transport, asking for a realistic cost estimate, I was shocked to receive the reaction: the line could definitely be built for £1.1 billion, and it was absurd that I had some doubts. My objection that the estimated costs per kilometre would be way lower than the costs of other recently built transport infrastructure projects was waived away: the ministry was sure that the line could be built for £1.1 billion. I then realised that something was wrong, and this was politically very sensitive. I checked



my calculations, asking a few other researchers for feedback, and they confirmed my estimates. I published my concerns in 1994 in an article in a professional journal (Van Wee 1994). By then I was working for a governmental institute closely related to policy making, the National Institute of Public Health and the Environment (Dutch abbreviation: RIVM), which later became the Netherlands Environmental Assessment Agency (Dutch abbreviation: PBL). All the research we did was as input for policy making, but was not allowed to draw conclusions on what policy makers should or should not do. Because my role was that of an independent researcher, not an activist trying to influence decisions, and not that of a researcher working for a university (and thus at a greater distance from policy making), I took no further action.

Later an official of the ministry who was heavily involved in policy making for the Betuweroute told me she did not sleep at all for two nights after I published the article, because she was afraid politicians would read it, and the positive decision to build would be endangered (which did not happen). The final costs of the Betuweroute were £4.7 billion (Cantarelli et al. 2010a). It seems that my estimate had been very accurate, but note that due to inflation between 1994 and 2007, £4.7 billion at 2007 prices represents a lower value than at 1994 prices.

Also the demand forecasts were not at all realistic (Meijdam 1993), but more wishful thinking. In the community of transport economists, the demand forecasts made on behalf of the ministry were considered to be ridiculously high, while those in the scenario without the Betuweroute were considered to be ridiculously low. Consequently the impact of the Betuweroute on rail freight demand, and the likely economic benefits of the line were heavily overestimated.

- 4 Several political parties supported the line at a very early stage, without any information on the problems/challenges, alternatives and effects.

Before the formal decision to build, several political parties committed to the Betuweroute, without having a clear picture of the problems/challenges and alternatives, or their pros and cons. In the Dutch context (and in many other democracies), it is difficult to change a political position after early commitment: politicians who do this get the reputation of being unreliable. This early commitment led to the installation of a committee to advise on the role of parliament with respect to large infrastructure projects (TCI, Temporary Committee Infrastructure projects) – see below. One of its recommendations was to not support or reject projects or proposals before key process steps (as presented above) have been made.

- 5 Two metres of reports were published preceding the decision-making, but many of those were manipulated or biased. The reports also made different assumptions with respect to the macro-economic scenarios when estimating the impacts of the line. No clear report summarising the main pros and cons was published.

The previous topic does not suggest there was no research on the impacts of the Betuweroute. The formal decision to build up all the reports together resulted in a pile 2 metres high. One of the problems was that this was way too much for politicians to read/check, even though the reports were published over several years. Another problem was that the assumptions behind the estimates were different, inconsistency between the claimed economic benefits (as a result of attracting more goods transport via the Netherlands) and the claimed environmental benefits (due to a shift from road to rail) being an example. A third problem was that several studies were not conducted according to academic standards, and were far from neutral. Several reports were written with the a priori idea that these should support a positive decision to build the Betuweroute. Academics criticised some of those reports heavily, but their criticisms generally did not reach politicians. A final problem was that there was no document giving a systematic and clear overview of all the relevant pros and cons of the Betuweroute, let alone possible alternatives. Several former members of parliament told me later that they missed a clear and neutral document of only a limited number of pages that summarised the rationale for the Betuweroute as well as providing an overview of the pros and cons.

- 6 There was no systematic evaluation of all the pros and cons (CBA or MCA).

Consequently any systematic comparison of the pros and cons of building the Betuweroute, such as a cost-benefit analysis or multi-criteria analysis, was lacking. The reports written only provided pieces of the jigsaw puzzle, explaining the effects, but the pieces did not fit, nor did they give the complete picture. An ex ante evaluation of the pros and cons of the alternatives (in this case, at least, to build or not to build the Betuweroute, preferably also of alternatives) would lend discipline to the debate. First of all it would lead to the development or application of future scenarios that are internally consistent. In case of the Betuweroute, as explained above, the assumptions behind the economic argumentation were inconsistent with the implicit assumptions underpinning the environmental argumentation. Second, at least for CBAs, there is quite a mature debate on how CBAs should be carried out, and to some extent this also applies to the state of knowledge in the 1990s. It should hence have been easier to trace manipulation. Third, such an ex ante evaluation would probably have received a lot of attention from the media, interested groups (for and against the Betuweline) and academics, and thus it would have fuelled the debates.

- 7 There was no idea about opportunity costs.

In most countries, the budgets of ministries are relatively stable. This implies that the yearly budgets for new transport infrastructure projects do not vary much between years. This means that projects that are financed come at the cost of other projects that could have been built. In

economic terms, building a project implies opportunity costs: an opportunity to build one or more other projects is missed, and so are the related benefits of those projects. It was not clear at the costs of which projects building the Betuweroute did come. It might have been at the cost of other projects that were never realised, or were postponed.

This problem was not limited to the Betuweroute only, because in the years when it was constructed, other large-scale transport infrastructure projects were built, such as the high speed rail line connecting Amsterdam and Rotterdam to Antwerp, Brussels and Paris, and extensions of the port of Rotterdam. Those actors with an interest in smaller transport infrastructure projects often complained that these large projects took too large a share in the overall budget of the Ministry of Transport for transport infrastructure projects. It is important to realise that in the Netherlands, local municipalities and provinces have limited self-generated financial resources. Consequently they rely on financial resources provided by the Ministry of Transport (at national level).

