

**Erasmus University Rotterdam**

*Erasmus School of Economics*

*Master: Economics & Business / Urban, Port and Transport Economics*

**MASTER THESIS**

# **Paying for Inland Seaport Infrastructure**

---

*With emphasis upon the case of the Port of Rotterdam*



**Lauratu Stijnen**

**Student N°333225**

Supervisor: **Dr. Bart Kuipers**

Date: **May 2013**

# **ACKNOWLEDGEMENTS**

I would like to thank all interviewees that gave me from their time, shared their knowledge and made this research possible. Further I would like to thank Dr. Bart Kuipers, whom I am very happy to have chosen as my supervisor – thank you for your encouragement and guidance throughout my thesis. My gratitude goes also to Mr. Maurits van Schuylenburg from the Port of Rotterdam whose initial guidance gave my thesis a push in the right direction. Last but not least I would like to thank Frank Stijnen for his unconditional support during these busy times.

# ABSTRACT

This Master thesis represents the last stage of the study Economics & Business with specialization in Urban, Port & Transport Economics in Erasmus University Rotterdam.

The paper tries to answer the question who must and who will pay in the future for the inland transport infrastructure connecting the Port of Rotterdam to the mainland. On a larger scale this thesis represents an explorative, qualitative and critical study on the topic of inland transport infrastructure of seaports. The focus is reduced to road and railway infrastructure in particular and the point of view is kept close to the interests of the Port of Rotterdam.

A solid conceptual framework and an interview-based research are the pillars for the analysis of the data. Examples of provision of inland transport infrastructure from various countries are explored, including the Netherlands. It is argued that procurement of inland transport infrastructure cannot be fully and completely examined unless both variables of such procurement are taken into consideration: financing and funding. Benefits and issues related to public and private financing are explored. Attention is given to private financing through institutional investors which is becoming a viable alternative to long-term traditional bank financing. The funding schemes investigated in this paper are general taxation, user charging from specific taxation, user charging from public and private tolls, donor funding from the European Union, land developers and specific businesses contributions, including ports.

The performed analysis shows that the traditional public financing with public funding approach and the rising private financing with public funding approach are the most viable scenarios for the future of inland transport infrastructure in the Netherlands. On the financing side, institutional investors are a “natural” match for infrastructure procurement and maybe even crucial in a time when long-term bank borrowing is stagnating. Projects deriving from public financing with private funding approaches are possible but only when the business case of the project needs to be supported by private tolls revenue. Pure private financing and funding is a very unlikely scenario, just as schemes where full ownership of the infrastructure is assumed by the private sector. The role of the port as investor in inland transport infrastructure is presented.

# TABLE OF CONTENTS

<b>I. INTRODUCTION</b>	<b>5</b>
1. PROBLEM DEFINITION	5
2. PURPOSE	6
3. RELEVANCE	7
4. METHODOLOGY	7
5. STRUCTURE	8
<b>II. THEORETICAL FRAMEWORK</b>	<b>9</b>
1. INTRODUCTION	9
♦ The nature of inland transport infrastructure of seaports	9
2. INVESTMENT IN INLAND TRANSPORT INFRASTRUCTURE OF SEAPORTS AND ECONOMIC IMPACT	11
2.1. <i>Connection between economic development and transport infrastructure development</i>	11
2.2. <i>Importance and priority of inland transport infrastructure investments</i>	12
2.3. <i>Possible investment scenarios and their driving motivations</i>	13
3. STAKEHOLDERS AND INTERESTS IN HINTERLAND TRANSPORT INVESTMENT	15
3.1. <i>Public acceptance of new procurement schemes</i>	15
3.2. <i>Stakeholders and sources of financing</i>	16
3.3. <i>Motivation behind the different types of investment</i>	19
3.4. <i>Public involvement in infrastructure</i>	20
3.5. <i>Private involvement in infrastructure</i>	24
4. SOME APPROACHES AND THEIR IMPLICATIONS	29
4.1. <i>Public-private partnerships</i>	29
♦ PPP stagnation	30
♦ Transaction costs of PPP	31
♦ Risks in PPP	32
4.2. <i>User charging and tolling</i>	33
♦ Tolls versus taxes	34
♦ Public tolls versus private tolls	35
♦ Road Congestion Tolls versus Road Congestion Taxes	36
4.3. <i>Developer contributions</i>	37
4.4. <i>Trans-European Transport Networks</i>	38
<b>III. INTERNATIONAL EXPERIENCE IN PROCUREMENT OF INLAND TRANSPORT INFRASTRUCTURE</b>	<b>41</b>
1. SOME NOTES ON ROAD PROCUREMENT	41
2. THE FRENCH ROAD EXPERIENCE	43
3. THE CHINESE EXPERIENCE	45
4. A NEW APPROACH FROM CANADA AND AUSTRALIA	46
5. RAILWAY SECTOR ORGANIZATION	47
6. ECONOMIC CRISIS AND SEAPORT HINTERLAND INVESTMENTS	53
<b>IV. THE DUTCH EXPERIENCE</b>	<b>55</b>
1. CASE: THE DUTCH ROAD DILEMMA	55

2.	CASE: DEDICATED EUROPEAN FREIGHT RAILWAY BETUWEROUTE IN THE PORT OF ROTTERDAM	59
<b>V.</b>	<b>RESEARCH FINDINGS</b>	<b>63</b>
♦	Positioning of ITI investments in the port background	63
♦	Perceived ITI needs, risks and future approaches	64
♦	Evaluation of efficiency and effectiveness of ITI projects	65
♦	The changing role of the government in procurement of ITI	66
♦	General taxation	66
♦	User charging (Tolling; Specific taxes related to the use of ITI)	68
♦	Donor government	69
♦	Developer Contributions	70
♦	The Port Authority as possible investor in ITI	71
♦	Institutional investors and private financing	72
♦	PPPs for road and rail projects	74
♦	Railway freight transportation	76
♦	Economic crisis effects on financing and funding of ITI	76
♦	Future visions of ITI procurement	77
<b>VI.</b>	<b>CROSS-EXAMINATION UNDER THE THEORETICAL FRAMEWORK</b>	<b>78</b>
1.	ON PUBLIC-PRIVATE MIXES FOR INFRASTRUCTURE	78
2.	PUBLIC FINANCING	82
3.	PRIVATE FINANCING	84
4.	PUBLIC FUNDING	86
5.	PRIVATE FUNDING (BY PRIVATE USERS OF THE ITI AND OTHER PRIVATE BENEFICIARIES)	88
6.	THE PORT OF ROTTERDAM AND INLAND TRANSPORT INFRASTRUCTURE	90
7.	CONCLUSIONS AND RECOMMENDATIONS	91
♦	Possible limitations and discussions	94
<b>APPENDICES</b>		<b>96</b>
	BIBLIOGRAPHY	96
	FIGURES & TABLES	100
	LIST OF INTERVIEWEES	101

# I. INTRODUCTION

In the global world of the 21<sup>st</sup> century, international trade is a driving force whose absence is impossible to imagine. Seaports as gateways with their port infrastructure are essential for the conduct of trade between different countries. Ports are complex and dynamic entities that operate in close relationship with various stakeholders on the level of cities, regions and countries and whose impact reaches far beyond the borders of nations. This inter-relationship is defined in terms of benefits and costs, as the inland transport infrastructure of cities, regions and countries is also dynamically used by the users of seaports. On the other hand, the benefits of ports are also shared between direct port users and the public, as ports have a well-known economic and strategic importance for the economy of countries. This specific position of ports creates issues with regard to their conceptualization – as straightforward gateways, as separate markets and distinct operational and business ventures or as part of integrated supply chains.

## 1. Problem definition

As a derivative of the problem of conceptualization of ports, the complex question of paying for port infrastructure emerges – who should pay for seaport infrastructure and based on what argumentation? More specifically the question of financing and funding of *inland seaport transport infrastructure* (road and railway) is an exceptionally interesting one because of the many stakeholders involved, their different nature (public, private), the complexity of the relations between them and the often clashing political and economic interests at all levels of government.

The problem definition begins with two simple facts. Firstly, transport infrastructure is very costly and therefore a significant investment. And secondly, the so vital for seaports inland transport infrastructure is not destined exclusively only for the use of ports. This infrastructure is (usually) under the responsibility of national governments and, except in the case of a dedicated infrastructure, is being used by various users. To take the example of roads – their traffic apart from related to the port is also commuter, professional and recreational. Domestic households, national economic entities and international users (“passing through” or transit) use it as well. However, the importance of this infrastructure for the different users varies; a seaport for example could not implement its gateway role without an uninterrupted road transport network. The intensity of usage of that infrastructure by different users is not the same; a household vehicle for example does not use the road network with the same recurrence as a freight truck. The costs of use for freight trucks and vehicles differ greatly as well. Not surprisingly, the level of negative externalities such as congestion, road accidents or environmental costs caused by different users is also different. Last but not least, the consequences of these negative externalities weight down differently upon the different users; the costs of congestion for the truck haulers for example (measured in time and money) are far greater than those for a domestic vehicle. When elaborating on these issues, one should not forget that port users form a percentage of the total users of the same transport network. Could it be said:

- That some users of the road network are more important than others?
- That some users are causing more damage to the network than others?

- That some users, if we follow the equity principle, should respectively pay more than others because they cause more damage or because they have bigger interest in solving the congestion problem?
- How could this be done in practice?
- Should there be differentiation at all?
- Would that be beneficial for the port?
- Should the construction, maintenance, operation and financing of new road networks be redirected to the private sector?
- What funding scheme would take place?
- What are the differences and the drawbacks of the public and the private investment approach?
- Is there a middle road?
- What instruments are there to finance infrastructure and what is their impact?

All these questions and many others are stepping stones leading to the big question of procurement of inland transport infrastructure of seaports. And if governments want to internalize external costs on inland transport networks they will inevitably go through the same various financing and funding options as well.

## **2. Purpose**

The research in this thesis aims to be explorative, qualitative and critical in nature. The aim and the result of the research will be to gain a deep insight into the problem of procurement of inland seaport infrastructure and into the factors affecting the choice of different financing scenarios.

Goods transportation via inland transport infrastructure is comprised of the total movement of goods using inland transport modes such as road, rail, inland waterways and pipelines. However, considering the very different character of these types of infrastructure, the dynamics of the road network, the heavy investment burden for the road and rail networks and the primal interests and relevance for the Port of Rotterdam, the main focus of this paper will be only on *road* and *rail inland infrastructure*.

The main research question to be answered will therefore be:

***\* Who must and who will pay in the future for the inland transport infrastructure (road, railway) of seaports and in particular of the Port of Rotterdam?***

Sub-questions cover but are not limited to:

- Who are the interested parties to fund and finance port-hinterland infrastructures?
- What are their incentives, perspectives and limitations?
- How are big inland infrastructure projects of the Port of Rotterdam funded and financed?
- What are the practical examples available from other countries and are there success stories?
- What are the external factors that could influence a change in the investment approach – specific economic and political country circumstances?
- How does the economic crisis change the game?

- What instruments do exist to fund and finance inland port infrastructure and what is their application and limitations?
- What are the risks and the issues related to the different scenarios?

The Port of Rotterdam, as any other seaport has a very deep interest in these options. In the unenviable role of a primary (and very dependent) user of the inland transport network with no say in the decision making process of investment redistribution, the exploratory research in this thesis could be of help in shedding a light on the options for the future. Port authorities are not by definition well positioned to develop inland transport infrastructure investment and access rules but may play a role in the dialogue.

The results of the research could eventually be used by the Port of Rotterdam to:

- Identify the options for the future;
- Understand better the impact of different infrastructure development regimes for the different stakeholders, including the port;
- Find arguments for preferred investment options and use these in the port-cities dialogue. This could be used to form the port's position with regard to financing and funding of inland seaport infrastructure and can be included in the port's planning and development strategy.

### **3. Relevance**

The main research question of this thesis is not going to stop being relevant any time soon. Optimal investment mixes and investment approaches will always be relevant for the ports themselves and for the respective governments - in times of economic prosperity and especially in times of economic downturn. Furthermore, the available scientific literature treating investments related to the port focuses predominantly on user-specific infrastructure investments and investments in superstructures in ports, with very little to no attention to inland transport infrastructure *of seaports*.

Although this research could also be useful for other stakeholders such as governmental authorities and regulators and not only in the Netherlands, the primary focus remains the interest of the Port of Rotterdam and therefore the point of view of the thesis will also stay close to the Port of Rotterdam. Nevertheless, investment approaches are not exclusive to specific countries or ports and therefore this research could be used to varying degrees in other geographical contexts. Any financing and funding strategy should of course vary according to the specific circumstances of the country in question.

### **4. Methodology**

The thesis will represent an explorative research and analysis of the problem. The core of the research will be based on papers connected with the main question and on interviews with experts from the Port of Rotterdam and from outside the port such as policy makers, financial and other experts with vast expertise on the topic. The methodology steps will be:

1. Establishing a solid theoretical framework in order to adopt knowledge and principles from previous research and past experience:



- a. Concepts, ideas and findings on inland transport infrastructure procurement from previous studies and research, including research on practical examples from various countries.
  - b. Illustrative case studies with empirical findings about the Dutch experience in financing and funding of important inland transport infrastructure.
2. In debt interviews with port officials and other related parties from outside the port (policy makers, financial and other experts with vast expertise on the topic).
  3. Final “cross examination” of the applied methods - evaluation of the information gathered during the interviews under the established theoretical framework and conclusions.

The need for a thorough theoretical framework became evident during the pre-thesis discussions with a port official from the Port of Rotterdam. During these discussions it was emphasized that a better overview of the practical examples from other countries is needed, a guideline that could lead the way for future developments in the Netherlands.

## **5. Structure**

The thesis consists of VI main sections that contain separate chapters. In section II a theoretical and conceptual framework will be build, based on important related literature. The main outlines for public and private involvement in infrastructure will be presented in this section. Section III contains some practical international examples of procurement of road and rail infrastructure from countries with ports. In section IV two illustrative examples related to the Dutch experience in the road and rail sector will be presented. Section V contains all in-depth research findings from the performed interviews. The evaluation of the research findings under the theoretical framework, conclusions and recommendations will be formulated in section VI.

## II. THEORETICAL FRAMEWORK

### 1. Introduction

The literature on seaports is to say the least – vastly extensive. It covers matters beginning from the basic definition of ports and reaches beyond their possible foreseeable future. The attention to investment is well present in scientific research. However, if one wants to find actual data specifically about *inland transport infrastructure of seaports*, it is not difficult to notice the lack of abundance. This specific type of infrastructure for ports usually occupies one of the last places in articles about port investments and, if present at all, usually stays at the surface of the problem, presenting a couple of facts from some countries and traditionally concluding that inland transport infrastructure remains the responsibility of the national or regional governments. It almost seems as if from the point of view of ports, the topic is overlooked and left in the pile with other topics labeled “not much to be done by the port”. Maybe this lack of depth stems from the unenviable position of ports being caught in the middle of two battling forces – the need for inland transport infrastructure to fulfill their role of international sea gateways and the lack of direct decision power over what kind of, how and when this infrastructure will be provided. The last being the direct result from the fact that in many countries to this day the inland transport infrastructure is financed by national governments and funded with tax money. Governments, on the other hand, have more interest in the topic, this day more than ever, although their interest is more general and not linked to seaports per se. This is why some of the more interesting financing approaches of inland transport infrastructure procurement are to be found in documents not directly linked to the port.

This being said, the building of any theoretical framework about inland transport infrastructure of seaports must rely on factual and scientific research in two main directions:

- Port investments and financing on one hand; and
- Infrastructure developments and maintenance under different institutional regimes on the other.

By combining these two main angles, a good picture can be build about ports and their hinterland infrastructures.

In this thesis, when an investment is mentioned it should be understood that an investment in *inland transport infrastructure (ITI)*<sup>1</sup> of seaports is meant and not other types of investment in seaports such as user-specific infrastructure and superstructure. When other types of investment are meant, this will be mentioned explicitly.

#### ◆ ***The nature of inland transport infrastructure of seaports***

As already mentioned, the nature of ITI of seaports is specific and this type of port investment differs from other typical port investments like in terminal infrastructure or superstructure. National roads and railways are not exclusively preserved only for the use of ports, although they are vital for the good hinterland accessibility of ports. Inland transport systems are not property of the port, but are part of collective capital. They are being physically connected but not physically

---

<sup>1</sup> ITI – Inland transport infrastructure

“included” in the domain of the port and are actively used by many other users at the territory of a country, such as domestic households, national economic entities and international users (transit). Their traffic is therefore port related, commuter, professional and recreational. ITI is usually under the jurisdiction of national or regional governments. Could it even be said that an investment in ITI is a port investment in the literal sense of the word? Musso et al. (2006) define investment as the variation of the total stock of capital goods used in productive activities. In the case of ports the product is actually a service and namely: supplying a throughput capacity. A port investment is therefore the variation of port equipment and infrastructure to provide a certain level of throughput capacity and it should allow for a better performance of the port. ITI definitely satisfies these criteria. It is an asset that is crucial for the production of port services. Hinterland accessibility is one of the most important criteria for ports today for them to be competitive in logistic chains and physical transport infrastructure is an essential variable of hinterland accessibility. ITI have a clear influence on the outcome of the port service as hinterlands become increasingly more contestable.

Further, Musso et al. describe some features which according to them are common for most port investments. ITI clearly falls under the category “general purpose” assets or infrastructures whose cost cannot be attributed to an individual user and whose benefit for an individual user cannot be easily defined (not quantitatively at least). ITI is more specifically an infrastructure that provides access to the port by land. ITI also carries many of the other port infrastructure features described such as indirect profitability, generators of environmental costs and negative externalities, significant time needed for construction, etc. If we follow the characteristics for a “public good” and namely non-rivalry and non-excludability, then we must conclude that ITI is a public good in countries where it is publicly funded. But as we will see later in this research, the non-excludability is optional and ITI can become profitable for a private operator, by eliminating the free riding problem. By following these guidelines one can easily identify another publicly funded port infrastructure in the Port of Rotterdam, used specifically by the terminal of the port – the Dedicated European Freight Railway (Betuweroute). This dedicated rail track in the terminal has been build to connect the port directly with the German railway network for rapid transport of large quantities of cargo.

It is often stated (ESPO 2011; Musso et al. 2006; Bonnafous & Jensen 2005), that in most institutional models the land access infrastructures outside the port area (those leading to the ports such as roads and rails) are provided by public investments while superstructures in the port terminal attract private investment (usually by the terminal company itself). This is not surprising. In the case of ITI many users are involved, including the port and this is a typical case of an infrastructure with many beneficiaries and collective interests. When the interests are collective, a public procurement usually takes place because the individual users have no incentives of contributing to an investment which will benefit other parties.

While building the main framework of this thesis and following the logical structure of ITI procurement, one notices one very important aspect, stemming from the nature of ITI. One cannot present a satisfying and complete picture of provision of ITI unless *the two main aspects of ITI procurement* are explored and included together – financing and funding of ITI. Therefore both financing and funding of ITI will be a vital part of this research and the goal will be:

- Financing of ITI – tracing the sources of provision of the financial means that are needed to implement the investment.
- Funding of ITI – tracing the actual actors that at the end of the chain bear the costs for an ITI investment.

## **2. Investment in inland transport infrastructure of seaports and economic impact**

The topic of economic impact of port investments emerges often very early in papers. The problem of conceptualization of the port mentioned in the first section also here plays a role. How ports are being viewed is tightly related to any assessment of economic impact, either direct or indirect, of any port investment. The observation given by Musso et al. (2006) is true to this day – ports continue to be regarded from two different and almost conflicting views: the port as a public service that has benefits for the economy and the port as a business system in a competitive environment. Regardless of the point of view that will be adopted, investments are needed. The difference is that in the first concept it is much easier to justify port investments by taxation but in the second one this is not so easy and the need for investment requires an efficient investment plan. It seems that the tendency which view is more popular is changing, although it is difficult to generalize because this depends on many factors – economic, political, social, historical, etc.