- 8 To increase support, many additional measures to reduce local environmental impacts were taken.

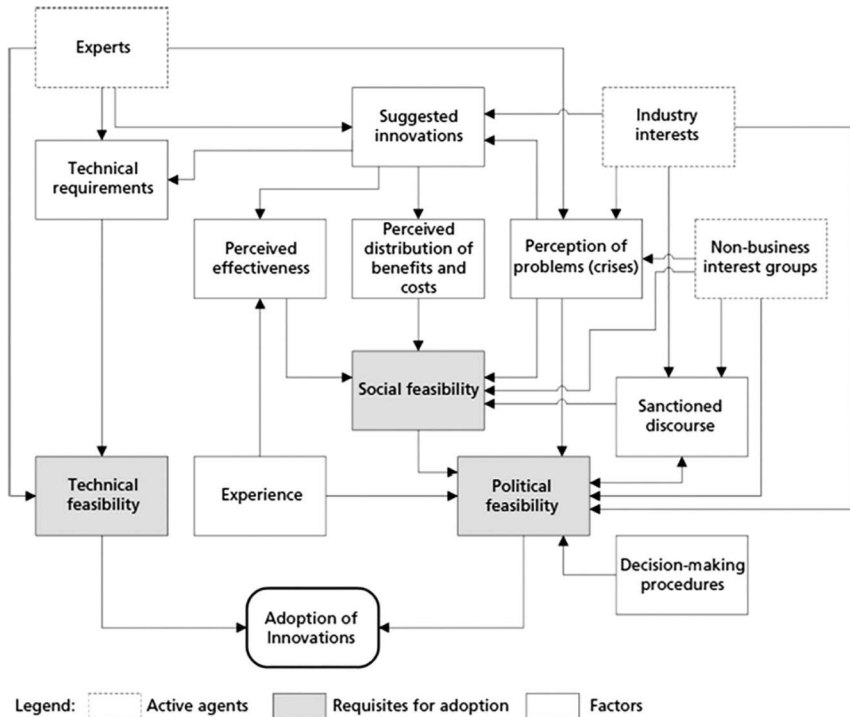
The original plans for the Betuweroute included hardly any measures to reduce the local impact, such as noise walls or barriers. I cannot prove it, but I always had the impression that this was done deliberately to achieve as low as possible cost estimates. But that was not at all realistic. For example, in 1978 a law had already been implemented to reduce exposure to high noise levels of road and rail projects. The early designs of the Betuweroute did not fulfil the related legal requirements for noise.

Local resistance against the Betuweroute was fierce: many local municipalities protested because they did not benefit from the line, but did face negative local impacts such as noise, barrier effects and visual impacts. To reduce local resistance, many local measures were added to the original plan. These measures were partly needed for legal reasons (noise) but more measures were added. No analysis of the additional costs and benefits of those added measures was made.

#### **6.4 How can this be explained?**

An important question is: how can what went ‘wrong’ be explained? Samset and Volden explain this, emphasising the differences between aligning the recipients’ objectives and national objectives, and information asymmetry. Both explanations definitely apply to the Betuweroute. As explained above, the proponents had specific objectives based on self-interest, rather than national objectives. They also had way better insights than parliament on the pros and cons, based on an overload of reports, that were largely not neutral.

But there is more to add to the explanation of what went wrong. The area of political economics is very useful in helping to understand what went wrong. I depart from the political economics framework for the implementation (or



Source: Feitelson and Salomon (2004).

Figure 6.1 A political economy model of transport innovations.

not) of candidate innovations, as proposed by Feitelson and Salomon (2004) and visualised in Figure 6.1.

The framework is very useful to understand the success or failure of complex candidate innovations that need the support of both public and private actors, such as large-scale transport infrastructure projects. In most countries such projects are publicly financed. Even in countries like France, where parts of the transport infrastructure are privately financed (toll roads), support of the public sector is needed.

I use this framework to help understand what went wrong in the main. Figure 6.1 shows that candidate innovations need to be technically and politically feasible. The Betuweroute is a conventional rail line, so technical feasibility was not at all a point of discussion. Figure 6.1, in addition, shows that for political feasibility, social feasibility is also important. Although there was substantial resistance from local municipalities and other interest groups along the proposed route, overall, the social support was quite strong. Awareness of the increasing congestion on motorways and the environmental pressure of road transport fuelled this support, and was dominant in the sanctioned

discourse (see Figure 6.1). The perception was that a dedicated rail line from Rotterdam Harbour to the German Ruhrgebiet would be an effective solution to these problems. In addition, several actors, especially organisations such as Rotterdam Harbour, and transport interest groups, supported the rail line. A factor less visible in the framework is that in the preceding decades, rail investments had focussed on passenger transport, not freight transport. This, combined with the low share of rail in freight transport on Dutch territory resulted in a positive attitude of many actors towards investing in a rail freight line, that is, the Betuweroute.

Looking to what went wrong, I will next discuss some possible explanations.

- 1 There was no clear debate on the problems/challenges/aims.
- 2 No alternative solutions were considered.