### ***2.1. Connection between economic development and transport infrastructure development***

There has been a significant development in literature over port infrastructure and port investment over time. Earlier literature focuses predominantly on the port as a public service and the differences between public and private ports with regard to financial strategies for port infrastructure. Byrne et al. (1996) for example conclude in their article that whether ports are public or private, they form an essential part of the infrastructure of countries and as such it is the countries' interest to maintain and expand that infrastructure to meet increased needs. In other words expansion and maintenance of port infrastructure is considered nothing more but a tool for countries to direct the economic benefits of ports into long term national economic development.

The direction of the relationship between ITI development and economic development is difficult to determine. Is ITI influencing economic growth or does economic growth inevitably trigger more rapid development of ITI? A difference in Western and Eastern European countries can be traced which illustrates this dilemma. Transport infrastructure investment has been declining since 1992 in Western Europe while in Central and Eastern Europe it has been increasing. The transport investment share for Western European countries has been 1% of GDP for long time but is declining since 1970 compared to Central and Eastern Europe where it has been increasing (Short & Kopp, 2005). It is obvious that there is firstly a need and secondly an opportunity for developing countries to do what their western brothers have already done with their transport networks. But it still remains unclear if transport network development is a direct consequence of economic boost or if it is a tool to support economic growth. What share of GDP to be allocated to transport investments remains almost impossible to determine even in theory, as Short & Kopp conclude. Many factors

would play a role in such a recommendation, such as geographical position, current transport intensity of the network and population redistribution.

Some authors (Nijkamp & Rienstra, 1995) support the claim that the relationship between transport network development and spatial-economic evolution of economies is twofold and has two directions. On one hand the transportation lies in the heart of economic development and on the other hand it reflects the socio-economic, political and spatial dynamics of societies. As Loosemore (2007) states, 20 years of continued reductions in US highway investment could cause a 3,5% reduction in GDP, an 8% increase in inflation and a 2,2% increase in unemployment.

The widely accepted opinion however remains that investment in European transport infrastructure will ensure the future economic growth and competitive strength for the Port of Rotterdam and Europe as a whole. Such an opinion has been expressed by various leading CEOs from European companies, including Hans Smits from the Port of Rotterdam Authority. The result was a manifesto with the European Commissioner for Transport Siim Kallas, signed in October 2012. It states that an infrastructure budget of €50 billion must be maintained by European countries. This has been reflected in the EU budget plans for transport, energy and telecoms (2014-2020), of which integrated road and rail networks are part. (Port of Rotterdam Authority, 2012)

## ***2.2. Importance and priority of inland transport infrastructure investments***

When the term investment is being used usually it is used in combination with profits or benefits. Port investments are not an exception. The importance and the priority of port investments should be determined on the basis of the need for the port to improve its service, namely assuring throughput at lower transport costs. But the need solely is not decisive for an investment if costs and benefits are not assessed. Unlike other business entities where costs and benefits are usually purely private, the unique position of ports as entities of public and private interest allows for investment mixes. Musso et al. (2006) classifies the effects of port investments into four groups:

- Direct profit for the investor himself;
- External microeconomic benefits;
- External macroeconomic benefits;
- Negative macroeconomic effects.

Although these effects and their interconnectivity are very complex and difficult to quantify, this conceptual framework could be useful for ITI too. Some of these effects are short-term, while others are long-term. Long-term effects of an ITI could be for example improved accessibility and better productivity of the logistic system. The private profit for the investor will be applicable in the situation when ITI are privately financed and in this situation the investor could also be the manager of the transport network, as we will see later in this paper. Direct benefits or profits might depend on the intensity of use of ITI. Direct benefits are very important possible aspect for ITI because they allow private investors that otherwise will not benefit at all from the project to be involved.

As mentioned by Musso et al. external microeconomic benefits are caused by a reduction in generalized costs. Investment in ITI could also lead to a reduction in generalized costs and an eventual surplus that could be transferred to the port users and respectively to the clients of the port users. External macroeconomic benefits on the other hand stem from a general improvement of the

macroeconomic environment of the port such as increased consumption, attraction of new firms, increased employment and profits, etc. Particularly interesting for ITI are the Keynesian multiplier positive effects. They are the result of a higher accessibility and increased demand of port services. Both types of external benefits (microeconomic and macroeconomic) depend on the relationship between the port and the external environment in which it operates.

The negative macroeconomic effects are a big part of the discussion over ITI and cannot be omitted. ITI is known for its environmental costs, but there are also other social costs that should be taken into consideration such as the impact of ITI on other industries affected by the port or congestion costs.

From the above mentioned we can draw a simple conclusion. Because the benefits and costs of a possible ITI development have public and private nature, there is a room for a “mixed” thinking, e.g. public-private oriented decision making. This lays the direction which our research will take.

### 2.3. Possible investment scenarios and their driving motivations

The direct investment benefits mentioned beforehand represent the private profitability of a project and the external benefits and costs have a direct influence on a project’s social desirability or usefulness. For presenting the different investment options for ITI, we will use a simple Cartesian coordinate system presented by Musso et al. (2006) and we will adapt it for ITI. This graph allows us to illustrate simply the various investment mixes and how the public and the private involvement can be combined, mixed and mutually corrected.

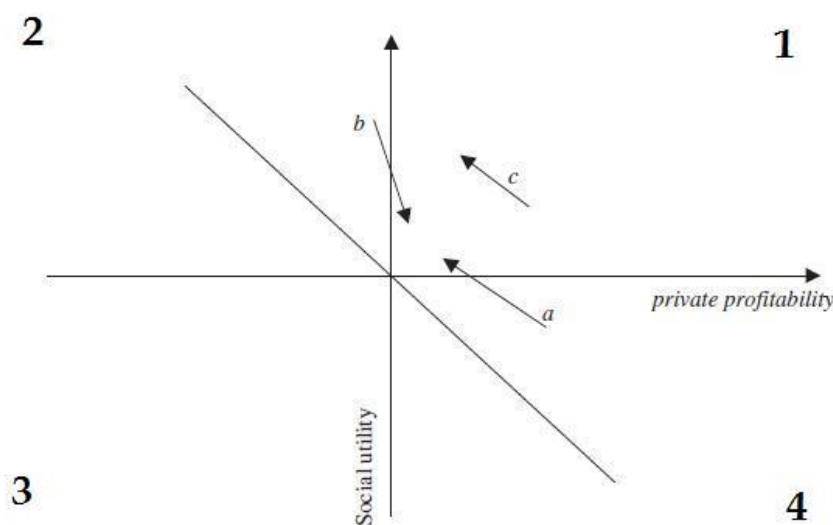


FIGURE 1: DIRECT PROFITABILITY AND SOCIAL UTILITY OF INVESTMENT, SOURCE: MUSSO ET AL. (2006)

The direct investment benefits are a profit forecast for the future. They are represented along the abscissa. Such private profitability arises usually from private investments. The social utility or desirability is represented along the ordinate. Such a social or external utility arises usually from public investments because they aim at long-term positive social benefits. The line crossing quadrants 2 and 4 is a bisector that separates the investments that have total (direct and external) positive utility from the investments with total (direct and external) negative utility, the later being on the left side of the bisector.

If ITI is provided by private investors and the investment also generates benefits for the society, such investment will be positioned in quadrant 1. Then the driving force would be private profitability, but because positive externalities are also observed, there is no need for public intervention. Nevertheless, such investment allows for some form of public regulation to ensure maximum public benefits. This situation is an option for the ITI of the Port of Rotterdam and there are many practical examples from countries where such an approach is being favored. If the government wants it can amend the mix of social utility and private profitability. That would be possible by introducing restrictions and regulations and is represented by vector c. In this case the social externalities are increased at the expense of the private investor's benefits.

If ITI is publicly provided and the investment in ITI generates social benefits, but no private profitability, such investment will be positioned in quadrant 2. A reason for such provision of ITI would be for example the need for better accessibility. If the government wants to increase the chance for private profitability and to promote private investment, this can only be achieved if the balance is positive - if the project is in quadrant 2, above the bisector. That can be done through allocation of grants, incentives, public co-financing of private projects or public-private partnerships. Such a shift in the direct private benefits is represented by vector b. Any attempt to shift the private profitability for projects that are below the bisector would be too costly and risky for any government. ITI of the Port of Rotterdam would be in quadrant 2 (above the bisector) if the government does not see a full private financing of ITI as an option. This is the dominant situation of ITI in the Netherlands. De Betuweroute railway project also falls in this quadrant, as an investment that has been seen by the government as socially desirable but not profitable for private capital. A common motivation for such an investment is the regional economic development, although societal cost-benefit analysis is much broader. It is however very difficult to assess the real effects of similar projects as the forecasted effects can only be estimated to a certain degree and the actual externalities become evident only in the course of very long periods of time.

In quadrant 4 are positioned investments which have private profitability for the investor but also carry high negative externalities for the society. Such projects are not uncommon for ports that sometimes have to "battle" with other stakeholders (such as the local community) in order to increase their port capacity for example. It is also difficult to assess and quantify the level of negative externalities and this opens doors for speculation. It is more than normal that ports do not like their projects to be located in this quadrant. This poses questions such as: what party has enough independency and objectivity to determine the position of a port project in this graph? A shift in social utility would be possible for projects that are above the bisector and this is represented by vector a. There is a chance however that this might decrease private profitability. All projects below the bisector should be discouraged through public measures.

Quadrants 1 and 4 are examples from market economies while quadrants 1 and 2 are typical for centralized economies. Everything in quadrant 3 would be a market failure. This graph allows us to position any port investment, including ITI and to determine the nature of the desired funding. In order to do that however one must be able to determine the social desirability and public profitability of ITI investments, as well as the tools to shift the mix of the two. These questions can be addressed to government experts and policy makers that have insight into the decision making process for ITI investments.

Any theoretical framework however can serve only as guidance for public authorities. What is observed in reality could be much more complex and interrelated to be described by any model. As history shows, port conceptualization is not static but is changing with time and how governments see and treat ports changes as well. The latest tendency in political approaches and European legislation is towards passing infrastructural costs to users (Musso et al., 2006) or the “user pays” principle. This could mean that projects are mainly selected on the basis of their private profitability and interests for the private sector.

### **3. Stakeholders and interests in hinterland transport investment**

The standardization of the public and the private role in transport investments seems to be disappearing. The general thinking that governments are the only ones that have to build and finance public transport infrastructures is slowly changing (Nijkamp & Rienstra, 1995). Based on a review of the available scientific literature treating the topic it can be summarized that the most noticeable change in road financing approaches of countries begins somewhere in the 1980s. The general financing thinking of countries changes which influences the extent to which the public and the private sector contribute to ITI and the different ways in which the private sector could participate. It is clear however that the private sector participates more significantly in the construction, the maintenance and the operation of ITI. In order to determine what possible procurement scenarios exist for the Dutch motorways and railways, we will first need to identify the interested stakeholders.

#### **3.1. Public acceptance of new procurement schemes**

A very important and often disregarded in strategic approaches fact is the importance of social acceptance of ITI projects. Regardless of the financing and funding scheme of a project, public and as a result political readiness are of crucial importance for its implementation. The example of the Netherlands confirms this, where there have been numerous attempts to address the road user charge possibility (check chapter IV-1. The Dutch Road Dilemma). All attempts failed because of lack of public and political support, the last of which in 2010 when the national platform “Alternative Charging Regimes for Mobility” created in 2005 was definitively rejected. This example shows that even a well supported scientific argumentation cannot always overcome the general public acceptance barrier. The crucial political support and commitment played an important role also in the case of the London initiative (Hensher & Puckett, 2005), but this time with positive results.

This is of course understandable considering the importance of infrastructure and quality of service provided on transport networks to the general public. It also requires that levels of community involvement, accountability and political pressures are not just “*virtually*”, but “*actually*” taken into consideration in ITI projects. In other words, public consultation should be fully integrated into the planning process (Loosemore, 2007).

An example is the acceptance of congestion tolls by road users. This new system could be facilitated if toll revenues were earmarked for specific purposes, for example: maintenance of ITI or public transport subsidies (see chapter II-4.2. User charging and tolling). But this acceptance solution must first be translated into an actual strategy and then be clearly communicated to the general public.



This makes the general public a vital stakeholder in ITI financing. Although the influence of this stakeholder is indirect, it remains of great importance and should be considered because as Sharpe (as seen in Loosemore 2007) has remarked, any infrastructure project lives or dies on its reputation with these people.

### ***3.2. Stakeholders and sources of financing***

For very long time (until the second half of the 1990s) road investment has been purely responsibility of governments. Funds for the construction and operation of road networks have come directly from general public budgets or from dedicated road funds. This is still the case in many countries. The problem with using general tax budgets is that the transport sector has many other competitors for this money – other industries and sectors like the health sector for example. It is not surprising that many countries with road networks funded purely by budget money report lack of financing for maintenance and new construction, which results in deteriorated road networks.

While attempting to determine all possible stakeholders in inland transport infrastructure procurement for this paper, one thing became clear. It is essential that one must first identify the different possible financing approaches and then determine the players and their specific role in the funding schemes, not the other way round. This proves to be extremely confusing because the funding systems are different in different countries. Existing statistics use different classification criteria and they do not always represent the actual payers in a specific financial system. For example if in country A the funding of roads is classified by the level of government that invests in roads (local, national), this is a classification by investing body. This makes it difficult to compare country A's road funding system to the data from country B where the information is classified by actual final payer. How can one compare financing systems if the data is not classified under the same variable? In order to compare different financial approaches one needs to classify the data according to the same criterion.

Nakagawa et al. (1998) make a very valid point that the best way to compare inland transport financing options is to use the actual payer as a main criterion – that is the actual contributor and the stakeholder that finally pays for the financing of ITI. This method allows to follow the complete chain of reaction between the different stakeholders. By using this classification method all stakeholders and the relationships between them can be easily identified. Moreover this helps to distinguish between the actual payer and the investment body that performs the investment, which are not the same. This method also identifies the sources of financing (or in other words the funding) used in a certain financing approach.

General tax budgets are one of the most common financing sources for ITI. When talking about general tax payers (the population) one remark needs to be made. General tax payers are not necessarily the same as road users as one does not have to be a tax payer to use the road and one does not have to be a road user if one is paying taxes. General tax road funding may be responsible for the entire road network or just for a part of the road network. General tax payers may pay national taxes (such as corporate tax, income tax, etc.) or local taxes (such as residence tax, fixed asset tax, etc.)

Stakeholders having very big interests in the funding of roads are of course road users. Users are paying for the usage of transportation systems in the form of specific taxes (as opposed to general taxes) and/or fees for the use of tolled roads and railways. Fuel tax is one example of specific tax and therefore a usage payment. The specific taxes collected by users might be used for the same mode of transportation in which the fees are paid or for other modes of transport. Users can be households, but business entities as well. The payments that road users make are various and often related to their vehicle – payments for the vehicle, for the right to own a vehicle, for the use of a vehicle, etc. Companies that acquire, own and operate vehicles are using the roads the same way individual users are. If the road network is financed by general tax revenue however, it could be said that business entities are contributing even more by paying corporate tax. There are no European countries where usage payment does not take place in one form or another. Tolls on roads on the other hand are being more and more used and there are very few countries that do not have or that are not considering some form of toll payments from users. User charging may be applied according to time of the day, type of vehicle, type of road and/or piece of road. In some countries vignettes are used not only for highways but for main roads as well.

Less known is that funding in some developed and developing countries in the European Union might be provided by a so-called “donor” investor which is nothing more than a donor government. The role of such a donor funding is usually supplementary. It stems from various transport funds of the EU. The main goal of these funds is the improvement of the transport networks of the member states, regional development and cohesion. Such a road funding takes the shape of a non-repayable aid or grants for construction and maintenance of roads. Examples of European countries that have benefited from such financing are Ireland and Spain. Outside of Europe such donor funding has been available for some African and Caribbean countries (PIARC, 2012). It is interesting to consider this stakeholder as a potential contributor in the ITI and to find out if there is ground for such funding in the Netherlands.

Another less known funding option is the use of urban community charges and land development payments. In some countries a developer charge is imposed to developers of land along the road. Such developers have to contribute to infrastructural investments in the vicinity of their businesses. The logic of such contribution is that the property of the developer benefits (in value) from the road improvement. Such a fee is not charged if the developer is already paying higher property tax. A subtype of this funding is when specific businesses are required to contribute to a certain road upgrading or because higher maintenance costs are expected in the future. New mine operators in some countries for example have to contribute if they want to start a new transport assignment or if they want to increase the axle load allowance (PIARC, 2012). Just like with the donor funding, it is interesting to consider the potential of such road contribution in the Netherlands. These questions can be addressed to government experts and policy makers that have insight into the options for ITI investments.

The more common investment bodies (governments and transport network operators/owners) and the less popular investment body (donor government) determine all possible stakeholders that might have interest in the investment in transport networks. The actual payers however are different than the investment bodies and can be found if one goes one level deeper, as it can be seen in figure 2 below. This leaves us with the following stakeholder and fund flow picture classified by actual payers:

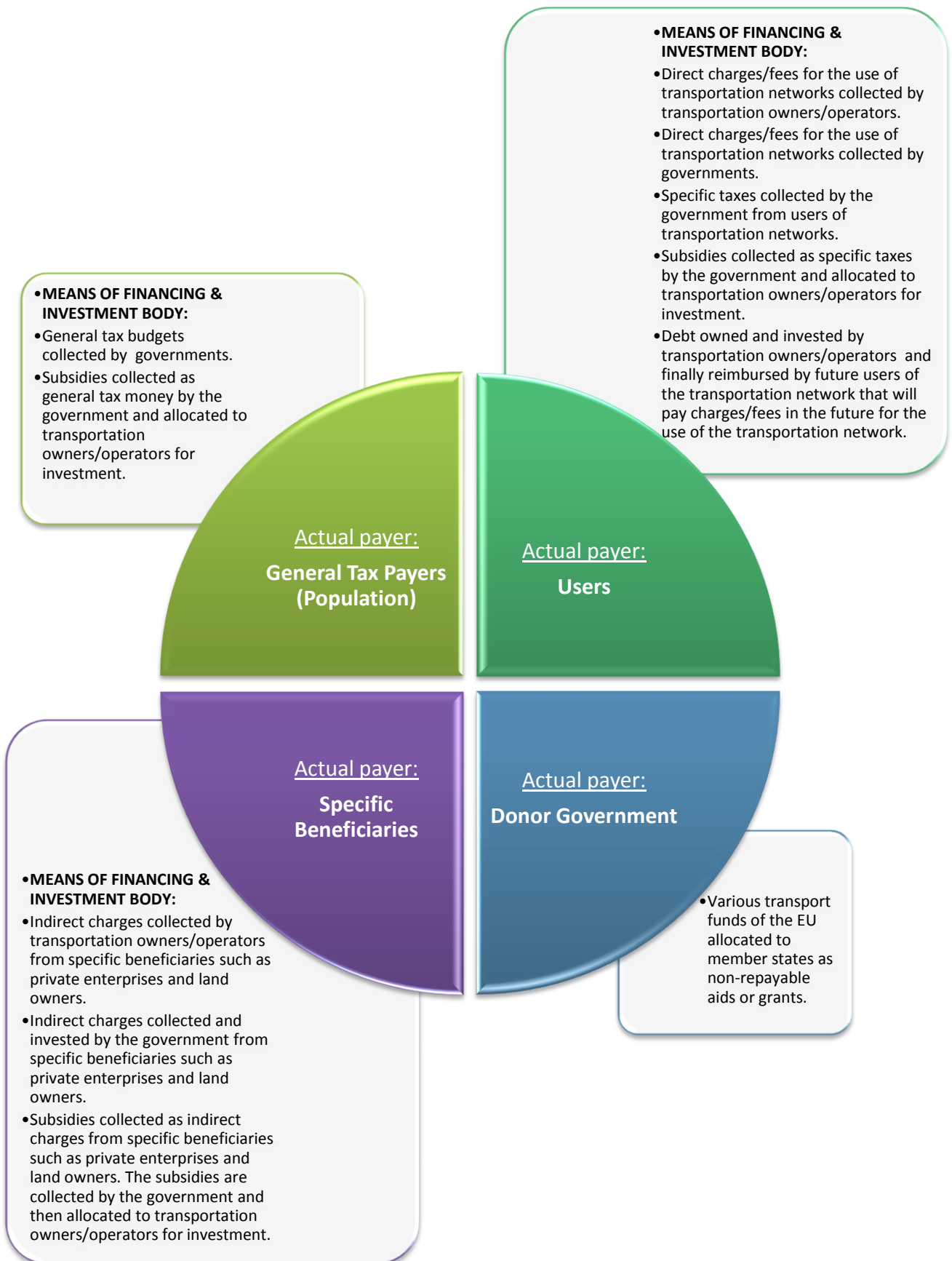


FIGURE 2: STAKEHOLDERS AND SOURCES OF FINANCING IN ITI INVESTMENT CLASSIFIED BY ACTUAL PAYER, SOURCE: AUTHOR

The position of the port in this context can be determined as follows:

- Businesses using the port's ITI are tax payers of general taxes and as such contribute to the public funding of ITI.
- The port itself however is also a tax payer, as any other economic entity and should be positioned in the tax payers' category as well (this will be controlled during the practical research).
- All businesses that use the port's ITI must also be positioned in the users' category. The port is interested in the future of ITI investments because its competitive position strongly depends on the availability and quality of the hinterland connections. It could be therefore said that the port is a big user of ITI or in other words is a leading player in the combined traffic.
- We should also ask ourselves if the port needs to be positioned in the Developers' (Specific Beneficiaries) category as well. As already mentioned, in some countries a type of road funding is when specific businesses are required to contribute to a certain road upgrading; maintenance project or for increased truck loading allowance. Should seaports, just as developers, contribute to upgrades and maintenance projects of the heavily used roads by freight traffic? Should such contributions come from the port itself or from port users such as hauler companies and under what form?

Although the Port of Rotterdam strives for a sustainable future through a modal shift from road transport to inland shipping and rail, the road share of this stakeholder is not negligible. The port itself is not using the roads but the companies using the port are, whether these are individual road haulers or part of a larger integrated logistic chain. The biggest share of the container throughput from the Port of Rotterdam to the mainland is still being attributed to the road sector - 56% to be exact, versus 32,8% leaving via barge and only 11,2% via rail (Port of Rotterdam Authority, 2011). Therefore, any change in (especially) road and rail financing and funding that will affect tax payers, users and potentially specific beneficiaries will affect the port as well. This will be of importance when determining the possible procurement scenarios.

### **3.3. *Motivation behind the different types of investment***

The logic that lies behind any public and private investment in ITI can be found in the theory of macroeconomics. According to the macroeconomics every capital investment is determined by the relationship between the forecasted returns from the investment and the expected cost for financing the investment.

For a private operator this would mean that an investment is desirable if:

- The project has an internal rate of return greater than the alternative way of investing the money (the market interest rate).
- The project has a risk premium. This risk premium must cover uncertainties related to the cost of the project, the expected traffic on the ITI and the forecasted revenues.
- The project has a profit margin that assures profitability.

If the internal rate of return is lower than the estimated returns, private investors could ask subsidies from the government in order to fulfill the project.

For a public (governmental sector) investor the net present value and the internal rate of return are also taken into consideration, but the cost-benefit analysis is not solely focused on private (direct) benefits and costs. Social desirability or social benefits and costs are also taken into account such as (safety, users' surplus and environmental effects). The ranking of projects uses the socioeconomic value as a base.

Interesting is the case of public-private partnerships (PPPs) and what the motivation of such mixed funding should be. Bonnafous & Jensen (2005) give an answer to this question. They created a simulation to find the optimal priority order for a set of PPP projects by using data for 17 French tolled highway projects that have been in competition in the early 1990s and since then have been implemented with a small amount of public money. They argue that while a purely public investment is driven by the net present value and the socioeconomic value of a set a projects, this might not be the optimal objective for a PPP. Public investments are ranking objects on their decreasing internal rate of return by taking into consideration their social costs and benefits. The actual implementation of these projects is determined by the actual available budgets of governments, hence the problem of budgetary constraints. In the case of PPPs and especially when projects are co-funded by the users of an infrastructure, the optimal ranking of projects is according to the authors their pure *financial* internal rate of return. This is especially true when there are budgetary constraints. The better criterion would be the ratio of the net present value to the amount of required subsidies. Their conclusions offer a useful approach for choosing between PPP projects and could be used for investments in ITI where users might be required to fund partially the investment. The need for such thinking is especially urgent today more than ever, when budgetary constraints almost always go hand-in-hand with ITI projects.

### **3.4. Public involvement in infrastructure**

Many countries are currently facing an increased demand for transport networks but are struggling in the same time to meet these needs with their available budgets. One of the reasons must be the ever increasing public debt of countries, backed-up by the severity of the economic crisis since the end of 2008. The Netherlands is not an exception. For this fact bears record the increasing expression of public opinion that especially now more road investments are needed, and in particular in relation to the interests of the Port of Rotterdam. An urge towards the national government for maximum hinterland transport network investments and the stress on their importance for the competitiveness of the Port of Rotterdam has been expressed by both the port authority and the employers' organisation Deltalinqs (Port of Rotterdam Authority, 2012). Van Den Bosch et al. (2011) support the view that the Port of Rotterdam is dependent on government investments when large infrastructure projects such as the Betuweroute, A15 highway and Maasvlakte 2 need to be realized. The perception of the transport network as a responsibility solely of the public sector is therefore *still very strong* in the Netherlands. The perceived importance of investments in ITI is being reflected in the European Commission's Budget for transport for 2014-2020, to be approved in November 2012. In this budget an increase in inland transport investments has been proposed and the idea for Trans-European Transport Networks (TEN-T) has finally a chance to become a reality. This might open new doors for the financing of ITI of the Port of Rotterdam.

In most countries the different levels of government own different types of roads that correspond to the position and the responsibilities of the governmental level in question. A survey conducted by PIARC (2012) in various countries, including the Netherlands summarizes the road funding responsibilities by road type. Although the name of the public sector agency might vary in the different countries, the information is still applicable and can be summarized as follows:

Road classification	Responsible funding authority
High standard roads carrying significant amounts of freight and through traffic across the country. Commonly referred to as National Expressways, National Motorways and National Highways	Federal / Republic / National Government
High standard roads carrying significant amounts of freight and traffic across states or Provinces or Regions or Counties. Some are of a lower standard than expressways / motorways. Commonly referred to as State, Provincial, Regional or County Highways.	State, Provincial, Regional or County Governments.
Moderate to high standard roads carrying freight and traffic within a State / Province / Region / County. Commonly referred to as State / Provincial / Regional or County feeder roads.	State, Provincial, Regional or County Governments.
Local roads carrying predominately local freight and traffic within a community or localised area. Commonly called local or distributor roads.	Local / Municipal Governments

FIGURE 3: FUNDING RESPONSIBILITY BY ROAD TYPE, SOURCE: PIARC (2012)

Almost all of the road networks in the countries from which information was obtained are ultimately owned by various levels of government. The classification of roads that exist in different countries is very similar and almost all types of roads exist in all researched countries with the exception of private roads.<sup>2</sup>

Although the evidence suggests that public budgets alone are failing to meet the needs for ITI investments, it would be wrong to say that public investments in ITI do not have their place under the right circumstances. After determining the different government levels and their road financing responsibilities it might be interesting and beneficial to investigate the cases in which public financing might be advantageous and under what conditions that might be.

In general economic and welfare theory governmental intervention is usually justified in these main situations:

- When an industry or a region is in its “infant” state and not yet competitive enough to survive in a freely operating market. In the case of the transportation sector this would translate in subsidies for the construction of ITI in less developed regions.
- When a Pareto-efficient allocation can not be achieved and this results in market imperfections or failures because of imperfect competition, imperfect information or absence of markets. In the case of the transportation sector this could happen because sometimes ITI needs to be a natural monopoly, in order for user’s interests to be safeguarded. For example

<sup>2</sup> In this case the term “private roads” relates not to ownership but to the type of road and the manner in which these roads are managed. For example a mine access road, roads in forest areas or internal roads within an industrial area.

in practice it is not always efficient for one infrastructure corridor to have two different operators. Secondly, governments sometimes need to intervene in case of negative or positive externalities (by imposing taxes or subsidies respectively) or public goods.

- When the results from a market economy are considered unacceptable or unwanted by society and governments. In the case of the transportation sector an example could be the provision of a public transport system which is unprofitable because governments want to keep it affordable for users.

However, against these arguments that support a public involvement in ITI, one must measure the eventual governmental failures that could also result. Such failures could occur if the government failed in assessing the real demand for public services or when the positive and negative externalities were wrongly determined.

According to Proost et al. (2007) efficient pricing and investment in transport infrastructure by local and regional governments can indeed be assured but there are certain conditions. The problems arise when there is tax imposing competition between different levels of governments, because they have different agenda's and motivations. They distinguish three different taxation scenarios of ITI that represent such competition:

- When governments on the same level but in different countries are competing for the taxation of ITI in their own jurisdiction, but actually for the same "passing through" or transit traffic - horizontal tax competition.

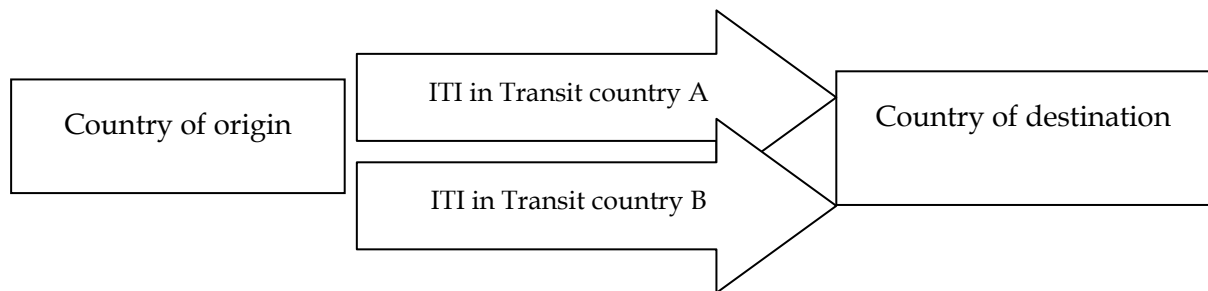


FIGURE 4: HORIZONTAL TAX COMPETITION 1, SOURCE: ADAPTED BY AUTHOR FROM PROOST ET AL. (2007)

- When governments on the same level but in different countries are setting taxation on ITI in their own jurisdiction and the traffic has to pass through both countries - horizontal tax competition.

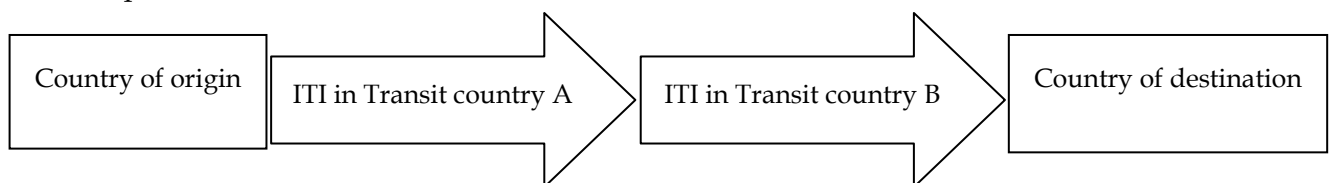


FIGURE 5: HORIZONTAL TAX COMPETITION 2, SOURCE: ADAPTED BY AUTHOR FROM PROOST ET AL. (2007)

- When two different levels of government in the same country determine taxes on the same ITI - vertical tax competition.

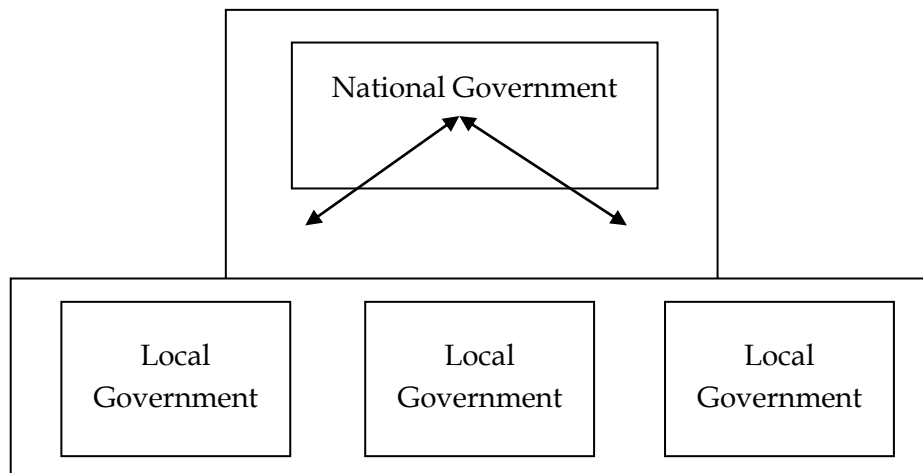


FIGURE 6: VERTICAL TAX COMPETITION, SOURCE: ADAPTED BY AUTHOR FROM PROOST ET AL. (2007)

In the first case of horizontal competition when there is a competition between two countries, if there is a user pricing on the ITI, such as a toll for example, this will allow for a bigger part for an efficient distribution of traffic on the road network. This means that efficient use of existing ITI could be expected and this will push the taxes down. But if there is no user charging, it could be expected that overuse of ITI and underinvestment may occur. An underinvestment may occur due to lack of perceived benefits of transit traffic by local governments and therefore lack of incentive to invest. Secondly, underinvestment may be triggered by increased capacity needs that cannot be covered by the collected taxes. Proost et al. conclude that when ITI cannot be tolled and transit is a big percentage of the traffic on ITI, it would be optimal to use national government financing. Another reason for ITI to be financed by national governments is if the tax base is too small and if the national government can levy taxes at a lower marginal cost than local governments.

In the second case of horizontal competition there is a competition between two countries setting taxes on different piece of the ITI network and the transit traffic has to pass through both countries. The problem here arises from the independence of the two local levels of government and their negligence for the potential losses of the other government. The total sum of the charges imposed by the two governments will end up even higher than monopoly charges. If user charging cannot be set, it could be expected again that underinvestment in ITI may occur, for the same reasons. In this situation, Proost et al. conclude again that national government financing would assure better ITI capacity use.

The third case is of vertical competition between national and local government that tax or subsidize the users of the same ITI (road or rail). This scenario is potentially problematic in the situation when local governments are required to finance ITI themselves (via tolls for example), while in the same time national government imposes a national high user tax (such as fuel tax for example). This double-weight on the shoulders of users of ITI results in overcharging and incapability of local governments to finance ITI. According to Proost et al. one of the solutions of this problem is revenue sharing and redistributing between different levels of government.



The conclusion is that decentralisation of ITI investment decisions to lower levels of government leads to inefficient schemes and conflicts and that in some situations national government funding of ITI is a must. That conclusion could be very much of use especially in countries where road and rail investments for whatever reasons are about to remain public responsibility.

A very important aspect that must be considered in relation to public funding of ITI is the *deadweight cost of taxation*. This term from the economic and financial theory is also known as deadweight loss of taxation or efficiency loss of taxation. It refers to loss of economic welfare when a tax is imposed. This cost arises when for example the public sector decides to use taxation as a funding mechanism for roads. It is of course also applicable in many other public sectors. The taxed good/service loses from its attractiveness and the chance that consumers will purchase/use the product/service decreases. Taxation also has financial effects on users and can therefore change users' behavior. The level of deadweight cost of taxation depends on the elasticity of demand for the product/service in question. An interesting question would be for example how elastic the demand and supply of ITI is and how strong the taxed subjects would react to new/revised taxation of the roads. The problem remains that it is very difficult to calculate deadweight cost of taxation and this could give rise to discussions about calculations methods and accuracy.

This will be important to consider when the options for investment mechanisms are put on the table. Then the deadweight cost of taxation could be put against the cost of tolling for example. Such estimation could help in the choice making for a funding option.

### **3.5. *Private involvement in infrastructure***

Private involvement in road funding is not a new phenomenon, contrary to popular perception. An example of private involvement in raising road funds are the various fund raising methods in the form of different taxes, related to vehicle acquisition, ownership, use, etc. Unlike private funding, private financing has been gaining more popularity since the 1990s and before that it was predominantly public sector taking care of financing (PIARC, 2012). Like early rail investments, some of the first toll roads were build with private investments. Canals, railways and roads in the nineteenth century were built with the aid of private capital (Nijkamp & Rienstra, 1995). It would be therefore more correct to say that private investment in ITI is being re-discovered again because of its fast capital expenditure and risk allocation attractiveness.

According to the extensive research performed by PIARC (2012) in various countries, the private sector's involvement in the management and operation of road networks is increasing over time with no signs of decreasing in the future. This involvement incorporates a range of specialty activities that differ greatly from country to country and between different road types. These activities can vary from very simplistic (such as snow removal) to very complex; one of the most complex being virtual ownership of roads by the private sector. The way these activities are arranged between the public and the private sector are various. The activities performed by the private sector are represented in growing complexity below. As sub-points are presented the various types of possible arrangements between the public and the private sector:

- **Design of the road network.**
- **Construction of the road network:**
  - Traditional Design-Bid-Build approach

- Design-Build approach
- Design-Build-Maintain approach
- Design-Build-Operate-Maintain approach
- Public-Private Partnerships (Design-Build-Finance-Operate-Maintain approach)
- Alliance contracts
- Early-Contractor-Involvement contracts

→ **Maintenance of the road network:**

- Single, specific, simple functions, well defined by contracts.
- Contracts for specific periods of time (usually 12 months or more).
- Mid-term contracts for 3 to 5 years based on performance standards - service delivery risk lies on the private provider.
- Long-term contracts based on performance standards - performance standards are defined and the private provider determines what to be done and how. The delivery risk for the private provider is significant, the outcome risk for the public sector as well.
- Concession arrangements (Design-Build-Operate-Maintain) - for a period of 25-35 years. The public sector specifies the performance standards and the private provider decides how to implement these standards.
- Alliance contracts - joined decision making by the private provider and the public road authority. The private provider is paid the costs made and profit that is an agreed margin.

→ **Operation of significant sections of the road network:**

- A new piece of the road network is not only designed, constructed, maintained and operated by the private provider, but also financed. The private sector enters into PPP with the public authority and usually imposes tolls for the use of the road section in question.
- An already constructed piece of the road network is maintained and operated (but not designed and constructed) by the private sector.

→ **Ownership of portions of the road network and provision of services to road users.**

All arrangements for construction of the road network except the traditional Design-Bid-Build approach, provision that the private sector carries significant levels of risk relating to costs and financing. Various countries in Europe, America and Asia have been increasingly using these new approaches.

Normally countries that choose to delegate also the operation of some parts of their road network to the private sector are countries that have a long history with and a well-developed private road construction industry.

Many authors have addressed the question if infrastructure financing and operation is an absolutely necessary competence of governments or if it can be delegated to the private sector with the bonus of achieving efficiency benefits. There is also the question of how much of the involvement should be private. According to Nijkamp & Rienstra (1995) governments should aim at achieving more economic benefits and these can be found in the operation of ITI. The financing of ITI according to them may be (partly) private if the operational profits allow it. A main argument that they use is that the motives and interests of the private and public sector differ and as transport infrastructures

have many social, economic, environmental and strategic effects, ITI should not be procured solely by the private sector.