Those actors with an interest in the rail line, such as Rotterdam Harbour, and highly placed people working for the former Ministry of Transport on rail freight had no interest in first discussing the precise problems and alternative solutions. They wanted the Betuweroute, and were able to put it on the political agenda at an early stage of the discussions. The decision-making procedures (see Figure 6.1) did not ask for a clear assessment of the problems/challenges, nor for alternative solutions. In other words, the perverse incentives paradox very well describes what went wrong in these respects.

- 3 The cost estimates were unrealistically and deliberately low. The demand forecasts were flawed.

Comparing the final costs with those on the decision to build, cost overrun appeared very limited, but as explained above, comparing the final costs with the original cost estimates published in 1990, the cost overrun was very large (Cantarelli et al. 2010a). This is not uncommon: the vast majority of large transport infrastructure projects worldwide face cost overruns (Flyvbjerg et al. 2014), the strategic behaviour of those having an interest in a positive decision to build being a likely explanatory factor (Cantarelli et al. 2010b).

The problem with strategic behaviour and cost overruns is that those who benefit from a positive decision to build are not those who need to pay. It is the tax payer who pays, or – if one assumes the total public budget for transport infrastructure to be constant – those who would have received the benefits from projects that could not be built. Because it is seldom made explicit which those projects are, those who lose out are set to remain anonymous.

Comparable problems exist with respect to demand forecasts.

Figure 6.1 explains that perceived problems and the distribution of cost and benefits influence social feasibility. The congestion and environmental problems were widely shared, but due to the notion that the costs would be quite low, the distribution of costs and benefits hardly played any role in the early stages of the debate.

- 4 Several political parties supported the line at the very early stages, without any information on the problems/challenges, alternatives and effects.

In line with the previous point, several political parties committed at an early stage, probably because they thought the Betuweroute would be an interesting option to reduce congestion and the environmental problems of road freight, and would consequently be socially feasible. Probably they did not worry too much about the distribution of costs and benefits because of the low cost estimate overall. Next they thought it would be a nice strategic decision to improve the competitiveness of Rotterdam Harbour, and this position was probably fuelled by input from industry (companies in the area of goods transport and Rotterdam Harbour) who suggested there would be a problem with the competitiveness of Rotterdam Harbour if the Betuweroute were not to be built ('perception of problems', in Figure 6.1). They were probably influenced by actors having an interest in the early commitment of politicians.

- 5 Two metres of reports were published preceding the decision-making, but many of those were manipulated or were at least biased. Moreover, the reports made different assumptions with respect to the impacts of the line.
- 6 There was no systematic evaluation of all the pros and cons (CBA or MCA).

At the time, there was no tradition of systematic evaluations on the pros and cons of candidate large transport infrastructure projects. Hence it was relatively easy to order studies and reports that considered only a part of the questions to be answered. It was also relatively easy to select non-neutral research institutes which wrote reports that the ministry wanted to be written. The early commitment of several political parties (see above) resulted in support for the positive attitude of successive Ministers of Transport, and because of that early positive commitment, the manipulated reports did not receive much attention from politicians. The decision-making procedures (see Figure 6.1) did not prescribe how research needed to be done, or how assessments of the pros and cons needed to be made.

- 7 There was no idea about opportunity costs.

By then (and still) the concept of opportunity costs hardly received any attention in debates on large infrastructure projects – debates were mainly on projects in isolation – in terms of the decision-making procedures. The Betuweroute debate was no exception. Discussions on opportunity costs would have extended the debate relative to considering alternatives to the Betuweroute, and the main actors did not have an interest in such wider talk. The decision-making procedures (see Figure 6.1) did not ask for opportunity costs to be made explicit.

- 8 To increase support, many additional measures to reduce local environmental impacts were taken.

Because of the early commitment of several political parties and the positive attitude of successive Ministers of Transport, opposition needed to be avoided as much as possible, or, formulated in terms of Figure 6.1, social feasibility was ‘bought’. Therefore, if local municipalities protested against the Betuweline because of local impacts, the reaction was often to reduce such impacts by adding hardware to the rail line.

To summarise, those with an interest in a positive decision to build the Betuweroute did not have to pay its costs, and had no interest in a more mature procedure as suggested above (the problems/challenges, options, evaluation). In addition to this discussion based on the framework of Feitelson and Salomon, public choice theory (Buchanan 1986) is helpful in understanding the positive decision to build the Betuweroute. Public choice theory explains political behaviour from an economic perspective, assuming the self-interested behaviour of people. Politicians want to be (re)elected. They receive more attention by playing a role in clearly visible large-scale projects than, for example, in reducing the maintenance problems of infrastructure, or from supporting smaller, less visible projects, even if these have better benefit to cost ratios. Flyvbjerg et al. (2014) argued that politicians have more to gain from a positive decision to build large-scale infrastructure projects, than to lose from the cost overruns of such projects.

Specifically for the perverse incentives paradox introduced above, explanations are first that the Port of Rotterdam supported the project but did not have to pay, so it was easy for them to ask for the line. Second, the ministry probably had as a perspective: the budget for transport infrastructure is constant. Which project to choose? Because passenger transport then dominated expenditure, those who were involved with goods transport also wanted some money to be spent on goods transport infrastructure.

## **6.5 The broader context: other projects and literature**

This section elaborates on the question as to what extent the results can be transferred to other contexts. The overall picture is that the Betuweroute is in some respects a ‘worst in class’ example, but it is not unique.