They pose the valid question in which cases one may speak of *pure* private financing of ITI. In order to answer they investigate different combinations of public-private involvement in ITI and determine these combinations by distinguishing between two main variables – the *financing* of infrastructure and the *operation* of infrastructure. The scenarios that they identify are as follows:

		Financing	
		Private	Public
Operation	Private	I	II
	Public	III	IV

FIGURE 7: PUBLIC-PRIVATE SECTOR INVOLVEMENT IN FINANCING AND OPERATION OF ITI, SOURCE: NIJKAMP & RIENSTRA (1995)

- I. The ITI is regarded as a normal and not public good and there is no public involvement. Market prices are in place and this situation is not always economically optimal. An example is the airline sector in US.
- II. The fixed infrastructure costs are covered by the public sector and the variable operation costs are born by the private sector. This is the situation of many railway industries, including in the Netherlands. The public sector however is not relieved completely because the infrastructure investments remain very high. An advantage is the gain in efficiency.
- III. An opposite of the previous situation - the fixed infrastructure costs are covered by the private sector and the variable operation costs are born by the public sector. It is doubtful if the private sector bears sufficient risk in this case in order to talk about private involvement in ITI. This situation also applies when the government decides to guarantee debts and to share the risk of lower than expected operation levels. It is more expensive than the previous option as the interest rates for governments are usually lower than these for the private sector. It is therefore a good short-term option. Examples are various tunnel projects in the Netherlands and links in Denmark.
- IV. Pure public involvement in both financing and operation of ITI – the situation in many road and waterway infrastructures.

According to the authors it is a question of *pure* private financing of ITI if these two main conditions are fulfilled:

- Considerable risk is beared completely by the private sector – this excludes the cases in which the public sector takes some of the risk by securing loans or revenues; and
- There is a use of direct user charges for financing the operation of the transport network – this excludes the cases in which the public sector pays the revenues and therefore reimburses the investor.

In the Netherlands significant attention has been given in recent years (in theory at least) to public-private partnerships and the ways the private sector can participate in infrastructure procurement. In 2007 a committee was created to research on the topic of “Private Financing of Infrastructure” for

road and rail infrastructure. The committee “Private Financing of Infrastructure” became popular under the name of its chairman – Ruding. The main position of the committee was in favor of more private involvement in ITI financing in both the road and the rail sector. Private financing was advised in combination with public funding, namely through the currently largely applied form of PPP in the Netherlands – the DBFM form (Design-Build-Finance-Maintain). The committee was in favor of more use of PPPs and active involvement of institutional investors in the financing. Unlike Nijkamp & Rienstra that distinguish between different public-private mixes based on the variables financing and operation, the report of committee Ruding (Commissie Ruding, 2008) based its findings on a framework with funding and financing being the two main determinants. The four main combinations that they determined were:

		Financing	
		Private	Public
Funding	Private	I	II
	Public	III	IV

FIGURE 8: PUBLIC-PRIVATE SECTOR INVOLVEMENT IN FINANCING AND FUNDING OF ITI, SOURCE: AUTHOR, ADAPTED FROM COMMISSIE RUDING (2008)

- I. Private financing with private funding – private exploitation of infrastructure where the private investors build the ITI and recover their costs (with compensation) from the operation of the infrastructure in question through imposition of tolls.
- II. Public financing with private funding – public exploitation of infrastructure where the financial means for investment are provided by the public sector and then funds are collected from the private users of the infrastructure in question and/or from private beneficiaries from that infrastructure.
- III. Private financing with public funding – the financial means for the investment in the ITI project come from the private sector (contracting parties and financiers usually united in consortia) that expect to recover their costs and to receive a compensation during the operational period of the project. This compensation comes from the public sector. The private financing can be partial or complete.
- IV. Public financing with public funding – the classical approach where the public sector provides the financial means for investment in ITI and is responsible for the funding through public approaches.

The types of private participation in practice are various. Each type differs in terms of the level of government participation, risk allocations, investment responsibilities, operational requirements, and incentives for operators. The most common types of private participations are privatizations and concessions (Guasch, 2004). The next figure presents the most common forms in a logical order from public to private participation intensity:

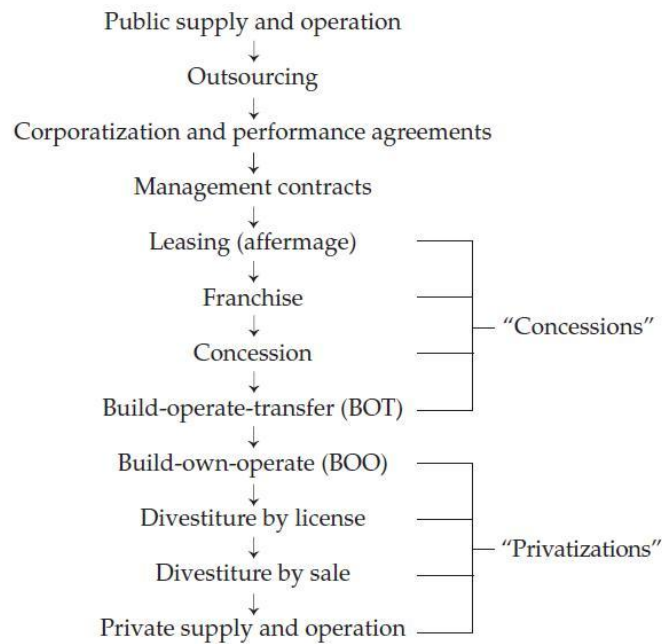


FIGURE 9: TYPES OF PRIVATE PARTICIPATION IN INFRASTRUCTURE, SOURCE: GUASCH (2004).

According to Guasch (2004) the most common form of private sector participation in infrastructure are concessions and privatizations, and much more rarely management contracts. Privatizations starting from the BOO form (Build-Own-Operate) are being the preferred approach for sectors such as telecommunications, electricity generation and natural gas while concessions including the popular greenfield form for brand new and discrete<sup>3</sup> projects BOT (Build-Operate-Transfer) have been adopted for ports, roads and railways. However, there are many forms of private sector arrangements beyond the above mentioned and sometimes their exact definition is being bended under countries' legislations. Therefore a careful handling of these terms is needed because confusion might arise and one must always take into consideration the legislation of the country for which these arrangements are discussed. The World Bank (2010) for example distinguishes among others between concessions, BOO, BOT, BOOT (Build-Own-Operate-Transfer), DBFO (Design-Build-Finance-Operate), etc.

The biggest difference between concessions and privatizations according to Guasch is in the ownership of the physical and land assets which by concessions remains with the government. The main reason for the adoption of the concession approach instead of the privatization approach for the road and railway sector are legal, political and constitutional constraints, including public concerns about performance. The definition given to concessions by Guasch is a contractual form for a specific period of time that gives the private firm the right to operate a defined infrastructure service and to receive revenues from it, or in other words a cancelable right to cash-flow. It is interesting to note that one of the basic features that are mentioned of a concession is the remuneration of the concessionaire based on tariffs *collected directly from users*. It would be interesting to see if the practice supports this conceptual framework.

<sup>3</sup> For a discrete asset and not for the whole network.

## 4. Some approaches and their implications

### 4.1. *Public-private partnerships*

One of the most fast spreading phenomena related to the private involvement in transport infrastructure development are the public-private partnerships (known as PPPs). This trend has been observed appearing in the end of the 1990s when a significant number of PPPs took place (Bonnafous & Jensen, 2005). Joint public-private projects might indeed be a feasible solution because there are many situations in which governmental intervention is a must for the private sector to find the investments attractive. This does not mean however that the investment should not be economical feasible (Nijkamp & Rienstra, 1995). The utility of such mixed contractual relationships could not only be of use for the implementation of big infrastructural projects at national level, but according to the European Commission PPPs are even considered “the way” to get closer to implementation of the very much delayed trans-European transport networks (European Commission, 2004).

Although there is no official definition of PPP in community law, the interpretation given by the Green Paper of the Commission refers to “forms of cooperation between public authorities and the world of business which aim to ensure the funding, construction, renovation, management or maintenance of an infrastructure or the provision of a service”.

PPPs are mainly characterized by their:

- Long contractual duration and complex relationship between the public and the private party.
- Funding method which often is mixed.
- Different roles of the private and the public party – the private party usually participates in the different stages of the project (Design-Build-Finance-Operate-Maintain) and the public party defines the objectives and assumes the monitoring role.
- Risk redistribution with the aim of relieving the public party from the entire risk bearing.

Every PPP case is specific and every characteristic mentioned above can be customized according to the specific objectives and needs of the ITI project. There are rarely two PPP projects that are the same.

Although the rise of this contractual form offers many opportunities, it must be noted that PPPs cannot and should not be used as miracle solutions to public deficits, as the Commission points out. Detailed assessments of added value are needed in order to choose between a PPP and a more traditional contractual form.

In different literature sources, the definition of PPPs is being used quite loosely and some degree of confusion exists about the scope of PPPs and the types of contractual arrangements that this term includes.

According to the practically oriented report of PIARC (2012), PPPs is the so-called Design-Build-Finance-Operate-Maintain method where operation of the network is also delegated to the private sector. Such projects are also used for improvement of ITI and the private party is referred to as a *concessionaire*. PPPs often result in tolling of the piece of ITI to fund the costs of the project.

In other contexts PPPs are not per se contracts in which the operation of the ITI is assumed by default. According to the Dutch governmental expertise platform for PPP (Ministerie van Financiën, Rijkswaterstaat en de Rijksgebouwendienst, 2013), the operational part is optional and Design-Build-Finance-(Operate)-Maintain approach is the most often occurring form of PPP. The payment of the contractor is done periodically according to the pre-agreed performance guidelines and the contractor is often a consortium of different parties. The preference in the Netherlands for the concession form is expressed in Koppenjan (2005).

The Green Paper of the Commission however distinguished between PPP in form and essence. The two identified forms of PPPs are:

- Purely contractual PPPs – designed as public contracts or as concession contracts;
- PPPs of institutional nature or also called institutionalized PPPs – in which the public-private cooperation is much deeper and they may result in the formation of a new entity held jointly by the public and the private sector or a public entity held by the private sector. This form allows the public party to retain significant degree of control over the project development. The law for public or concession contracts does not per se apply to this form of PPP.

The different interpretations as seen above make it difficult to draw a clear definition-content picture for the PPPs. Different angles are taken into consideration in the different sources according to the perceived importance from practical point of view. While sometimes concessions are regarded as a form of PPP, but not in essence, other times they are by default considered a PPP. While in some sources operation of the ITI by the private sector is assumed as an integral part of PPP, in other it is an optional matter. These and probably many other distortions, although inconvenient, must be taken into consideration when assessing the different points of view expressed by researchers.

### ◆ **PPP stagnation**

Although PPP does sound like a valid alternative for ITI investments, the practice shows that there is also enough space for failure of public-private co-operations. In the Netherlands, although there is a big interest in PPPs for ITI, in practice few such arrangements get to a phase of actual implementation, or in other words – there is stagnation of PPPs (Koppenjan, 2005). On the basis of analysis of 9 transport infrastructure case studies involving PPPs in the Netherlands, Koppenjan identifies three major patterns in the arrangement of PPPs:

- A quick start-up of PPP based on intense interaction between relevant public and private stakeholders, resulting in a successful project;
- Interactive decision making and early involvement of the private party resulting in a too ambitious project for which there is no support in further stages;
- Hesitant and risk-avoiding behaviour resulting in disappointing results from consultation researches, overwhelming public planning involvement and difficult contract negotiations.

According to Koppenjan the last factor is a pattern that could be observed in Dutch ITI projects such as the Second Maasvlakte, Betuweroute and several national highways. His criticism is also directed at the Dutch PPP Expertise platform (PPS bij het Rijk) that or gives too little attention, or advises against PPP in the planning phase, public sector participations and integral planning approaches.

The usual reason of this behaviour – avoidance of risk. Instead, a logic of connectivity is advised (as opposed to a logic of division):

	Logic of division	Logic of connection
Project content	Scope reduction; subdivision of project into parts; <i>ex ante</i> goal setting	Scope management; integral planning; interweaving of objectives and interests
Project owner	Government is principal (contract giver); private parties are agents (contract takers)	Public and private parties are partners
Risk management	Risks are reallocated and transferred	Risks are jointly assessed, reallocated and shared
Project definition	Unilateral, public project development	Joint project development
Political involvement	<i>Ex ante</i> political framework (public-public agreements)	Management of public and political interfaces
Private involvement	After formal public decision	In the phases of exploration and planning
Project culture	<i>Ex ante</i> clarity about project content and distribution of costs, benefits and responsibilities	Joint image building and gradual development of trust and content
Connecting elements	Contractual agreements	Dependencies, opportunity for gain, trust, and process agreements
Steering principles	<i>Ex ante</i> frameworks, contract management	Process management and arrangements for cooperation

FIGURE 10: LOGIC OF CONNECTION VS. LOGIC OF DIVISION IN PPP PROJECTS, SOURCE: KOPPENJAN, (2005)

High expectations of PPP must meet a sound problem investigation of why PPP are failing, problem understanding and attempts to solve them. PPP fail not only because of lack of sound economic reasons for project implementation, as it could be expected, but also because of organizational and co-operational problems. If these bottlenecks are addressed, this will leave the door wide-open for a sound dose of optimism for the future of PPPs in ITI development.

#### ◆ **Transaction costs of PPP**

An important issue when assessing the use of a PPP in an ITI project, as opposed to public funding, is transaction costs. The general view is that the contractual form of PPP might be much more expensive than traditional public procurement due to its high transaction costs (Soliño & De Santos, 2010). According to Soliño & De Santos there is a room for shift of the costs' ceiling, because PPPs offer considerable benefits that in turn might lead to significant savings during the entire life span of the project. Therefore, they try to find a way to save transaction costs in the procurement methods of PPP. The procurement procedure is a focal point in the tendering (launching) stage of a project. The importance of the tendering phase is according to the authors crucial, because PPP creates a form of "monopoly" in which the private party is the manager of the ITI.

The procurement methods for PPP projects as listed in PIARC (2012) are as follows:

- Open tender – the public party prepares an invitation for open tender that is accessible for all interested public parties. The interested parties have to submit a tender proposal that satisfies the requirements of the project in question. It is a well-established method.
- Restricted tender – tender proposal cannot be submitted by all interested private parties, but only by approved companies. This pre-qualification is done by the public party and reduces time and the number of candidates.



- Competitive dialogue – a new approach that comes of use when the public party is not able to assess the technical, financial or legal requirements for the successful completion of a project. All aspects of the project are discussed with the private sector candidates before the submission of the tenders.
- Negotiated procurement – an exceptional procedure that may be applied in the cases specified by the European Law. The tenderers must be initially invited by the public party. The terms of the contract are negotiated between the selected tenderers and the public party in order to adapt the tenders to the desired outcomes.
- Alliance contracts – the private party participant is usually a consortium. An initial assessment is done of all interested parties and the chosen candidates are invited for the second phase – development and assessment of proposals. In the third phase an interim alliance contract is signed with the chosen candidate.

Soliño & De Santos's findings point out that the principal reason for high transaction costs of PPP projects is the use of the Negotiated procurement method in the launching stage of projects. In the same time, the use of Open tender offers much room for cost savings that could amount to 7% of the capital value of a medium road project. Moreover, the Open tender method enhances competition. However, the vital requirement is that the public authority has a clear picture of its objectives and the means to achieve the desired outcome.

#### ◆ **Risks in PPP**

The risk sharing and allocation in PPP projects are one of the main reasons for the appeal of such contractual forms for the public sector. Risk is shifted to the private sector participant that in return is driven by a profit incentive. However, from social welfare point of view (and thus the main objective of the public sector), a successful execution of the desired outcomes of the project and added value for money remain a central goal (Grimsey & Lewis 2002; Soliño & De Santos, 2010).

Grimsey & Lewis (2002) identify the main objectives of the three main actors in PPPs:

- The public authority - economic, efficient and effective money expenditure (value for money). Value for money is usually achieved through the expertise (innovation, skills, techniques, practices) of the private participant and the risk shift to the private party.
- The private sector participant - direct revenues to cover operating costs and debt financing, while assuring returns.
- The lender of finance or finance guarantees – sound project cash flows for debt repayments. Financial security provided by the private sector company itself is usually not a condition. Therefore the incapability of materializing the predicted revenues represents the biggest risk for the lenders. Performance guarantees are sometimes provided.

On the basis of the main objectives of the involved actors at least 8 basic risk groups were identified: technical risk (engineering, design), construction risk (techniques, costs, delays), operating risk (high operating and maintenance costs), revenue risk (revenue deficiency), financial risks (revenue streams, financing costs), force majeure (war, acts of God), political risk (legal changes, lack of support), environmental risk (impacts, hazards) and various combinations of the above mentioned risks.

According to Grimsey & Lewis, a sound analysis of the risks of PPP projects must take into account the different perspectives of the three main involved actors: the public party, the private party and the lender. Only when the needs of these three stakeholders are taken into consideration could a project be successful. Moreover, on top of value for money and risk allocation, there is another identified variable for the successful completion of a PPP project: the securing of a stable and long-term revenue stream during the entire operation life of the infrastructure.

The practical example of the provision of the Skye Bridge Project in UK with private financing proves to a big extent the findings of Grimsey & Lewis. The case is presented in the paper of Moles & Williams (1995) and shows that identification of risks must be made for every participant involved. Moreover, a separation should be made between the risks of the participants on their own account and on account of their participation as shareholders of the concessionaire company. The concessionaire in this case is a newly created partnership company set by the consortium that won the tender. The risks that they identify are:

- For the construction company - construction risk, risk of exceeding running costs on the bridge (because of the fixed costs maintenance contract) and risk of termination of contract.
- For the bank acting as an arranger for the project - professional reputation risk.
- For the lenders - financial risk related to lower traffic and revenues. Although the inflation adjustment for tolls offers some protection, if traffic falls below certain level, the project would not generate enough cash flow to cover the debt repayments.
- For the shareholders of the concessionaire - loss risk. The shareholders will only benefit if a profit is made after satisfying the lenders. However, if the project is at a loss, they will suffer only their equity investments and the participating companies in the concessionaire do not bear a financial risk.

In the case of the Skye Bridge, a major estimated gain was that the project would be supplied earlier than through public investment alone. However, it would appear that tolls were higher than they would have been by the traditional approach and that the toll regime would last longer (in practice 27 years). A gain for the government in the form of Corporate Tax is also considered a benefit, if the project is at a gain. The major finding of the Skye Bridge Project is however that it is possible to shift largely the risk to the private sector without any attempt to limit private participation profits.

## **4.2. *User charging and tolling***

User charging is a system in which the main principle is that the costs of a trip have to be paid by the user of the transport network that is making the trip. In its essence this is a main principle from economic theory (equity principle - user pays). A solidarity principle in transport infrastructure would be if except users, non-users of the transport network also contribute to ITI funding (through general taxation for example). This is the case in most European countries. A funding mechanism that uses user charging can dedicate the collected funds to new investments and maintenance of the transport mode in which the revenues are collected or to other modes. User charging can take different forms and is rarely in its pure "theoretical" form.

User charging does not necessarily mean tolls, as it is usually assumed. It also occurs in the cases when taxes are levied, directly or indirectly relating to the usage of roads - fuel taxes, road charges

according to user (for example vignettes), value added tax for vehicle maintenance, parking charges, etc. Tolling systems are another form of direct user charging.

Road tolling is considered an innovative method of road funding. This mechanism is on the rise, especially when it is part of private sector involvement in ITI development. The primary way in which this method is applied is through PPPs. However, it is a common misconception that toll roads have to be privately operated. This is indeed the case in many countries but not per se the rule. Toll roads can be publicly owned and managed as well, just as it is in countries like Japan, Austria and South Africa (PIARC, 2012).

Some authors (Zietlow & Bull 1999, as seen in Jaarsma & Van Dijk 2002) believe that user charging schemes are prone to fraud and that their transaction costs are high (for tolls costs can go up to 10-30%, even on high volume highways). According to Ragazzi (2005), the cost of tolling for European highways is estimated at 10-15% of tolling revenues. Time losses (waiting times at tolling collecting stations) are also part of collection stations costs. Collection station costs add 10% extra to investment costs.

Moreover, determining the road wear costs that need to be incorporated into the user charge is difficult. There are many road wear factors that are difficult to quantify and not always taken into consideration. Important road wear factors that ought to be taken into account are:

- Covered distance;
- Types of road sections covered (according to susceptibility to road wear); and
- Weight of the vehicle used (indicating degree of road wear).

However, most price policies consider only weight of the vehicle and this is incorporated in general taxes (Jaarsma & Van Dijk, 2002).

The public acceptance of user charging systems is an important issue that should have a central place in any user charging scheme. Farrell & Saleh (2005), Kocak et al. (2005) (as seen in Hensher & Puckett 2005) and Oberholzer-Gee & Weck-Hannemann (2002) (as seen in Ragazzi 2005), support the view that revenues from user charging should be earmarked and allocated to public transport improvements in order to assure public support and longevity of the project. Moreover, according to Farrell & Saleh, a special attention should be paid to the preferences of the stakeholders in the area where user charging is used.

Next, some options related to user charging and tolling will be briefly presented and discussed. Here I will draw mainly on the paper by Ragazzi.

### ◆ ***Tolls versus taxes***

As already mentioned, there are two ways of using user charging to fund ITI. One is through the tax system and the other one is direct user charging, for example through tolls. What would be preferable: tolls or taxes?

Ragazzi (2005) uses a Net Social Benefit formula for road infrastructure over a definite time span. He opposes two options – a state in which the infrastructure is financed publicly (through general tax revenues) and a state in which the infrastructure is tolled. In this case in order to compare, deadweight cost of taxation must be weighed against the cost of collecting tolls.

If the entire transport network is publicly funded, the traffic would redistribute itself over the entire transport system in a way that private (time, vehicle costs) and social (congestion) costs are minimal. This being said, there are some problems that might arise from tolls. Some social losses that could occur are:

- Lower total traffic because of the levied tolls;
- Diversion of traffic to other “free” roads where private costs are higher. As a result the private and social costs of users of free roads increase because of increased congestion.

An important issue raised by Ragazzi is when tolls are used just like an additional “hidden tax” on users. If tolls are in fact an additional “tax” and a very small percentage of the revenues goes for the operation and the amortization of ITI, then they are not funding the cost for construction of ITI. This is the case in Italy where the relation between level of taxation and costs of highways is theoretical and in practice not known. Also unknown is the socially optimal level of taxation which allows governments to manipulate the road charging systems.

### ◆ **Public tolls versus private tolls**

As already mentioned, tolled roads do not have to be per se privately operated. Japan, Austria and South Africa are examples of countries that have ITIs which operate with tolls charged by public operators. A public operator that levies tolls could be for example a state agency. But are there advantages in granting concessions to public and private operators?

Private concessionaires are attractive to politicians because then ITI funding comes with a very low political cost for them. But private financing in its pure form is rarely the case as often governmental subsidies are required, if the expected revenues from the operation of ITI are considered insufficient by the private sector.

One downside mentioned by Ragazzi when the concessionaires are private is a risk of decreased efficiency and attempts for extra profits. If concessions are granted to different private operators, the transport network might become fragmented. Concessions act as natural monopolies for a certain period of time and a change of concessionaire occurs only when a new ITI is needed or when an old concession contract expires. Therefore, in order to secure efficiency and to prevent extra profits of the “concessionaire-monopolist”, a regulation is needed. However, it is very difficult to regulate all aspects (such as tariffs, investments, maintenance) of concessions in advance because of their long-term nature (up to 40 years).

Other advantages of tolls by public concessionaires mentioned by Ragazzi could be found in the:

- Stability of revenues and guaranteed debt reimbursement of public companies.
- Exclusion from the public sector accounts (and as a consequence from the European Monetary Union) – for companies for which tolls are the main income, even if the company is wholly owned by the government.
- Advantages from unbundling - a public company has only limited staff. Services for the procurement of ITI (planning, contracting, construction, maintenance, toll collection) are contracted out through tenders. Benefits may arise from the competition between suppliers.
- Unbundling also allows for setting different tolls for various tracks at socially optimal levels. Unlike by private funding where tolls depend on the historic construction cost and socially optimal levels are not always taken into consideration.

→ Maintaining a balance between total network revenues and costs.

Borgnolo & Rothengatter (2005) explore some practical examples that cover the scenario of public versus private tolls. The first option is user charging by public owned entity of the *entire* (road or motorway) network through public tolls and other taxation instruments. In this situation user charging does not have to cover all vehicle types or if it does, the level of tolls differs per vehicle type. Among the countries that favour the public tolls regime are also Austria, Germany and Switzerland which all have distance-based heavy goods vehicle charging systems. Switzerland is the only country in which the entire road network is charged as opposed to the motorway network alone.

Concession regimes and private tolling are present in many European countries among which South Europe has a very big share with countries like France, Italy, Portugal, Spain, and more recently countries like Greece, Croatia and Slovenia have also joined the concession family. In this situation the private involvement is assured through PPP and the user charging covers all types of vehicles on the motorway network. An interesting fact mentioned by Borgnolo & Rothengatter is that the passenger cars' revenue share on tolled motorways (80%) does not necessarily correspond to the share of motorway costs due to passenger cars (45-55%). This signifies that "readiness to pay" is also taken into consideration when imposing private tolls. In many countries the tolled motorway network is divided (and fragmented) between the different concessionaires.

#### ◆ **Road Congestion Tolls versus Road Congestion Taxes**

Congestion taxation is an explored alternative in many countries, including in the Netherlands because of the severity and the impact of the congestion problem (see chapter IV-1. The Dutch Road Dilemma). The Port of Rotterdam as a big ITI user is very much interested in the optimal use of the road network. The accessibility of the port to the hinterland is very much dependent on the flawless road traffic. Bottlenecks are a big issue and except the obvious hard measures for improving them (such as new infrastructure), currently also soft measures are used (modal shift, traffic management in the port). Control of congestion through some form of taxation or toll is a regulatory alternative. But can they coexist together? And can one be more beneficial than the other for the optimal social redistribution of traffic?

According to Ragazzi, for the optimal social use of the road network, road users must be charged for:

- The marginal costs of road maintenance;
- Externalities (environmental and accidents); and
- Congestion.

For this, different levels of taxation are needed because only one road tax (for example fuel tax) cannot incorporate and reflect all three types of costs. Moreover, fuel tax funding becomes gradually more problematic, because it proves not to be sufficient any more (Hensher & Puckett, 2005).

Studies by the UK government point where taxation and tolling meet. According to their findings, the use of congestion tolls determines the optimal level of fuel taxation – the more congestion tolls are used, the lower is the optimal level of fuel taxation.

Ragazzi stresses that the only reason to justify the use of tolls is the fact that for example fuel tax cannot differentiate between levels of damage to roads caused by different types of vehicles. This justifies tolls on trucks like in Switzerland and Germany. Tolls therefore can bring the charging close to the optimal social mix. But in order for the transport flows not to be diverted to other “free” roads, tolls should be imposed on all roads (like in Switzerland) and according to the degree of congestion. The discrimination of poor people could be an argument used against tolling for congestion. Congestion tolls could be seen as a compromise between private and social costs on the road – with tolls private costs of drivers increase, but the congestion and environmental costs decrease. In turn, time spent in congestion as (a personal cost) also decreases.

### **4.3. *Developer contributions***

We already identified in the Stakeholders chapter that developer contributions could also be a source of financing for ITI developments. Although a less known option, there are some countries where a developer charge is imposed to developers of land along the road. The contribution of specific businesses to ITI expansion and/or improvements is what will be explored in this chapter. The involvement of a port authority in ITI development is seen from two different perspectives: voluntary investment in ITI and charges imposed by the government for developments in ITI.

The involvement of port authorities in ITI developments is based on the assumption that port authorities may theoretically take on a multitude of facilitating and entrepreneurial responsibilities, reaching beyond their port perimeter. According to the report of ESPO (2011) concerning port governance, this would depend on a certain number of factors concerning the relationship of the ports with their governments and their internal governance. Four essential factors are identified that are strongly interrelated:

- Legal and statutory framework – not only national but also EU law.
- Financial capability – financial power is a key factor when port authorities have higher ambitions and want to take on a facilitating and entrepreneurial role. Such a role could be for instance real estate development or active regulation and investing in regional networks.
- Balance of power with the government – the desire of port authorities to get involved in entrepreneurial activities might not be the desire of the governmental agencies that stand behind their public ownership. In the case of the Port of Rotterdam these are the Municipality of Rotterdam and the Dutch State. In the case of ITI, this factor would influence the extent to which hinterland-oriented strategies outside the port can be developed.
- Management culture of the port authority.

The report findings point out that when transport infrastructure outside the port area is concerned, hardly any port authority bears financial responsibility. In most cases it is government that does and for some types of ITI such as railway infrastructure and especially pipelines private operators are also involved. The question remains however to what extent this is a matter of historical habit and to a mix of negative factors that do not allow it? Also, are there port authorities that would have the interest and the possibility to invest in ITI networks?

Usually developer contributions to major infrastructural projects are mentioned when enhancements and upgrades of ITI need to take place. The current UK approach to the problem is that when there are infrastructure upgrades necessitated by port projects, the developers have to

contribute to the cost (Asteris & Collins, 2010). The logic of such an approach is that port developments generate the need for enhancement of ITI. Moreover, the contributions also could reflect to a certain degree the negative externalities (pollution and congestion) caused by the extra demand.

According to Asteris & Collins it is not surprising that port authorities do not agree with this policy. Their main arguments for the flaw of this treatment of port authorities are:

- Ports are treated as generators of costs and externalities (from ITI upgrades) and not as gateways that facilitate trade. If port are considered facilitators that would justify the financing of ITI by taxation.
- ITI upgrades are indivisible – even if port authorities contribute, third parties may also benefit without paying the cost.
- It becomes very difficult to estimate the cost of proposed project schemes when there are developer contributions.

There are more drawbacks from direct payments for connectivity improvements, such as:

- The costs of connectivity charges might end up being borne by terminal users, as in the case of the port of Felixstowe where a surcharge of 5.50 pounds per container was imposed.
- If competitors of the contributor port are not required to contribute to the costs of port-associated transport enhancement programs, that might lead to a financial disadvantage of the charged port.
- ITI contributions may add to the time to bring a port project to fruition.

Measures such as more investment in ITI and/or the introduction of a comprehensive system of road pricing are considered remedial and possible solution to the serious congestion and environmental problems on UK haulage roads.

#### ***4.4. Trans-European Transport Networks***

To date, the responsibility for the choice and funding of big transport infrastructure projects has laid with the individual member states. Since 1990 however, there has been increasing attention paid to the problem of cohesion of transport networks for the free flow of goods in the EU. This has been triggered and accompanied by some wide-spreading urgent problems in transportation networks all over Europe.

The transport challenges facing the EU at the beginning of the new millennium were increasing (Rees, 2005):

- Increasing congestion levels with total congestion costs being 0.5% of the total national wealth in the EU.
- Increasing environmental issues with transport being responsible for 1/3 of the CO<sub>2</sub> emissions (80% from road transport).
- High accidents numbers – 50 000 killed every year in the EU.
- Fuel dependence – increased supply risks and prices. 97% of transport depends on oil fuel.

The White Paper of the European Commission from 2001 put transport as point of attention for EU member states. A particular problem treated by the White Paper was the decrease in public

investments in ITI. Rees (2005) points out that in the beginning of the 1980s investments in transport infrastructure represented 1.5-2.0% of GDP. Until 2001 this figure has fallen down to 1.0% of GDP. The transport sector was growing faster than the economies as a whole, while governments were investing less. The result of this could of course be expected: congestion. The discrepancy between traffic and economic growth is represented below:

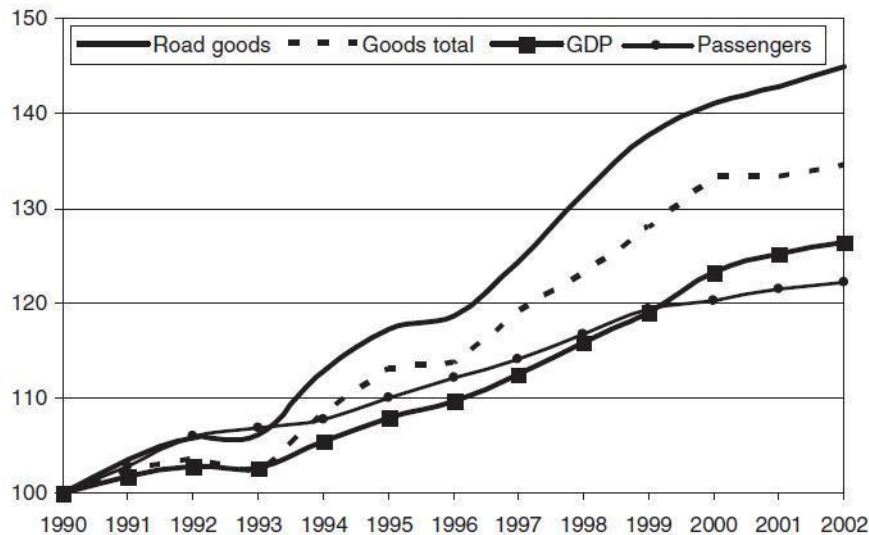


FIGURE 11: THE DEVELOPMENT OF TRANSPORT IN THE EU 15, SOURCE: REES (2005)

The plans for the Trans-European Networks (TEN) were adopted at first in the 1990. The Trans-European Transport Networks (TEN-T) are part of the TEN, together with the other two sectors of concern – Energy (TEN-E) and Telecommunications (eTEN). TEN-T represent a planned set of road, rail, air and water transport networks in Europe.

According to Rees, after the first conception of the idea, the plans for the TEN have never fully taken off because of problems in securing an adequate budget. In 2004 however the TEN were re-launched. It was decided that 30 priority projects must receive the financial funds for transport. The estimated amount needed was €225 billion and the available budget – €600 million. This big difference between availability and needs led the Commission to require big increase in resources for the budgetary period after 2007, with a big focus on private investment involvement through PPPs. It was planned for the Commission to cover 15% of the financial requirements of the 30 priority projects in the period 2007-2013. This support would be largely used to create interest and to attract loans from financial markets. It was also planned that existing users of routes in the vicinity of the priority projects would contribute through pricing schemes. However, pricing of ITI must follow some EU guidelines:

- Charges must be equitable - clear link between costs and charges for transparency and justification.
- Non-discrimination between users.
- Charges must include external costs.

The main sources of TEN-T funding are the TEN-T budget, the Cohesion Fund and the European Regional Development Fund (Proost et al., 2011).



One fundamental point for TEN-Ts must be noted and this is the role of the Union in the networks. Initially was planned that the Union will only play a subsidiary role in TEN-Ts, meaning that it will not promote or manage transport networks itself. Its role would be instead limited to encouraging investments, organizing feasibility studies and in *extreme* situations supplying small parts in financing (De Lathauwer, 1995). TEN-Ts cannot therefore be seen as a solution for lack of public funding for ITI at national level or as a main contributor to financing schemes. Instead private funding possibilities must be explored to the fullest (including user charging) and mixed financing must take more central place in projects. According to De Lathauwer this mixed thinking has led to the creation of a completely new discipline in economic sciences that must take into consideration all aspects of public and private involvement together – financial engineering. This has indeed been reflected in the activities of the TEN-T Executive Agency that currently has a Financial Engineering Sector. This sector is responsible for establishing PPP coordination framework, providing expertise in EU financial instruments for PPP procurements and assuring dialogue between PPP stakeholders.

Despite the big enthusiasm for the completion of the TEN-T projects, only 5 projects of the 30 priority ones have been fully completed, among which the Betuweroute in 2007. However, important sections of the remaining projects have also been completed and nearly one third of all necessary investments have already been made. The financial budget allocated for the implementation of the TEN-T program for the period 2007-2013 is €8.013 billion (TEN-T Executive Agency, 2013). The slow movement of the TEN-Ts could possibly be explained by a genuine characteristic of infrastructure procurement – long time for implementation and by budgetary constraints. Of course there might be other reasons and this question can be addressed to experts. It might be that there is a lack of overlap between projects that qualify for inclusion in the TEN-T program and projects that are ready to be implemented in the short-term. This might be a factor for consideration when determining financing strategies.

### **III. INTERNATIONAL EXPERIENCE IN PROCUREMENT OF INLAND TRANSPORT INFRASTRUCTURE**

International examples of procurement of ITI vary greatly. Only in Europe a couple of very different approaches for financing and funding of ITI can be found – South Europe, North Europe, East Europe and Scandinavia all seem to have a generally different idea about the optimal financing and funding of ITI and motorways in particular. Asia, North America and Australia add to the interesting mix with innovative and very interesting approaches, some of which still in their infancy in Europe. Moreover, the investment methods change constantly as many countries are striving to find the “best” possible investment mechanisms for their transport networks. Such practical examples could be of great use for this research, as previously discussed with the Port of Rotterdam. The long experience of some of the countries in building, managing and financing of motorways, as well as the transitions in investment approaches have valuable lessons to teach. Although economical and institutional factors may differ greatly from country to country, finding the “best” approach for the Netherlands requires a broad overview and the ability to draw lessons from foreign experience. As the main focus of this research are the interests of the Port of Rotterdam, only countries with seaports will be included in this section. First, some examples of procurement of motorways will be presented, as container throughput via road remains the biggest share of inland transportation from the port to the mainland. Next, insight of some countries’ railway industry regulation and practices will be included. An overview of the available literature shows that the developments in motorway procurement are quite dynamic and vibrant and therefore far easier to replicate than any changes in the rail industries which are famous for their heavy institutionalization and tardiness.

#### **1. Some notes on road procurement**

Although very different in nature, most countries do have automobile users’ tax systems and toll systems. The countries that do not have a lot of tolled roads (UK, USA) are actively investigating the possibilities to use toll-road projects more in the future and the possibility to use private capital more actively for the construction, maintenance and financing of roads. Some countries (Germany, USA) do specify that the actual use of collected funds will be for road maintenance and improvement while others do not (UK, France). The countries that do specify the use of the road user taxes usually establish specific road funds that take control of the road investments. These road funds carry different names in the different countries and are usually established by state acts. The financial resources from these road funds can be used solely for the improvement of roads or partially for roads and other transport modes such as public transport for example (Germany).

A disadvantage of systems where general tax funds are used for road investments is that the funds can also be allocated by governments elsewhere. The political game factor must also be taken into consideration when general tax budgets are used and allocated. The existence of road funds on the other hand means that dedicated income for road investment will be available regardless of a country’s budgetary constraints at a certain period of time. However, general funds have the advantage that the money collected in sectors different than transport could be redirected for road improvements. Therefore, as Nakagawa et al. (1998) point out, the size of road investments is not

per se dependent on the existence or non-existence of dedicated road funds in countries. As mentioned, stable financing is one of the benefits of having a dedicated road fund. On the other hand many countries with dedicated road funds are experiencing delayed road maintenance and construction because of political and economic efforts to keep private sector charges low. While some developed countries have abolished their dedicated road funds many developing countries (like Latvia in 1997 and the Czech Republic in 2000) and countries in transition (particularly in Africa) are establishing theirs (PIARC, 2012).

Toll road systems (UK, France, USA, Japan) are usually used for highways and financed by debt. When toll roads are financed by debt, the reimbursement of this debt usually falls on the shoulders of future users of the network that will have to pay fees. This means that the stakeholders who will reimburse the debt (the actual payers) are not always those who borrow and use the financial sources. Who the actual payer is will depend on the way the resources to reimburse the debt are collected – through general tax money or specific taxes paid by users. Tolls (direct fees) are imposed to users of toll roads but the level of tolls can vary greatly not only between countries but also inside countries and in some cases government subsidies are provided to transport owners/operators. The way tolls are collected and redistributed can also vary greatly. Some systems use the national principle of collection of tolls (Japan) which means that the total network revenues are collected together and not separately for different autoroutes.

Germany does not have concession toll systems but does impose a fee for heavy load vehicles on highways since 1995 (Nakagawa et al., 1998). The specific road fund (ÖFFA) is responsible for the construction funds for highways and derives its income from fuel tax instead of tolls. Fuel tax as specific tax is therefore paid by the users of the networks. The road fund also issues debt in the form of bonds.