As explained above, the Betuweroute faced a strong cost overrun if we compare the final costs with those in the Second Transport Structure Plan. Cost overruns are by no means an exception to the rule, the strategic behaviour of those with an interest in a positive decision being one frequently suggested explanation (Cantarelli et al. 2010b; Flyvbjerg et al. 2014); (see also Chapter 5 of this book). Perverse incentives apply in the sense that those responsible for unrealistically low cost estimates do not pay the bill, literally and figuratively. Note that cost overruns also have other explanations (Cantarelli et al. 2010b), optimism bias being an important one. Optimism bias implies

that those estimating costs did not intend to underestimate them, but were too optimistic. If optimism applies, one could argue that there is still a problem with ‘wrong incentives’ because there is a lack of incentive to do ‘better’. Those estimating costs could be provided with guidance on how to estimate costs via institutional rules. A specific method to arrive at cost estimates is Reference Class Forecasting (Flyvbjerg and COWI 2004). This method implies that cost estimates of comparable projects realised in the past are used to estimate the costs of new projects. In addition, it is an option to allocate some of the risks of ‘wrong’ cost estimates to private parties.

Next, overly optimistic estimations on the use of transport infrastructure projects are also not an exception: many *ex ante* evaluations overestimate demand (Van Wee 2007). Institutional rules could provide incentives to do ‘better’.

Looking at other projects, the most comparable project was the already introduced high speed rail line from the Netherlands to Belgium and Paris, completed in 2009. Comparable problems existed with respect to cost overruns, demand shortfall and decision-making. In addition, after the opening of the line, there were problems later on with the poor quality of the trains, and currently (2021) the line has only limited use, way less than forecasted / assumed in the decision-making processes.

Another example is a not (yet) built fast rail line (conventional rail, HSL or Maglev) connecting the North of the Netherlands to the Randstad area (Amsterdam and Schiphol Airport). The North of the country is doing economically less well, at least in terms of unemployment rates, average incomes and diversity of the economy. About two decades ago, discussions started on building a fast rail line to reduce these problems. At an early stage, some kind of commitment was given to the Northern provinces to build the line. Two CBAs were carried out, both showing that the costs would be much higher than the benefits. Related travel demand modelling studies showed that trains would have increasingly lower occupancy rates on the more northerly sections of the line. Economic impacts would be limited, and the increased number of jobs in the North would not come at the cost of the prosperous West, but at the cost of the Eastern part of the country, also a region that is not doing well economically. Partly based on the CBA results, a negative decision was made, and the North received other forms of financial compensation. Nevertheless the debate was re-opened, and a recent study was carried out, a CBA being part of that study. Again the conclusion was that costs would be way higher than benefits (about 2.5 times higher, at least). So, again, this is an example of a discussion in which only one type of solution was proposed – a fast rail line connecting the North of the Netherlands to the Randstad area. In this case, multiple alternatives to that rail line were considered, such as fast conventional rail versus high speed rail. Again, the proponents of the line did not have to pay for it, and the perverse incentives paradox describes what happened.

Zooming out to the much wider category of Dutch transport infrastructure projects, the way these are financed is of interest. As already explained



above, local and provincial authorities have relatively low ‘own income’ to spend on transport infrastructure projects compared to other countries. They largely rely on money from the national Government. This has important advantages, because the national Government evaluates candidate policies from a national perspective, not only a local or regional perspective. The risk of departing from the local perspective is that a project could make sense from a local perspective, but not from a national perspective, because the gains for a local municipality come at the cost of losses to other municipalities. For example, improving the canal connecting Amsterdam harbour to the North Sea could be beneficial from the Amsterdam perspective, but not from the national perspective, because Amsterdam and Rotterdam Harbour compete. A disadvantage of the reliance on national funding is that local governments could ask for projects they would not build, and would not have to pay for fully, even if they had the money. After all, they receive most – if not all – of the benefits, but pay only a small part of the costs. On the other hand the national perspective is an example of a ‘good incentive’, at least from the perspective of the Dutch tax payer.

## **6.6 Relationships with other paradoxes**

As explained above, this paper departs from ‘the perverse incentives’ paradox. The paper of Samset and Volden (2016, p. 299) presents ten paradoxes. The ‘perverse incentives paradox’ (Paradox 9) influences several of the other paradoxes, at least Paradoxes 1, 2, 3, 4, 6, 7 and 10. In this section, I will argue how. The definitions of all paradoxes below are literally taken from the original paper of Samset and Volden (2016).

- 1 The success paradox: success is measured in terms of tactical performance rather than strategic performance.

Samset and Volden make clear that success is a difficult term, and can be defined and operationalised in many different ways. They further explain:

...is necessary to distinguish between the projects’ tactical and strategic performance. Success in tactical terms typically means meeting short-term performance targets, such as producing agreed outputs within budget and on time. These are essentially project management issues. Strategic performance, however, includes the broader and longer-term considerations of whether the project would have a sustainable impact and remain relevant and effective in its operational phase, throughout its lifespan. This is essentially a question of getting the business case right, or, in short, of choosing the most viable project concept. [...] Strategic performance ... includes the broader and longer-term considerations of whether the project would have a sustainable impact and remain relevant and effective in its operational phase, throughout its lifespan. [...] Strategic performance is

a question of how the project performs after the outputs have been delivered.