Country	Specific road fund(s)	Toll road systems	Subsidies	Actual payer <sup>4</sup>
				<i>Green – main utilized funds</i> <i>Blue – secondary utilized funds</i>
UK	No	Yes, few, desire to increase	No	<ul style="list-style-type: none"> <li>▪ General tax payers</li> <li>▪ Users (general taxes)</li> </ul>
Germany	Yes	No	No	<ul style="list-style-type: none"> <li>▪ General tax payers</li> <li>▪ Users (specific taxes)</li> <li>▪ Users (general taxes)</li> <li>▪ Users (fees)</li> </ul>
France	No	Yes, most expressways	Yes, few	<ul style="list-style-type: none"> <li>▪ General tax payers</li> <li>▪ Users (general taxes)</li> <li>▪ Users (fees)</li> </ul>
USA	Yes	Yes, few, desire to increase	Yes	<ul style="list-style-type: none"> <li>▪ General tax payers</li> <li>▪ Users (specific taxes)</li> <li>▪ Users (fees)</li> <li>▪ Users (general taxes)</li> </ul>

<sup>4</sup> The information is based on the findings of Nakagawa et al. (1998) who analysed and classified in detail the different taxes paid by users of transportation networks and general tax payers in the different countries. The vastness of this information does not allow inclusion in this thesis but can be found in their paper.

				<ul style="list-style-type: none"> <li>▪ Indirect beneficiaries</li> </ul>
<b>Japan</b>	No, recently abolished in 2009 (PIARC, 2012)	Yes, all expressways, some public roads, tunnels and bridges	Yes, few	<ul style="list-style-type: none"> <li>▪ General tax payers</li> <li>▪ Users (specific taxes)</li> <li>▪ Users (fees)</li> <li>▪ Users (general taxes)</li> </ul>

FIGURE 10: HIGHWAY PROCUREMENT IN DIFFERENT COUNTRIES: COMPARISON, SOURCE: AUTHOR, MAINLY ADAPTED FROM NAKAGAWA ET AL. (1998)

## 2. The French road experience

In their aim for the best efficiency, the historical path of countries has led them to take very different decisions and to achieve very different results in shaping their road networks.

The French have tried not to respect dogmas in the search for the most pragmatic approach. By doing this their approach has proved to be largely different, both in its structure and in its guidelines. Fayard et al. (2005) investigates the French motorway experience and how it came to be. In 2005 78% of freight traffic and 90% of passenger traffic was concentrated on the road network, the rest being mostly borne by rail. The central government's road network represented 4% of the whole road network but 40% of the traffic was concentrated on it, mostly on motorways and specifically on tolled motorways under concession. According to a new law from 2004 a significant part of the national network was to be transferred as of 2006 to counties and only the main axes including all motorways were to remain under national governmental control. The share of public funding for roads has decreased from 56% in 1975 to 27% in 2005, while in the same time the share from concessionaires has increased from 32% in 1975 to 53% in 2005. In terms of expenditures, concessionaires have spent more on toll motorways than the government on all of the rest of the national road network. Maintenance and investment funding come from both public and private parties. The toll tariff is fixed on a 5-year basis contracts between the government and the concessionaires and toll revenues are used to cover depreciation and financial costs (40%), operating costs (20%), net return (10%) and VAT and other taxes (30%).

<i>Total road network in 2005</i>	<i>976,000 km</i>
<i>Central government road network (after 2006)</i>	<i>18,000 km</i>
<i>Central government motorway network tolled and under concessions in 2005</i>	<i>7840 km</i>
<i>Concessionaire expenditure on tolled motorways in 2003</i>	<i>€2,8 billion</i>
<i>National government and local government expenditure on the rest of the road network in 2003</i>	<i>€2,4 billion</i>

The history of French motorways begins in the mid-1950s. The first trait of this initial stage was a commitment to grant concessions only to public companies or mixed companies in which public shares are a majority. The second trait was toll financing of the French "autoroutes". Toll financing was supposed to be the exception to "free" roads, but this quickly became the rule. Initial concessions were only for small parts of the motorway network. After 1970 a period of liberalization and privatization began. Private companies were allowed to compete for new concessions and to

strengthen the existing mixed companies responsible for concessions. Four new private companies were awarded motorway concessions in this period although all four were consortia of major public works companies. No investors were interested in investments in ITI with such a long pay-back period and governmental aid was less than in the 1960s. Tolls were set by the concessionaires up to a limit determined in the concession contracts, but as of 1975 the government decided to regulate tolls. The period from 1982 up to 1994 was marked by the oil crisis and an attempt to create a nation-wide mechanism of consolidation network. In the beginning of the 1980s the motorway system faced serious cash deficit partly due to the crisis and a new dedicated road fund was created. Three of the private companies were overtaken by the government and a new governmental agency was created to control the public concessionaires. This agency strengthened the state control over public companies. Private concessions became an interesting opportunity once more for the public sector. The period between 1994 and 2000 was marked by consolidation of the semi-public companies and extension of tolls to urban areas. Some private concessions with tolls were deemed successful (for example the Prado-Carenage Tunnel in Marseille, 1993 and the A14, La Defense - Orgeval road in Ile-de-France, 1998), while other suffered from too high toll leverage that resulted in protests, cancellation of franchise and big municipality expenses (the Western Part of Ring Road "TEO" in Lyon, 1997). In the case of TEO the municipality assumed operation of the link and imposed much lower tolls. Since 2000, changes in toll policy were made to reflect European guidelines. More private concessions were granted and motorway firms adopted a more aggressive commercial policy (tariff differentiation based on discounts, seasons, local users, etc.) In 2005 the tolled motorways were ran by six largely state-owned companies on the way to be totally privatised, four publicly owned companies (operating tunnels, bridges, and urban roads) and four privately owned companies.

The French approach is an example of adaptation according to the needs for infrastructure - the main concern has always been to solve the current issues when they arise and to simply procure the ITI needed. Tolling is not a new phenomenon but is being part of the system since the creation of the first motorways. As stated by Fayard et al. (2005) currently a long-term strategy for motorways is being attempted and there is a trend from public management towards commercial management and achieving of a good infrastructure network without too much funding from the taxpayer. In France tolls are used before anything else as a way of financing and their levels are not much different between different road sections and concessionaires. However, the average level of tolls is higher for privately owned companies. Major challenge for France represents aligning the established French practice with the guidelines from European legislation. An example is the Eurovignette reform negotiations that at the time did not differentiate between a distance related charge (toll) collected by the government and a financing toll collected by a concessionaire. This implied that the same rules were being planned for determining the level of both types of tolls (public and private). Such European measures can represent a threat for countries where tolls are determined by the market and not by bureaucratic decisions. According to Fayard et al. the future of the French system might be shaped by the following factors:

- Increasing complexity in public-private relations - more diversity of public-private relations and new arrangements such as shadow tolls.

- New schemes of tolling and pricing - unbundling tolls and concessions (as in Switzerland, HGV in Germany) and road pricing schemes (such as in UK) might give rise to zonal pricing and network pricing instead of the current link pricing.
- Moving from an era of intense investment to an era of maintenance of existing networks and integration of the network.
- New relationships between the public sector and independent private partners - standardization and tuning of contracts (both concession and commercial).

### 3. *The Chinese experience*

The Chinese experience is interesting in the context that it is quite different than the path taken by European countries. The development of the transport infrastructure of China goes inevitably hand in hand with the political developments in the country.

Loo (1999) investigates how China managed to take advantage of various capital funds from different economic players to finance its ITI without sacrificing its political socialism. Historically, as in many other communist systems in the early 1980s, the decision-making power with respect to railway investments and planning was highly centralized. Highway construction and operation decisions on the other hand were in the domain of local transport agencies with provincial road "maintenance" tax being the main financing source. The first opportunity to improve the attractiveness of Chinese ITI for foreign investors was introduced in 1981 when a standard of infrastructure ("national" and "provincial" roads) was created. The period before 1978 was characterized by the government being involved in all stages of an ITI planning and development, assuming the role of a planner, investor, operator and regulator. The years between 1985 and 1995 marked the devolution of central and provincial governments as key financiers, direct investors and administrators in ITI projects and the more active inclusion of municipal government, domestic and foreign non-governmental investments. The latter were assured through the financial market or joint ventures and after the formalization of foreign investments, through subcontracting and shareholdings. The 1990s were marked by a boom of highway developments financed by a wave of foreign capital from multilateral agencies, the World Bank, other international banking agencies and foreign governments. This in turn triggered an extensive construction of large bridges. The forms of financing took the shape of BOT (Build, Operate and Transfer) or BOO (Build, Operate and Own). An important key in attracting foreign investments has been the favourable conditions in the investment packages offered by the provincial government such as:

- Special terms on equity, toll revenue and right to develop land and route (usually for 30 years).
- An equity share of 50% or more.
- Some income from the property development as a compensation for the slow internal rate of return in ITI projects.

The new development in the Chinese situation is represented in the report of the Economic and social commission for Asia and the Pacific (2006). In general the share of direct budgetary allocations has declined over the years in China. The national budget allocations for roads in 1977 were 78% of the total road investments for that year, in 1992 were 9%, to drop in 2004 to only 3,6%. This means that public budgets' participation in ITI is decreasing, which reflects the global trend.

#### **4. A new approach from Canada and Australia**

Institutional investments in infrastructure are a topic that has been getting increasing attention in recent years. Although it is difficult to trace the initial spark of interest for pension funds or insurance companies investments in ITI, Canada and Australia are often mentioned as pioneers where significant portion of road upgrading and expansion is being financed with pension-fund capital invested in projects through PPPs (see for example Euromoney Institutional Investor PLC, 2006; Della Croce, 2011). Canada especially is famous for direct investments in infrastructure. That gives investors an equity stake in the infrastructure asset usually through a concession agreement (but depending on the chosen contractual form, outright ownership might be also assumed). In general the interest for pension funds arises when opportunities align well with their investment-portfolio needs and can thus contribute to achieving fund solvency. The time span since the rise of this form of financing of ITI is still short to get to any final conclusions about the lessons learnt in the long run. One might say that the framework for this type of investments is still being laid and opportunities are still being explored. This is indirectly reflected in the lack of literature, empirical findings and good data not only in economical science but also in other spheres (see for example Inderst, 2010).

Although there is lack of abundant scientific data, the emergence of this new phenomenon is recognized in the vast attention that it has been given in the media and by institutions such as OECD. In the media articles in pension fund management periodicals such as the one of Robertson & Horsman (2005) outline the basics, such as where the main interests for the involved parties stem from. According to them pension funds in Canada are constantly looking for new opportunities to deploy their capital. This is partially due to the aging population in the country where it is expected that the proportion of people over 65 will more than double in 30 years. Long-term, more secure and income increasing investments become a must for pension funds and infrastructure investments seem to meet these needs. Infrastructure is by nature illiquid and with an investment horizon of approximately 20-25 years while pension funds' liabilities have a 20-year-long duration. Another mentioned benefit by the authors besides stable returns and liability match is diversification, as infrastructures are not affected by economic cycles (such as inflation for example). On the risk side for pension funds, project risks (mainly costs and timing) and political and policy risks (delay, cancellation, negative cost-revenue balance) are identified.

With this natural "match" between pension funds and infrastructure investments it appears only a matter of time before more practical examples are observed and lessons are drawn from experience. Moreover, pension funds expand their horizon also abroad, when foreign investment needs arise. In 2010 it became known that two Canadian pension funds have won the race to operate Britain's 110 km High Speed rail link from London St. Pancras to the Channel Tunnel (Smith, 2010). This pension fund participation requires also actual operation of the railway link, as opposed to pure debt financing. The British government had been facing budget deficit and has decided to sell the concession in order to raise cash. The winning consortium Borealis had to compete with a consortium in which another institutional investor took part – the insurance German group Allianz. This shows that foreign institutional investors are not restricted by borders and their interest in such investment schemes is strong enough to commence undertakings abroad. It would be inaccurate however to claim that this is a new occurrence, because as early as the late 1990s Canadian pension

funds have already tried to seize opportunities abroad. In 1998, the giant Canadian public pension fund The Caisse Financial Group saw an opportunity in the financial troubles of Asia and decided to invest in road and rail transportation projects, ports, the generation and transmission of power, telecommunications, water supply and waste water treatment plants (Rogers Publishing Limited, 1998). The interests of pension funds in infrastructure procurement are so big that it has even been suggested that the wave of new entrants might have already triggered the revenues down (Euromoney Institutional Investor PLC , 2006).

In one of the few available scientific papers, Inderst (2010) speaks about confusion in this field of investment and little research done. He also expresses the view that the performed research could not completely support the long-term benefits associated with infrastructure investments such as stable incomes and hedging from inflation.

Institutional financing of infrastructure is a theme that has been identified by OECD as well. In a working paper for OECD, Della Croce (2011) elaborates on policy measures that are needed in order to accommodate the change in investment approaches. This paper recognizes the increasing interests of institutional investors in infrastructure investments but also the fact that most of them at present are still not willing to invest. Previous survey research data is analysed and successful practices of institutional investment in infrastructure from among others Canada, Australia and USA are investigated for some concrete policy actions to be proposed. Stanley (2011) in an article for an OECD journal expresses the need for governments to create solid regulatory frameworks that will give institutional investors the stability and security they need. Moreover, according to him the focus must be put on creating a framework that allows institutional investors to fill the funding gap instead of seeking semi-public funding solutions that could eventually discourage the private sector.

Institutional involvement in ITI is still a new phenomenon in Europe. More involvement from foreign pension funds in domestic infrastructure might be the way to draw lessons from foreign experience. However, the attention given to the topic by OECD shows that the market should not be left on its own and that governmental and regulatory adjustments will be needed to accommodate this change in investment thinking.

## **5. Railway sector organization**

The railway industries in Europe have faced a constant process of reform since the 1990s. Unlike developments in the road sector, it seems that any changes in the railway sector take longer and governments are extra careful to implement reforms. The literature covering railway organization is mainly focusing on a couple of aspects in the organization of the railway industry - the vertical reorganization, the horizontal reorganization and the public or private nature of the railway companies after the reorganization. Vertical reorganization usually takes place first. This could be explained by the introduction of the European Directive 91/440 that focused on separate accounting systems for railway infrastructure and operations. The logic of vertical separation follows the theoretical logic that competition can be introduced in railway operations, although infrastructure cannot be contestable.

The tendency is that full vertical separation usually occurs after countries have first virtually separated the management of the rail infrastructure from the management of the operations on rail



networks. It is why vertical separation can take different forms. An institutional vertical separation would mean a full legal separation of the bodies responsible for infrastructure and operations. Other variations of vertical separation could be (Mizutani & Uranishi, 2012): accounting separation within the same organization, different organizations being held by the same holding company or a system of lending arrangements with third parties, etc.

Horizontal separation (passenger-freight service) follows, although much more sporadically in different countries. Horizontal reformation usually takes the form of tendering of regional passenger services or franchising system in regional passenger services. In the freight market it takes the form of opening of the market for freight operators, including in some cases international. Open access for foreign freight operators on the whole network is provisioned by the European directive 2004/51 and aims at the creation of a Trans-European Rail Network (Cantos et al., 2010).

The following compiled table (figure 12) represents the situation that is currently<sup>5</sup> observed in a number of countries with regard to their railway organization. In general Western Europe shows a tendency for vertical and horizontal separation, although there are a few exceptions. Sweden seems to be a pioneer in vertical and horizontal separation. Interesting and unique is the situation of UK that is following the full privatization and deregulation approach since the mid-1990s with unmatched amount of private participation, including private ownership of the infrastructure. However, UK has recently decided to strengthen the regulatory regime (ECMT, 2001). Other countries such as US, Japan, Germany and Switzerland keep their position of vertical separation avoidance. Nevertheless, Germany and Switzerland are trying to keep the passenger and freight services contestable, in the case of Germany through franchising and open access for freight operators. In terms of user charging of infrastructure, the collected data shows that there is almost no country that can fully cover the costs for renewal of infrastructure and investments through user charging, with partial coverage being the result at best. Only UK manages to cover the costs for renewal fully, but not the costs for new investments.

---

<sup>5</sup> The most recent available information for Denmark comes from Mizutani & Uranishi (2012). However the information for the different countries comes from different sources that are also dated differently, the oldest one is ECMT (2001).

Country	Vertical separation of ownership and management of railway infrastructure from operations	Ownership of infrastructure	Horizontal separation passenger services	Horizontal separation freight transportation	User charging structure	Does user charging cover infrastructure renewal and investments?
Sweden	Yes, in 1988. Ownership and management of infrastructure – state agency Banverket. Management of operations – Statens Järnvägar.	Public sector entity – Banverket.	Yes, tendering system in 1989.	Yes, free entry for freight operators, in 1996.	<ul style="list-style-type: none"> <li>▪ Variable charge per gross tonne-km for freight and passenger traffic.</li> <li>▪ Marshalling charge per shunted truck for freight traffic.</li> <li>▪ Accidents per train-km charges for freight and passenger traffic.</li> <li>▪ Information to passengers per gt-km.</li> </ul>	No
The Netherlands	Yes.	Subsidiary company owned fully by the public sector. Prorail became a subsidiary of central government's ex-Ministry of Transport, Public Works and Water Management. Under private law.	Yes, tendering system since 1998. Exclusive concession granted to NS.	Yes, free entry for freight operators. 8 freight operators.	<ul style="list-style-type: none"> <li>▪ A variable charge per train-km applied differently to passenger and freight trains.</li> <li>▪ A charge per station stop applied to passenger trains.</li> <li>▪ Charges are differentiated by market segment and by type of station.</li> </ul>	No
Germany	No.	Subsidiary of common holding company owned by the public sector.	Yes, franchising system in the passenger service.	Yes, free entry for freight operators.	<ul style="list-style-type: none"> <li>▪ Variable charge per train-km.</li> <li>▪ Variable charge per net TKM for freight.</li> <li>▪ An axle load component for freight traffic.</li> <li>▪ A “tilting” component for passenger traffic.</li> <li>▪ A Train path reservation fee (for “on demand” paths).</li> </ul>	Partly cover renewals, investments and noise.
Switzerland	No.	The Swiss government is owner of the	Yes. 27 passenger operators (1 national).	Yes, free entry for freight operators. 6	<ul style="list-style-type: none"> <li>▪ A variable charge per train-km to passenger and freight trains.</li> <li>▪ A variable charge per gross tonne-km to freight and passenger trains to cover wear and</li> </ul>	

		infrastructure.		freight operators (1 national).	<ul style="list-style-type: none"> <li>tear costs.</li> <li>A charge for stops in traffic nodes applied differently to large and small nodes.</li> </ul>	
<b>Japan</b>	No.	Private company.		No open access.		
<b>UK</b>	Yes.	Non-profit private company - Network Rail (after the bankruptcy of the privately owned authority Railtrack Plc. In 2001).	Yes, 25 privately owned passenger franchises for a fixed number of years each.	Yes, open access. 6 privately owned freight operators.	<ul style="list-style-type: none"> <li>Fixed access charge independent of traffic intensity.</li> <li>Variable charges per train-km for passenger traffic.</li> <li>Variable charge per gross tonne-km for freight traffic.</li> </ul>	Renewal costs are covered <b>fully</b> although some revenue comes from direct government grants.
<b>US</b>	No.	Private company.		Limited open access.		
<b>France</b>	Yes.	Public sector entity - RFF.	No open access, SNCF only national operator.	Open access allowed since 2003 but so far the national operator SNCF is the only user.	<ul style="list-style-type: none"> <li>A fixed access charge applied to all traffic in the same way.</li> <li>A train path reservation fee (per path kilometre reserved) applied differently to passenger and freight trains.</li> <li>A charge for reserving stops at passenger stations (per stop reserved) applied to passenger trains.</li> <li>A charge for "additional services (transmission of electrical current, use of marshalling yards and use of intermodal terminals) applied differently to passenger and freight trains.</li> <li>A variable charge per train-km applied differently to passenger and freight trains.</li> </ul>	Partly.
<b>Italy</b>	No. However, the infrastructure is managed independently.	Public sector company.	Yes, franchising system in the passenger service. 4 passenger operators (1 national).	Yes, open access. 10 freight operators (1 national).	<ul style="list-style-type: none"> <li>A fixed access charge applied to all traffic in the same way.</li> <li>A train path reservation fee applied to all traffic in the same way.</li> <li>A variable charge per train-km applied to all traffic in the same way.</li> <li>A variable charge per train minute spent at</li> </ul>	No.

					nodes applied to all traffic in the same way.	
<b>Austria</b>	No. However, the infrastructure is managed independently.		Yes, first entry in 2001. 3 passenger operators (1 national) and 12 freight operators (1 national). However, dominance of the national operator.		<ul style="list-style-type: none"> <li>▪ A variable charge per train-km applied to all traffic in the same way but varying by line according to willingness to pay</li> <li>▪ A variable charge per gross tonne-km – applied to all traffic in the same way</li> <li>▪ Other income from “additional services”</li> </ul>	Partly (intended).
<b>Belgium</b>	No. However, the infrastructure is managed independently.		1 national operator.	2 freight operators, including 1 national.	<ul style="list-style-type: none"> <li>▪ A variable charge per trainkm applied to all traffic (freight and passenger) in the same way.</li> </ul>	
<b>Denmark</b>		Publicly owned organization – Danish Railway	11 passenger operators, including 1 national. Some passenger services have been franchised to Arriva.	Yes, free entry for freight operators in 2001. 6 freight operators.	<ul style="list-style-type: none"> <li>▪ A variable charge per train-km applied to all traffic in the same way.</li> <li>▪ Capacity charges at bottlenecks – applied differently to passenger and freight trains.</li> <li>▪ Øresund and Great Belt crossing charges applied differently to passenger and freight trains.</li> <li>▪ Domestic freight trains currently receive an environmental grant as a refund of access charges, but this is controversial and under review.</li> </ul>	Partly the costs of investment (intended).

FIGURE 12: VERTICAL AND HORIZONTAL SEPARATION IN THE RAILWAY SECTOR, OWNERSHIP OF THE INFRASTRUCTURE AND USER CHARGING, SOURCE: AUTHOR [ADAPTED FROM ECMT (2001), ECMT (2005), CANTOS ET AL. (2010) AND MIZUTANI & URANISHI (2012)]

It is not to say that vertical separation is without issues, such as increased transaction costs and lost economies of scope. The practice shows that in some aspects achieving an effective regulatory regime for separate infrastructure managers may be more difficult than for vertically integrated railways (ECMT, 2001). And as the examples of countries like Germany and Switzerland show, horizontal separation does not have to be dependent on vertical separation and operations can be made contestable even without institutional separation of infrastructure and operations. Furthermore, some aspects of infrastructure management can also be made contestable through the use of contractors for the construction and maintenance of infrastructure. That could create competitive pressures and influence infrastructure costs. That does not necessarily mean that these costs savings will be transferred to the customers (ECMT, 2001).

The Dutch rail network covers 3013 km of which 2266 km are electrified and 922 km are a single track (Centraal Bureau voor de Statistiek, 2013). In the Netherlands Prorail is responsible for building new infrastructure, maintaining existing rail infrastructure, allocating rail capacity, traffic control and rail network management. In other words, it is responsible for the operation and maintenance of the whole railway network, including freight transportation. Prorail is a fully state owned company under private law and has access contracts with railway undertakings, of which the biggest client is the passenger network operator NS. On the basis of exclusive concessions, the central government handed a concession to Prorail until 2015. A concession for the main passenger transport network was also directly awarded to NS until 2015 and regional passenger networks are gradually being tendered out. There is full open access for freight transport, with 8 railway undertakings active in the market. With this background, the Netherlands supports the on-going trend in Western Europe and falls under the category of countries that choose privatization, vertical and horizontal separation. However, unlike in UK, the infrastructure remains under public ownership; although from regulatory point of view its operation and management is under private law.

In terms of user charging for the use of infrastructure - according to the Dutch Ministry of Transport (as stated in ECMT 2005), charges for the use of the rail infrastructure would as of 2005, cover traffic management and maintenance costs in full. This is compared with the period up to 2005 when central government had to cover the remainder. However, charges do not cover the costs of *infrastructure renewals and investment*, salaries, accidents, air pollution or noise. The structure of charging is as follows:

- A variable charge per train-km, applied differently to both passenger and freight trains.
- A charge per station stop applied to passenger trains only.
- Charges are differentiated by market segment and by type of station.

There is a reasonably extensive availability of scientific research on railway markets measuring various benefits of vertical and horizontal separation of services. Mizutani & Uranishi (2012) for example try to explain through an empirical cost model (total cost function of a railway organization) the effects of vertical and horizontal separation on cost reductions in the railway industry. Their findings show that horizontal separation indeed appears to decrease railway's costs. As for vertical separation, the effect on costs depends on the train density on the railway network. If the density remains low, vertical separation indeed tends to decrease total costs of railways. If the density increases however, vertical separation tends to increase the total costs. From this it can be

concluded that vertical separation “policy for all” might not be the best alternative in all national contexts. Instead, a consideration of the train density on the rail network must take place as vertical separation might be too costly for too dense networks.

Cantos et al. (2010) on the other hand investigate the effects of vertical and horizontal separation on efficiency, productivity and technical change by using non-parametric mathematical programming techniques. Their findings suggest that countries that have separated their railway industries both vertically and horizontally experience the greatest improvements in efficiency and productivity. In countries where only vertical separation has taken place this effect was significantly smaller. As a main determinant of efficiency has been identified the combination of vertical separation with the entrance of new operators. Similarly this is an important determinant for increased productivity as well. As a main determinant for productivity increases is identified the technical change. However, according to the authors, tendering systems for passenger services does not seem to have an effect on efficiency. Even the introduction of country-specific factors does not seem to change the results.

## 6. Economic crisis and seaport hinterland investments

The first signs of recovery in goods transportation volumes following the global economic crisis in 2009 could be seen worldwide the following year. Unlike global freight volumes transported by air and sea, those by rail and road showed slower progress. The volumes transported by rail and road remain lower than the volumes before the economic crisis although there is an improvement since the beginning of the crisis. According to statistical data of OECD (2013) both rail freight transport and road transport were severely hit by the crisis in 2009. For rail the tonne-kilometres<sup>6</sup> in the European Union increased 10% in 2010, still remaining with 7% below the levels before the crisis, slacking far behind the progress of countries like Russia and the USA that almost managed to reach their pre-crisis volumes. For road the recovery has also been slow with increase in tonne-kilometres in the European Union in 2010 with 4% and levels remaining below the levels before the crisis.

The effect of the crisis on the goods transportation in the Netherlands does not deviate from the world trend. The inland goods transport development in the Netherlands for 11 years is represented in the table below.

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
83.2	82.9	84.1	82.3	89.4	88.0	87.8	90.7	90.3	79.2	87.8

FIGURE 13: INLAND GOODS TRANSPORT IN THE NETHERLANDS IN BILLION TONNE-KILOMETRES, SOURCE: OECD (2013)

According to data from the Port of Rotterdam Authority (2012), the port throughput in 2012 increased by 1,6%. Although this is a modest outcome, it is a significantly positive result considering the slow recovery in the Netherlands and Europe from the beginning of the crisis. The expectations for the coming years are also positive and the port plans to continue to support the existing line of continual investment, moderate price policy and cost control. It is also strongly believed that the port contributes to the recovery of the entire Dutch economy.

<sup>6</sup> The transport of one tonne over one kilometre.

With this being said, recovery is happening, but slowly. Improving the competitive position of ports that in turn contribute to the welfare of economies is more crucial than ever. Therefore investment in ITI must not be put on the back seat, although the economical times are tough. This will be difficult, because the financial crisis inevitably caused fractures in the credit market.

A report from EPEC (2009) on possible remedial actions for the struggling PPPs offers an overview of the credit situation and bank lending for ITI developments:

- Reduced bank liquidity and difficulty to raise even short-term funds due to the collapse of the inter-bank lending market.
- The PPP model is being tested as project finance and PPP lending is competing for scarce capital that has good corporate alternatives.
- Deals take longer to close because of the blockage in the loan market.
- Bank margins have increased substantially with some banks completely withdrawing from the Project Finance market. International orientation replaces domestic orientation.

According to information of PIARC (2012) the effect of the crisis is reflected in the significant delay and cancellation of many PPP investment projects in 2008 and 2009. Other PPP projects required extra help from governments. Governments in Spain and Mexico responded by increasing co-financing through equity loans, the ones in UK and USA by increasing co-financing through new financing instruments. In France the road sector is getting additional funding for more than 30 projects (amounting to almost €470 million) and the French government has also taken steps to help struggling PPPs. In Denmark the government is offering state guarantees to finance lending and has began tax reforms that aim to reduce income tax burden. There has been an increase in infrastructure spending for bridges, railway signaling and road maintenance and the government is seriously considering introducing road pricing to cover the increased costs. Findings from the International Road Federation<sup>7</sup> indicates that while 63% of road projects between October 2008 and January 2009 in developing countries have not been affected, 27% have experienced delays and 90% of these delays are attributed to the crisis. Moreover, the cost of funding has increased and the assessment of financial risks has become much stricter. It is interesting to note that funding for Greenfield (new) and small projects is easier to obtain than for existing ones. As a whole, debt availability decreased and the interest rates increased significantly. Therefore the wide-spread perception that private involvement in ITI is the ultimate solution in times of crisis is not supported by the evidence. PPP projects experience difficulties coming to a close and governments often have to interfere.

---

<sup>7</sup> IRF - 420 members in 90 countries, representing governments, government agencies, universities, private companies and individuals.

## IV. THE DUTCH EXPERIENCE

In this section two examples from the Dutch experience in procurement of inland transport infrastructure will be examined as concise and illustrative case studies. The data gathered is empirical. Some conclusions and lessons will find their place in this section in order to evaluate the lessons learnt and to lay the ground for possible future developments.

### 1. Case: The Dutch road dilemma

The Dutch dilemma consists of the fact that for years there have been many plans to change and improve the way Dutch motorways are funded and managed and many plans to introduce road pricing that have led nowhere. The scientific literature based on these failed plans is limited. This section is built on the basis of empirical data - the available public information and a number of presentations and reviews from the responsible (at that time) Ministry of Transport, Public Works and Water Management (Ministerie van Verkeer en Waterstaat<sup>8</sup>).

The Netherlands possesses more than 2600 km of motorways (UNECE<sup>9</sup>, 2013).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<u>Netherlands</u>	2265	2499	2516	2542	2585	2600	2604	2582	2637	2631

FIGURE 14: MOTORWAYS LENGTH PER COUNTRY AND YEAR IN KILOMETRES, SOURCE: UNECE TRANSPORT DIVISION DATABASE

Since the Law on the Reform of Road Management (LRRM) introduced in the Netherlands in 1993, a shift was made from specific road funding (a Road Fund dedicated for road investments and maintenance) to general road funding (Municipality and Provincial Road Funds). Each governmental level has a corresponding road level in the road network and is responsible for it. The administration levels (national, provincial and municipal) are responsible both for the policy and the investment decisions. The national government (Ministry of Transport, Public Works and Water Management<sup>10</sup>) is responsible for the national motorway network while each of the 12 provinces manages a network of rural arterial highways. The minor rural network is left to the 512 municipalities and 11 Water Management Boards in the Western part of the country (Jaarsma & Van Dijk, 2002). This makes the financial flows of road funding in the Netherlands organized as follows:

---

<sup>8</sup> The Ministry of Transport, Public Works and Water Management (Ministerie van Verkeer en Waterstaat) was a Dutch ministry that on 14 October 2010 merged with the Ministry of Housing, Spatial Planning and the Environment to form a new entity under the name Ministry of Infrastructure and Environment.

<sup>9</sup> UNECE - United Nations Economic Commission for Europe

<sup>10</sup> Currently this would be the newly formed Ministry of Infrastructure and Environment.



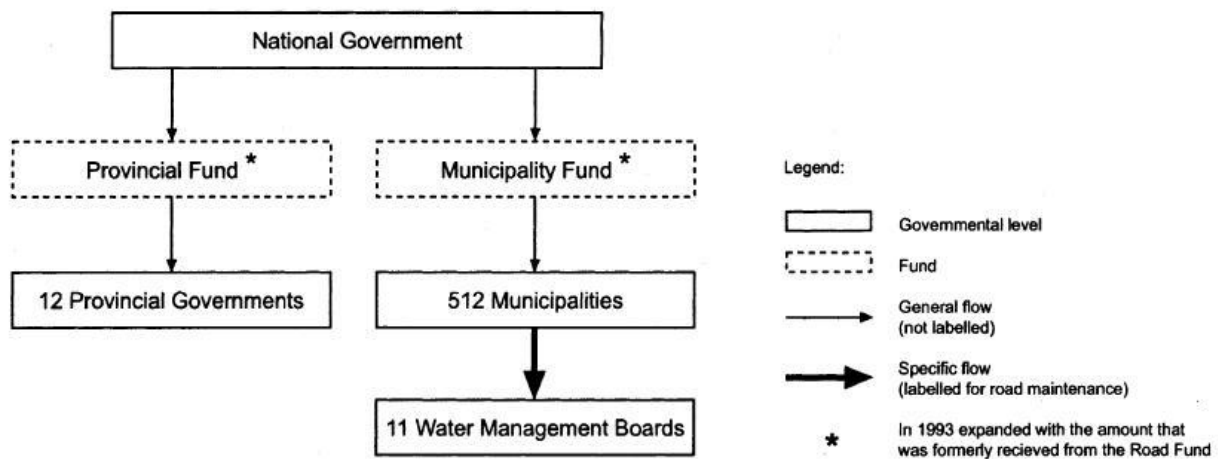


FIGURE 15: FINANCIAL FLOWS FOR ROAD MAINTENANCE IN THE NETHERLANDS AFTER THE INTRODUCTION OF THE LRRM IN 1993, SOURCE: JAARSMAN & VAN DIJK (2002)

It is interesting to note the charges for infrastructure use in the Netherlands. There are no tolled roads in the Netherlands. Tolls are used in only 4 tunnels and one bridge (Nieuwebrug, since 1788) as a way to finance their construction and maintenance. The tolled tunnels are: Kiltunnel, Westerscheldetunnel (tolls until 2033), Wijkertunnel (tolls until 2026) and Noordtunnel. The tolls for the Wijkertunnel and Noordtunnel are not user tolls, but shadow tolls as a way of financing, paid by the state (Directorate-General for Public Works - Rijkswaterstaat) to the concessionaire, instead by the users of the tunnel (Bollen, 2013). It is interesting to note that Noordtunnel is not ownership of the Directorate-General for Public Works (Rijkswaterstaat) as it is the case of all other tunnels in the Netherlands, but of ING Bank (Rijkswaterstaat, 2012). According to information of PIARC for 2003, from the almost 58,000 km of motorways in Europe, approximately 22,000 km are under concession, of which the Netherlands owns the negligible 4 km. 2 km come from Noordtunnel (highway A15 in South Netherlands) and 2 km from Wijkertunnel (highway A9 in North Netherlands).

The Port of Rotterdam is connected directly to the European motorway network which passes through all countries of importance for the port, from the United Kingdom to Russia and from Scandinavia to Italy. This connection begins with the main segment - the highway capacity of the A15. Currently A15 is being expanded to allow more traffic capacity and these upgrades should be completed in 2015. (Port of Rotterdam Authority, 2012)

Daily congestion problems are an everyday issue for the Dutch highway network with no tendency of decreasing, actually on the contrary. These problems are in particular related to the dynamic economic centre connecting Amsterdam, Utrecht, The Hague and Rotterdam. A significant share of the congestion problem is due to the freight transport flows from and to the Port of Rotterdam, for which the road network remains the most actively used connection to the hinterland.

There have been numerous attempts to address the road user charge possibility and to elaborate on the eventual outcomes of it, the first of which started already in the 1980s. All of these attempts failed not because of insufficient technological progress, but because of lack of public and political support. Among these are:

- 1988: Highway Toll Project I (Rekening Rijden I)

- 1992: Rush-Hour Disc (Spitsvignet)
- 1994: Highway Toll Project II (Rekening rijden II)
- 1999: Congestion Charge (Spitstarief) and road pricing in the form of tollbooths on all access and exit roads of the four major cities in the Randstad
- 2001: Kilometre charge by no later than 2006

The lessons learnt from these initiatives include the lack of political courage for pricing policy implementation, the failure to communicate clearly to the public where the collected revenues will be allocated and to communicate the perceived fairness of the system (payment according to usage, pollution, etc.). In all cases lack of political and public acceptance was the biggest problem.

In 2004 a national platform was created called “Alternative Charging Regimes for Mobility” (“Anders Betalen Voor Mobiliteit”). The platform was created by the Minister of Transport and Public Works and the Minister of Finances and included business, governmental, social and scientific representatives. Its role was advisory and its purpose was to investigate the alternative opportunities for road charging. Various options were explored and among the them were:

- Payment per kilometer with a rush-hour surcharge
- Payment per kilometer by heavy goods vehicles
- Congestion charge at busy times and places
- Fuel tax increase

An extract overview of the implemented investigations is as follows:

	Decrease travel time loss	Environment and security	Costs (Investments)	Introduction	Prosperity
1 <b>Congestion charge at busy times and places</b>	Up to 55%	tot 3%	200 mio	2009-2011	1,3
2 <b>Fixed charges per kilometre</b>	Up to 40%	tot 10%	3 miljard	2011-2016	1
3 <b>Tolbooths (6 places)</b>	ca. 15%	ca. 0%	100 mio	2009 and further	ca. 0
4 <b>Fuel tax increase</b>	ca. 15%	Up to 10%	0	2006	-2,4

FIGURE 16: EXPECTED RESULTS FROM INVESTIGATED ROAD CHARGING ALTERNATIVES, SOURCE: MINISTRY OF TRANSPORT, PUBLIC WORKS AND WATER MANAGEMENT (MINISTERIE VAN VERKEER EN WATERSTAAT)

The selected option by the platform in May 2005 was a kilometer-based pricing regime varying according to time, place and expected effects on the environment for all roads (not only highways) and all types of vehicles. That would be achieved through satellite technology and On-Board-

Equipment (OBE)<sup>11</sup>. It is worth mentioning that this road pricing system is different from tolling. It is variable, based on the behavior of the users and unlike toll systems covers the entire road network and not a specific route. Moreover, the charges to be collected are not connected to road construction and maintenance costs like in toll systems. Future infrastructure financing will come from the total collected revenues. The system was considered to be feasible by 2012-2014 and provisioned the conversion of the fixed taxation system (taxes for purchase and ownership of vehicles, provincial surcharges) into a system based on actual vehicle usage. The collected revenues were to be collected by an Infrastructure Fund and to be invested firstly in new road investments and maintenance and secondly in public transport improvements. (Nationaal Platform Anders Betalen voor Mobiliteit 2005)

	Reduction of travelling time during congestion	Improvement road safety	Investment costs	Introduction	Prosperity
<b>Kilometer Charge: Differentiated on the basis of time, place and environmental aspects</b>	40-60%	10-12%	± 3 billion	2012-2016	± 1 billion

FIGURE 17: EFFECTS OF KILOMETER CHARGE, DIFFERENTIATED ON THE BASIS OF TIME, PLACE AND ENVIRONMENTAL CHARACTERISTICS, SOURCE: MINISTRY OF TRANSPORT, PUBLIC WORKS AND WATER MANAGEMENT (MINISTERIE VAN VERKEER EN WATERSTAAT) <sup>12</sup>

In the beginning of 2010 of the system was declared “controversial” by the cabinet and as a consequence the Minister of Transport has given instructions to discontinue the project.