(p. 300)

Distinguishing tactical versus strategic performance makes sense, and the paradox suggests the focus is often on tactical, not strategic performance. In case of the Betuweroute first of all, to the best of my knowledge, it was not made explicit what 'success' would mean, not even in tactical terms. There were notions of a shortage of capacity on the existing rail tracks for goods to be transported from Rotterdam Harbour to Germany. In addition there were abstract notions that the Betuweroute would be a 'strategic decision', and good for the Dutch economy, but it was less clearly explained what strategic *performance* was to be obtained. This can be understood from the perspective of the paradox of perverse incentives: if strategic performance was specified, it would be relatively easy to show that it was doubtful that the Betuweroute would be a success. If success was defined in quantitative economic terms, the report of CPB (1993) referred to above would undermine the claim that the Betuweroute would be a success.

As Samset and Volden make clear, sustainability should be a component of strategic performance. In the case of the Betuweroute, environmental impact was the most likely sustainability dimension, in addition to economic performance. Indeed, as explained in Section 6.3, environmental impacts were mentioned in the Betuweroute debates. However, it is striking to see the line of reasoning in the arguments. In 1994, I was asked by the Dutch Ministry of Housing, Spatial Planning and the Environment (a ministry that does not exist anymore in its current form) to write a report, together with others, on the average freight emission factors for rail, road and barge. My contact at the ministry told me that the results would be used to quantitatively underpin the plea for building the Betuweroute, from an environmental perspective. Seemingly there was an interest in measuring strategic performance. But the problem was, as explained above, that only providing emission factors would be misleading, because the Betuweroute was, for economic reasons, argued to attract more freight to be transported via the Netherlands and to compete with barge transport. So suggesting that the Betuweroute would be good for the environment because emissions per ton kilometre of rail transport were lower than those of road transport, without including the impact of the economic scenarios (transport volumes by mode with and without the Betuweroute) on emissions would be incomplete, or even misleading. Therefore, we, as researchers, decided to multiply the emission factors by transport volumes for the scenario with and without the Betuweroute, showing that the impact of the Betuweroute on freight emissions would be very low. This was despite the request, and even order, to leave out these calculations. The report hardly gained attention in

the debate, but later on several politicians told me they felt manipulated because as far as they could remember, they had never explicitly received information other than the emission factors. Moreover, as one politician told me, maybe our report had been provided on a Friday afternoon, together with many other documents, to be read over the weekend, when family members expected him to spend time with them, so he could have easily overlooked the report.

As a side note: the calculations we made by multiplying average emission factors for road, rail and barge and transport volumes was a very rough method. As Van Wee et al. (2005) argue, average emission factors do not necessarily apply to specific cases, for several reasons. For example, the characteristics of goods vary by mode, so for the transport of a given type of goods, other factors could apply. In addition, detour factors differ between modes because of different networks, and long distance road transport has lower emission factors than average road transport.

All in all, the perverse incentives paradox explains the occurrence of the success paradox in the case of the Betuweroute: those with an interest in a positive decision to build the Betuweroute had no interest in discussing the strategic performance of the rail line.

- 2 The paradox of the significance of front-end management: less resources are used up front to identify the best conceptual solution (project governance), than to improve tactical performance during implementation (project management).

Samset and Volden put this paradox in the context of uncertainty and information to reduce uncertainty, and argue,

It is widely believed that uncertainty is highest at the initial stage, when the project concept is conceived, and that it tends to reduce rapidly as information accumulates over time. [...] Major issues such as agreeing on the most effective solution to a problem and the choice of concept need to be dealt with as early as possible – later on is too late. [...] Where projects fail strategically, it is likely that the problem can be traced back to decisions in the earliest phases, when the initial idea was conceived and developed. What happens during the front-end phase is therefore essential for a project's success. [...] In most cases the key issue at the earliest stage is to shed sufficient light on the underlying problem that provides the justification for the project, and the needs that the project is meant to satisfy. [...] It is a paradox therefore that most of a project's planning resources may be spent on detailed planning and engineering, while too little is usually spent on getting the idea right from the start where the potential to reduce uncertainty by means of adding information is the largest. The paradox is that most resources are used to reduce uncertainty during the implementation phase, where the potential is much less.

In case of the Betuweroute, a lot of documents had already been produced years before the decision to build, but as explained above, there was no information on what the problems or challenges were, and which alternative solutions would be available. The information aimed to underpin the need for the Betuweroute and to increase the likelihood of a positive decision to build. So again those having an interest in a positive decision to build, including the Ministry of Transport and Public Works, did not have an interest in a strategic discussion to identify the problems, challenges and alternative solutions. In other words, the perverse incentives paradox helps to explain what happened in the case of the Betuweroute with respect to the paradox of the significance of front-end management.

- 3 The paradox of early information overflow: decisions are based on masses of detailed information up front rather than carefully selected facts and judgemental information relevant to highlight the essential issues.

Samset and Volden write about this paradox,

the front end phase is when fundamental choices are made, uncertainty is at its highest freedom to choose is at its optimum, and available information is most restricted. Adding information, therefore, makes sense – but only to a certain degree. The crucial issue is not the volume but what type of information is needed. [...] In the initial phase of a project the priority is to establish an overall perspective, and to analyse the problem in its context, considering the needs and priorities of stakeholders, users and affected parties, in order to come up with a sensible strategy. Opportunities and risks should be considered. Experience suggests that creativity, imagination and intuition can be more valuable at this stage than large amounts of data.

They also emphasise

the need to invest in relevant information at the earliest stage of a project, while at the same time limiting the search to what is useful for decision-making at this stage. A targeted search for information regarding the main uncertainties likely to affect the project is more cost-effective than an unguided search, since it makes it possible to increase the share of relevant information and reduce the total amount.

(p. 302)

This paradox definitely also applies to the Betuweroute. As explained above, 2 metres of reports were produced, but not the type of reports needed in line with the argumentation of Samset and Volden. The reports aimed to convince decision-makers and others of the need for a positive decision to build the Betuweroute. Again the perverse incentives

paradox helps to explain what happened in case of the Betuweroute with respect to the paradox of early information overflow.

- 4 The paradox of the opportunity space: the choice of conceptual solution is made without systematically scrutinising the opportunity space up front.

Samset and Volden write about this paradox,

Every project is initiated to solve some problem or meet some needs. And every project faces a choice of concept in terms of how to solve this problem. Consequently, a key task in the early phase of a project is to identify possible ways to solve the problem it has been mandated to solve (setting up the opportunity space), furthermore to evaluate alternative concepts (limiting the opportunity space), and decide on the one best suited. There is much evidence to suggest that this is not always how things are done. (...). A (...) case study of 23 major public investment projects (Whist and Christensen, 2011) went deeply into how the analytical and political processes interacted during the front-end phase, in order to understand how this affected the outcome of the projects. It was found that the majority of projects started out with a predetermined solution.

(pp. 302–303)

The Betuweroute perfectly matches the pattern found by Whist and Christensen (2011): as explained above, the project started with a predetermined solution. No alternatives were considered. A difference between the Betuweroute and the first part of the description of Samset and Volden is that there was not a clear description of the problem. Moreover, the need was formulated in a narrow-minded way: there was a need for a better rail connection between Rotterdam Harbour and the hinterland. But the need behind that better connection was not made explicit. Again the perverse incentive paradox helps to explain what happened: if those with an interest only want a predetermined solution, then it is better to avoid any discussion on the problems it should solve or the needs it should satisfy.

- 5 The cost estimation paradox: the focus is on the final cost estimate (the budget), while early cost estimates are overlooked.

Samset and Volden write, referring to a report written by Welde et al. (2014),

The report discusses possible reasons for the substantial underestimation in early phases. An often used distinction is made between political, technical, and cognitive reasons (e.g. Flyvbjerg, 2005). It may be very difficult to prove that the cause is political, but in several of the projects there were clear indications that the first estimate was deliberately low in order to increase the chance of the project idea being considered. This corresponds well with other studies that

have attempted to prove that costs are underestimated deliberately to make the projects appear more attractive. (...) Hence, it is clearly a paradox that so little attention is devoted to the initial estimate. (p. 306)

As explained above, the early costs estimates of the Betuweroute were ridiculously low, and discussing the estimates was a very sensitive matter. I will now elaborate a bit more on the dynamics of the cost estimates. Cantarelli et al. (2010a) introduce the concept of lock-in to explain what happened. Following Woerdman (2004), they explain (p. 793), “Lock-in is created when suboptimal policies are used as a consequence of path dependency, even though a better alternative is present”. They explain how low cost estimates might lead to a situation of lock-in, and how politicians and other actors might decide to support a project long before the formal decision to build. They propose a theoretical framework to help understand which factors (‘input variables’) lead to lock-in (Figure 6.2). It is beyond the aim of this chapter to fully discuss the framework, but it shows that lock-in occurs due a complex interplay of factors leading to escalating commitment, the need for justification, inflexibility and the closure of alternatives. The framework helps in understanding the importance of the cost estimation paradox: cost estimates that are too low might lead to early commitment, long before the formal decision to build. Actors with an interest in a specific project might benefit from the communication of low cost estimates at an early stage, in the hope of early commitment.

Cantarelli et al. show the timeline of cost estimates in the years preceding the formal decision to build (Figure 6.2).

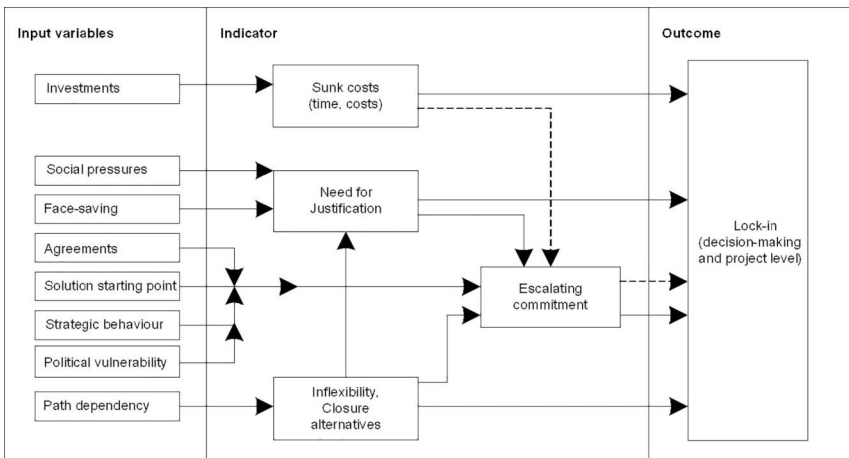


Figure 6.2 Theoretical framework for lock-in. Solid lines represent the influence of conscious lock-in, dotted lines the influence of unconscious lock-in.

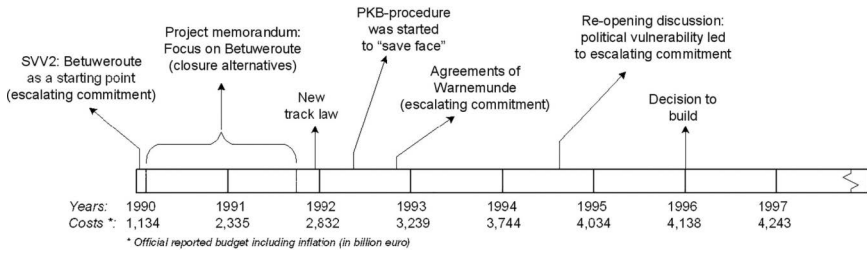


Figure 6.3 Timeline for the Betuweroute project (decision-making level).

Figure 6.3 shows that the initial cost estimate was as low as £1.1 billion, whereas the cost estimate at the decision to build was £4.1 billion. It is difficult to say at what point of time politicians and other actors had the idea that there was no longer any way back, for reasons of early commitment. The research team (Cantarelli and colleagues) tried to empirically assess these actor specific points in time by contacting the politicians involved in the decision-making process. The responses they received were so low that they had to abandon the study.

Again the pattern is in line with the paradoxes discussed above: the paradox of perverse incentives explains that it made sense for proponents of the Betuweline to come with excessively low cost estimates. Next a process of lock-in occurred, as a result of which there was no way back, long before the decision to build. The theoretical framework presented by Cantarelli et al. (2010a) might be helpful to understand the process of lock in.

Not only is the discussion on lock-in and early commitment relevant to help understand the importance of the perverse incentives paradox and the impact it has on the cost estimation paradox, but it also makes clear that the literature on cost overruns comparing final costs with costs at the decision to build shows only part of the real problem. Because early cost estimates tend to be lower than those at the decision to build, and because of early commitment (as a component of lock-in), it is very possible that cost overruns based on a comparison of final costs and costs at the 'point of no return' are way larger than those that follow from comparing the final costs with those communicated at the decision to build.

- 6 The paradox of disregarded analyses of costs and benefits: detailed estimation of cost and benefits is commonly done up front, but disregarded by decision-makers, who tend to emphasise other aspects.

Samset and Volden write about this paradox,

A substantial amount of resources is devoted in major investment projects to establish a decision basis. Detailed Cost–Benefit Analyses are often performed, and complex models are developed to simulate

traffic volumes and other inputs to these analyses. However, there are indications that decision-makers have little confidence in Cost Benefit Analysis in Norway. [...] The paradox in this case is that so much effort is devoted to the calculation of a net present value that decision-makers may not find useful or credible.

(pp. 306–307)

As explained above, no CBA preceded the decision-making process in the case of the Betuweroute. The perverse incentives paradox probably explains why: a CBA would show that the costs would be way higher than the benefits. So the proponents had no interest in a comprehensive, clear and neutral CBA. It is important to realise that at the time of the Betuweroute debate, it was not common to carry out a CBA. But, as will be explained in the next section, the discomfort that many had with respect to the whole Betuweroute procedure and debate led to the obligation to conduct a CBA for large transport infrastructure projects in the Netherlands.

On a side note: about a decade or so ago, I was contacted by an organisation that wanted to organise a conference on the positive decision to build the Betuweroute. This was after the opening of the line in 2007. They suggested the core should be a debate between a proponent of the Betuweroute and someone who was ‘against’ building it. They contacted me to fulfil the role of the latter. I first explained that I was not ‘against’ building the Betuweroute, but supported the idea that parliament should be well, clearly, impartially and timely informed. This did not apply to the Betuweroute. Second, I explained that it was very unlikely that the benefits could ever be high enough to compensate the high costs, and that we did know this at an early stage. So, I was willing to make these points, and debate with a proponent. I even made a ‘quick and dirty’ CBA underpinning my second point. The organisation was pleased with my willingness to contribute. Several weeks later they contacted me again: the conference had been cancelled because none of the proponents was willing to debate with me on this topic at a conference. This gave me the impression that they had already known that the costs would be larger than the benefits, and that parliament had not been informed adequately.

- 7 The paradox of ‘predict and provide’: the tendency is to choose a ‘predict-and-provide’ strategy rather than to explore alternative solutions.

Samset and Volden write about this paradox:

When confronted with capacity problems, the planners, who are often engineers, almost always recommend increased capacity based on estimates of future demand. However, unsurprisingly, there is often excess demand for public services and infrastructure offered free-of-charge to citizens. The need should not be defined narrowly



as a need to increase capacity but rather as a need to solve the congestion problem. The latter allows for a variety of measures, including demand regulation, congestion pricing, and legal and informative measures, most of which are far cheaper than a construction project to expand capacity. [...] The paradox in this case occurs when needs and benefits assessments in public infrastructure projects are decoupled from overriding political priorities and goals, possibly because such overriding societal goals are conflicting and multidimensional. (p. 308)

This definitely applied to the Betuweroute debate. A manipulated forecast was made showing a very strong increase in rail freight demand, and that there was definitely not enough capacity on the existing rail infrastructure. Proponents hence argued that the line needed to be built. The variety of other measures as addressed by Samset and Volden was ignored. The perverse incentives paradox clearly explains that this makes sense from the perspective of the proponents of the line: if you want a line, you do not want a debate on alternative solutions for rail freight transport capacity; neither do you want a debate on the overriding political priorities and goals, in this case relating to the economy, environmental impacts of freight transport, or congestion on the road connection from Rotterdam Harbour to the hinterland.

## **6.7 What did we learn?**

Because of the positive decision to build, combined with a lack of understanding of the rationale and no clear and neutral assessment of the pros and cons of the line, many people (politicians, interested groups, citizens, etc.) felt manipulated, although on the positive side, the process also contributed to important improvements in decision-making procedures.

First of all, together with the process leading to the construction of the High Speed Rail line from the Netherlands via Belgium to Paris, which faced comparable criticism, it led to the development of a manual to ex ante evaluate large transport infrastructure projects, the core being the obligation to carry out CBAs for such projects according to the manual (Eijgenraam et al. 2000) published by the Netherlands Bureau for Economic Policy Analysis (CPB). The report was the result of many debates and contributions from leading researchers and institutes. The manual not only prescribed a CBA for large national transport infrastructure projects; it also explained how to carry out CBAs. In addition, after three years of applying the manual, a thorough evaluation of experiences was made, leading to several additions to the manual. Up to 2017, over 100 CBAs had been carried out using the manual (Annema et al. 2017).

Second, in 2013 a more generic manual was written, to be applied to all kinds of projects, and not only transport projects (Romijn & Renes 2013), published by CPB and PBL (Netherlands Environmental Assessment Agency). Again, a CBA is the default, and instructions were given on how to ex ante evaluate projects.

Third, largely because of the experiences with the role of parliament in the decision-making process of the Betuweroute and the High Speed Rail line from the Netherlands via Belgium to Paris, as explained above, a committee (temporary committee infrastructure projects – Dutch abbreviation TCI) was founded to study and advise on the role of parliament in the decision-making processes of large infrastructure operations. The cost overruns of both projects played an especially important role in the establishment of the committee. The committee report (Tweede Kamer 2004) advised, among other things, on research support for parliament, removing the ban on contacts between members of parliament and civil servants, and making sure that members of parliament are not overloaded with less relevant information, while important information should be sent to parliament.

## 6.8 Conclusions

This chapter departs from what Samset and Volden (2016, p. 308) refer to as ‘the paradox of perverse incentives’:

public investments with no financial obligations for the target group may cause perverse incentives and result in counterproductive projects. [...] The term perverse incentives refers to the situation where one or more actors are motivated to make choices resulting in a project that is a complete failure seen in retrospect.

The chapter has explained that the positive decision to build the Dutch Betuweroute, connecting Rotterdam Harbour to the German Ruhrgebiet can be understood by this paradox. Although a cost-benefit analysis was not carried out, it is extremely likely that the benefits will never be high enough to compensate for the construction costs of almost £5 billion (even ignoring other costs, such as maintenance costs). No private party had an interest in participating in the building of the rail line. Yet a positive decision to build was made. Those actors supporting the construction of the line did not have to pay for it – the Dutch tax payer had to pay. However, the social benefits in terms of the environment and congestion reduction are very small. As economists have argued: the main beneficiaries are German companies who have an additional transport option to receive and ship goods way below the real transport costs. What is more, these German companies did not pay anything for the construction of the line, as they do not pay taxes in the Netherlands.

The chapter also makes clear that many things went wrong, such as having no clear explanation of the problems the line was supposed to solve, or the

related challenges. No alternatives were considered, and the cost estimates were seriously flawed.

I argue that the perverse incentives paradox helps to explain several of the other paradoxes discussed in the paper of Samset and Volden: those having an interest in a positive decision to build the Betuweroute did not have to pay for it, and this resulted in several perverse incentives that are further detailed and discussed by other paradoxes.

Although the Betuweroute is a ‘worst in class’ example, it is no exception. Cost overruns and demand shortfalls are a worldwide problem. The problem that those who benefit from a positive decision to build do not pay for the costs, providing a wrong incentive, is also common.

On the positive side, the Netherlands learned a lot from the Betuweroute (and the HSL South). Since 2000, it has been obligatory to assess candidate national large transport infrastructure projects via a social cost-benefit analysis, making use of a dedicated manual. Based on the advice of a special temporary committee report published in 2004, the role of parliament in the decision-making process was strengthened. Later (2013) a manual for the ex ante assessment of all kinds of projects was introduced. Several experts think that the decision not to build a fast rail line connecting the north of the Netherlands and the west was largely due to the CBA showing that the costs would be way higher than the benefits. Koopmans (2010) estimated the CBA related costs of CPB, and assumed that a negative decision to build candidate projects evaluated according to the CBA manual for which costs exceeded benefits could be attributed to 10% of the CPB and CBAs. The welfare losses (calculated from the difference between estimated costs and benefits) were about £20 billion. Hence, the positive value of the CPB and CBAs is estimated to be £2 billion (10% of £20 billion), implying a benefit-cost ratio of the related work of 17. In other words, the obligation to carry out a CBA according to the CBA manual was a decision which significantly increased welfare in the Netherlands. The negative experiences with respect to the Betuweroute, the lessons learned and the actions taken made positive contributions to Dutch society.

A final remark on the paradox, as formulated by Samset and Volden (2016, p. 308), in particular the sentence, “The term perverse incentives refers to the situation where one or more actors are motivated to make choices resulting in a project that is a complete failure seen in retrospect”: I argue that this applies to the Betuweroute, but not only in retrospect; long before the formal decision to build, several researchers had already warned that a positive decision would result in welfare losses.

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