According to the new coalition agreement of the current cabinet concerning special planning and mobility, road pricing will not be introduced in the form of a kilometer levy. Instead a priority will be given to the “Beter Benutten” (Better Utilization) program that is aimed at making better use of the infrastructure and reducing traffic congestion. (Cabinet Rutte-Asscher, 2012)

As the kilometer-based system was rejected, the current taxation system remained in power:

- Purchase tax - at the time of purchase of a new vehicle.<sup>13</sup>
- Vehicle operating tax - annually paid amount for vehicle usage.<sup>14</sup>
- Eurovignet for trucks.<sup>15</sup>
- Excise duty on fuels.<sup>16</sup>

<sup>11</sup> OBE is a system that registers all vehicle movements on paved roads (national, regional and local).

<sup>12</sup> Calculations based on average rate of 3,4 eurocent per kilometre, and a congestion rate of 11 eurocent per kilometre.

<sup>13</sup> This is a percentage of the net catalogue value of the vehicle with some fixed amounts to be added or deducted depending on the CO<sub>2</sub> emission.

<sup>14</sup> The level depends on the type of vehicle, weight of the vehicle, the fuel used and the province in which the owner lives.

<sup>15</sup> Based on the European Commission’s Eurovignet Directive.

<sup>16</sup> According to fuel type.

## 2. Case: Dedicated European freight railway Betuweroute in the Port of Rotterdam

This chapter covers the procurement of Betuweroute (also wrongly known as Betuwe-line<sup>17</sup>) and is based on empirical data. The public information available comes from sources such as the operator of the line Keyrail, Dutch and EU governmental websites and documents, the Dutch Supreme Audit Institution (Algemene Rekenkamer) and the Port of Rotterdam.

The Betuweroute is the dedicated freight railway line that was built to connect the Port of Rotterdam and the port of Amsterdam to the German border, crossing at Zevenaar. The actual construction began in 1997 after an official decision in 1996, although the plans for the construction started already in the early 90s. The Betuweroute is already in exploitation since June 2007. It is around 160 km long double track - direct connection to the European mainland. It consists of two parts: from the Second Maasvlakte to Kijfhoek (known as Port Railway Line or in Dutch Havenspoorlijn) and from Kijfhoek to Germany. The first section represents around  $\frac{1}{4}$  of the entire Betuweroute and needed an upgrade, including doubling the track, electrification, construction of a rail bridge (Dintelhaven) and rail tunnel (Botlek). The remaining  $\frac{3}{4}$  from Kijfhoek to Germany (known as A15 line) needed to be completely built from scratch. The line follows for 80% highway A15, up to the German border. The connection consists of two tracks and a third one is planned for the future, although an increase in the number of trains is currently possible. The operator of the line is Keyrail and shareholders of Keyrail are the port authorities of Rotterdam (35%) and Amsterdam (15%) and the rail track maintenance organization Prorail (50%).

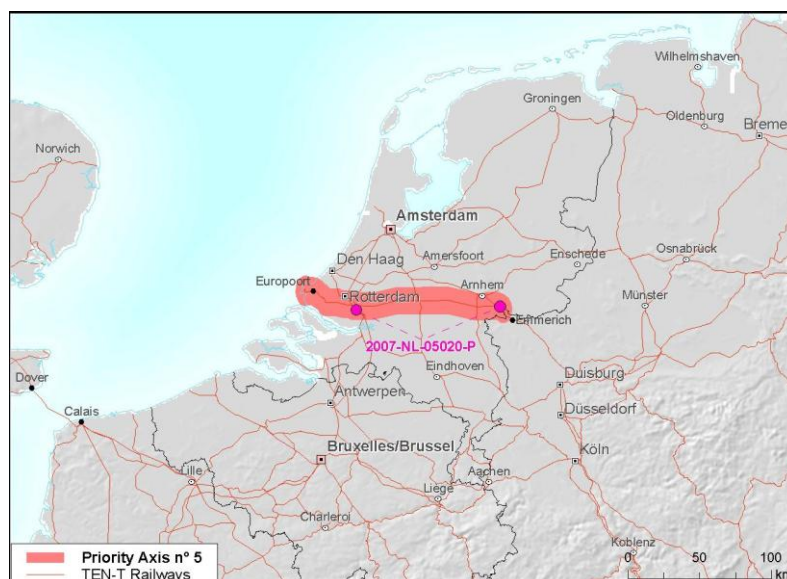


FIGURE 18: BETUWEROUTE, SOURCE: TEN-T EXECUTIVE AGENCY (TEN-T EXECUTIVE AGENCY, 2013)

The Dutch Supreme Audit Institution performed an inspection of the project in 2001 (Algemene Rekenkamer, 2001). In the initial planning documents from 1990 for Betuweroute it was stated that

<sup>17</sup> When referring to the railway freight track, the correct name is Betuweroute. However, because of numerous incorrect repetitions in the media by politicians, the press and the public, Betuweroute is still confused with Betuwe-line (Betuwelijn) which is the passenger rail track between Elst and Dordrecht.

the project would be also privately financed for an amount between €0.7 and €0.9 billion<sup>18</sup>. For the costs related to obtaining private financing (surveys, consultations and steering groups) €22.7 million were allocated. In the period up to 1994 the attempts to obtain private funding were central. This was followed by a period of reconsideration and up to 2001 the costs made have not led to any concrete contracts, but only to a further shift in the possibility for a private investment decision.

The policy information that served as basis for future decisions for private financing of the Betuweroute was defined by the Dutch Supreme Audit Institution as inaccurate and having serious shortcomings. A mistake was made in the data for transport volumes and unrealistic rate of return was calculated. In 1993 and on basis of this inexact information, the Minister of Transport at that time drew an unrealistic and too optimistic picture for the feasibility and the level of private financing for the project. After correction of the mistakes it was predicted that if market conditions would be taken into consideration, the traffic volumes would be much lower. The recommendation of the audit organ was rejecting private financing and PPP as feasible for Betuweroute.

The entire Betuweroute project was surrounded by controversy about the constantly rising costs. In the initial planning documents from 1992, the cost of the entire project from the Port of Rotterdam to Germany was roughly estimated at €2.3 billion. At the end of 2000 the costs were re-estimated again and this time at €4.7 billion, while the available national budget was €4.4 billion.

The project was identified as one of the 30 top priority projects for the TEN-Ts by the European Commission. The TEN-T contribution however is only €135 million of the €4.7 billion needed. The exact costs of the project as evaluated in 2005 are:

Priority section	Type of work/status	Distance (km)	Timetable <sup>(1)</sup>	Total cost as of end 2004 (million EUR)	Investment up to 31.12.2004 (million EUR)	TEN-T contribution, including studies, up to 31.12.2004 (million EUR)
Betuwe line	Rail (upgrade)	160	1998–2006 (2007)	4 685	4 130	135
<b>TOTAL</b>		<b>160</b>		<b>4 685</b>	<b>4 130</b>	<b>135</b>

FIGURE 19: BETUWERROUTE COSTS EVALUATION, SOURCE: EUROPEAN COMMISSION'S DIRECTORATE-GENERAL FOR ENERGY AND TRANSPORT (2005)

The project was given to a separate organization (the Management Group Betuweroute) that was initially part of the Dutch Railways (Nederlandse Spoorwegen). Since 1995 there were many organizational changes that took place and the construction and management functions of the project were redistributed multiple times. Ultimately, the control of the project remained in the hands of the Dutch state in the face of the Ministry of Transport, Public Works and Water Management. Since 1999 the Management Group Betuweroute and the ministry present themselves together under the name Project-Organization Betuweroute (Projectorganisatie Betuweroute).

<sup>18</sup> The initial calculations were made in guilders but the amounts are converted also available in euros.

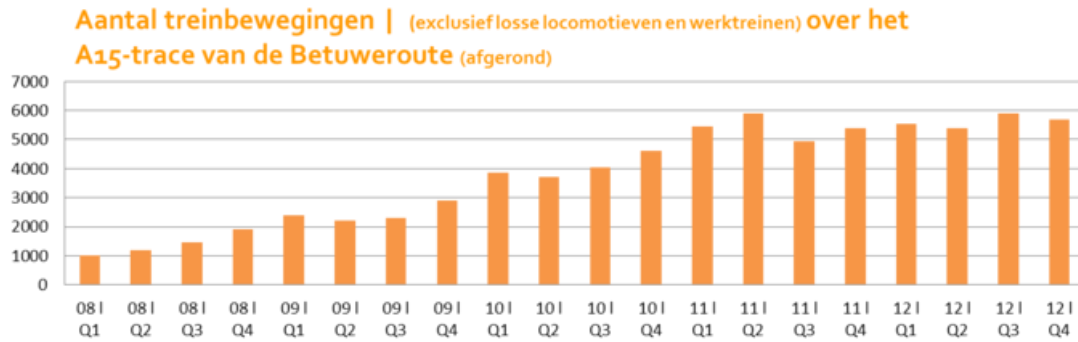


FIGURE 20: AVERAGE NUMBER OF TRAIN MOVEMENTS ON THE PIECE OF BETUWERROUTE PARALLEL TO HIGHWAY A15 (LOCOMOTIVES AND MAINTENANCE TRAINS EXCLUDED), SOURCE: (BETUWERROUTE EXPLOITATIEMAATSCHAPPIJ B.V.)

Weekly there are approximately 450 to 500 trains using the Betuweroute and according to the operator Keyrail the line is responsible for approximately three-quarters of the West-East transportation of goods by rail. The goal of Keyrail for 2013 was to have 150 trains per day running in 2013, which now looks quite optimistic. In 2012, around 22,550 trains ran on the Betuweroute and this is almost 4% more than in 2011 (Port of Rotterdam Authority, 2012).

The lessons learnt from the beginning of the project to its completion in 2007 are various. It will take time before the full potential and results from this investment project become clear. The main point of criticism during the procurement has been the lack of sufficient control on costs. Since the beginning there has been an insufficient risk management and uncertainties that could and did easily lead to setbacks, budgetary deficit being one of them. Much time was spent and many costs were made in relation to the assessment of the private financing alternative that never came into completion.

Another point of criticism of the Dutch Supreme Audit Institution has been the systematic disregard by the ministry of the opportunities to expand other modes of transportation, such as the inland navigation on the Rhine. In his paper Fremdling (2000) places the construction of the Betuweroute into a historical perspective and puts the freight transportation by rail against the alternative mode that has been available in the Netherlands much longer before railway - inland shipping. By using a "social saving" approach he concludes that when social welfare is concerned, there is no big difference if goods are transported from the North Sea to the mainland via Rhine or railway. His interesting findings might put a different perspective on future investments like Betuweroute and answer questions such as:

- Is the expected economical welfare increase so big as to deserve an investment similar to the Betuweroute?
- Are there transport modes which improvements could yield less costs and that could bring a similar level of welfare?

However, there are at present a number of perceived benefits and advantages from Betuweroute for the Dutch economy that are publicly expressed by the Dutch government (Rijksoverheid, 2013). Among these are:

- The exclusivity of Betuweroute only for freight transportation;



- Decreased freight traffic on the passenger rail network and less delays;
- Increased freight transportation capacity and possibilities for easier modal shift;
- Saved time and money because of the direct link between the Port of Rotterdam and the mainland;
- Decreased hazardous substances transportation risk in populated areas.

We could assume that the German government also accepts these benefits as genuine as it has now decided to build a third railway track between Emmerich and Oberhausen. However, the funding has not yet been finalized.

According to the Port of Rotterdam Authority (2012), the Betuweroute is not always the most suitable railroad for all destinations and the expectations are that it will not be able in the future to handle the entire rail freight transport from Rotterdam to the hinterland. This means that also passenger lines will have to be used in the future and that might have influence on factors such as traffic, delays, costs, safety and modal shift.

## V. RESEARCH FINDINGS

This section comprises all interview findings from the conducted research on the topic of ITI investments (railway and road). The interviewed parties have a different background and their objectives are naturally dictated by the formal position that they occupy in the organization they work for (Port of Rotterdam Authority, Directorate-General for Public Works (Rijkswaterstaat), Research Institute for Mobility Policy (Kennisinstituut voor Mobiliteitsbeleid), and Ministry of Finance). Although the main research question remains the same and is of focal importance when interviewing all parties, the sub-questions vary according to the background and the expertise of the interviewed persons. The discussed topics during the meetings were sometimes in the form of a question and sometimes in the form of an elaboration on a matter of interest. In any case the findings in this chapter are presented as objectively as possible which was facilitated by the available detailed transcripts from the interviews. During the evaluation of the information it was identified that the sub-questions/topics could also be more efficiently combined and/or subdivided. Because of this complexity, it was decided that it would be best for the purpose of this research and mainly the cross-examination in the next section of this paper if the information is presented and classified according to sub-topics instead. Assessment is made on the collected data and the information is structured according to the main identified questions of interest.

### ◆ *Positioning of ITI investments in the port background*

The Investment and Risk Management activities in the port authority of the Port of Rotterdam are concentrated in the same department that takes responsibility for approximately €200 million of investment infrastructure projects within the port, with main focus on port development activities inside the area of Rotterdam. The investment related activities include among others feasibility studies, best approach planning from the point of view of the port, business case preparation for investments inside the port and in subsidiaries in- and outside the Rotterdam area (revenues and costs evaluation, assessment of the expected maintenance of all fixed assets from investment point of view, etc.). However, in terms of ITI investments, the position of the port is that of an extensive lobbying player and focuses on the needs of ITI investments in general and on the port's interests in particular. The lobbying role is expressed in various port documents, such as for example the Port Vision 2030 and in discussions with the port shareholders – the Dutch state (approximately 30%) and the Municipality of Rotterdam (approximately 70%). This influence is considered “extensive” when the investment projects concern the interests and the relevance for the port (examples are the Blankenburg tunnel and the railway Botlek tunnel). The role of the port in such projects is related to research that is conducted for the expense and on initiative by the port. The research covers issues such as best approach, evaluation of costs, expected influence for municipalities geographically related to the ITI project, financing options, funding options (forecasting for tolls) from user and economic point of view, etc. The port ambitions and research findings are presented to the Dutch government that in turn takes notes of the port authority's effort and assumes responsibility of performing their own research. This procedural decision making is inevitable when public transport infrastructure is concerned.



### ◆ *Perceived ITI needs, risks and future approaches*

According to the port there is a need for more road infrastructure investments. However, it was also acknowledged that the construction of new road infrastructure does create some leverage in capacity only in the short run, for mobility levels to increase again soon after. Moreover, road capacity in the Netherlands is not a current big issue according to the port and there are at present works being performed on the existing big transport bottlenecks, such as the Caland rail bridge (in Dutch Calandspoorbrug; currently in investigation phase). The level of influence on cross-border projects such as the third track of Betuweroute in Germany (the Netherlands-Germany cross-border project) is limited to the influence of the Ministry of Infrastructure and Environment in the national borders of the Netherlands, as the German part of the project is beyond Dutch authority. This represents a significant time and scope risk and is currently the biggest threat in this cross-border project for the Port of Rotterdam.

During the interview with a representative from the Research Institute for Mobility Policy the question of underinvestment in ITI capacity in the Netherlands was discussed. There is an observed difference in the budget availability for investments in ITI at present as opposed to past periods. It was expressed that every project must be firstly evaluated according to its social cost-benefits and if they are positive, the next step must be the finding of funding. A positive social cost-benefit analysis however is not a guarantee for implementation of the project as sometimes the required investments are not available. Therefore underinvestment is currently observed to a degree, if underinvestment is defined as the impossibility to execute all ITI projects that do have a positive social cost-benefit value.

In terms of the current governmental policy relating to investments in infrastructure, the main focus can be found in the new governmental policy plan SVIR (Structural vision for Infrastructure and Space<sup>19</sup>) that is an actualization of the current spatial and mobility policies. The need for a new framework such as SVIR is explained by the outdated policy documents that do not reflect the current political accents and changing circumstances such as the economic crisis, climate change and increasing regional differences. SVIR emphasizes that investments in ITI must focus in these regions and areas that are most economically dynamic and important for the competitive position of the Netherlands (such as the Randstad, Eindhoven, Venlo, mainports, etc.). This is a shift from the previous perspective, where the main measure on ITI stated that all infrastructure networks must be pushed forward according to some competence (for example the number of congested hours vs. non congested hours).

To the question to what extent the advice prepared by Committee Ruding in 2008 (see Commissie Ruding, 2008) was reflected in policies and practice controversial answers were received. In the discussion with the Research Institute for Mobility Policy it was replied that not much was overtaken. Partly this could have been due to the used formulations and lack of specificity in the report about what changes are needed. On the other hand there is still a lot of emphasis on PPP and the next step would be not to focus solely on infrastructure but on other viable investments through PPP, such as buildings. However it was also acknowledged that it is possible that the findings of the

---

<sup>19</sup> SVIR - Structuurvisie Infrastructuur en Ruimte

Committee might be already reflected in actions. In the discussion with the Ministry of Finance the answer to this question was that the advice prepared by Committee Ruding in 2008 has in fact been taken into consideration and that in the end of 2010 a progress report was sent to parliament with update about what has been done so far. It is estimated that around 80% of the recommendations have been implemented. However, certain points have been more difficult to implement, as for example the involvement of institutional investors in ITI, the reason being that institutional investors themselves are being quite hesitant to take part in ITI procurement. Currently this issue is being worked on.

#### ◆ ***Evaluation of efficiency and effectiveness of ITI projects***

The evaluation of new ITI projects is performed in a planning scheme called MIRT (Multiannual program Space, Infrastructure and Transport<sup>20</sup>). Different regions propose specific projects of interest that are entered in this annual system of evaluation. The first step of the decision tree is analysis of the projects and results in a decision about the viability of the project. The projects that get a positive evaluation at this first step are forwarded for further detailed evaluation that includes the various options of procurement. The third step is the actual procurement of ITI. The MIRT program has been included in the annual budget of the Ministry of Infrastructure and Environment as an additional annex.

The main goal of MIRT is to objectively estimate the value of an investment. It is not really easy to have an investment approved in MIRT as the process requires a lot of work and analysis, regardless of the public, private or mixed nature of the project. It is also time consuming. The decision for implementation of a project afterwards lies with politicians.

There is no equivalent program of MIRT for existing ITI projects as they are more scattered in the political agenda.

Every new ITI project is being assessed through a number of value added tools:

- Market scan – this tool is performed in all projects initially listed in the MIRT. It shows possibilities for faster, cheaper or higher-quality realization of projects by using the private sector. It weights opportunities against risks and determines following actions.
- Public-Private Comparator (PPC) – this tool is carried out for projects exceeding €60 million. It compares the traditional public approach with public-private execution of a project. The added value is expressed in time and money.
- Public Sector Comparator (PSC) – this tool is obligatory for all PPP projects. It is being used to find the best contractor within the public sector for DBFM projects. PSC gives you an idea of the total project costs over the project life cycle.

The value for money measurements are being implemented at the level of Directorate General for Public Works (Rijkswaterstaat). The Ministry of Finance is a supervisor of the process that checks all PPC and PSC results. The ultimate test remains the tender itself. PPC remains a very conservative instrument which might predict for example value for money of 10% efficiency gain but when the procurement takes place in almost every project an even larger value for money gain is observed

---

<sup>20</sup> Meerjarenprogramma Ruimte, Infrastructuur en Transport

(also due to the competition). It has never happened until now that a project has a positive PPC and a negative PSC.

### ◆ ***The changing role of the government in procurement of ITI***

The changing role of the government in ITI investments has been discussed. At the level of the Ministry of Infrastructure and Environment two main directions of change can be observed. Firstly more decision making power is being given to local governments as opposed to the national government. This does not include decisions about major ITI projects but only smaller projects and investment decisions. Local governments get annual budgets and the power to decide how to spend them. The main reason for this change is the assumption that local governments know better what kind of investments is needed. However, also relief of responsibility for the national government and achieving a smaller and leaner governmental structure are also determining factors in the aim for efficiency. The second main direction of change relates to more market involvement in ITI procurement, of which PPPs are the most feasible form.

The practice shows that most of the ITI projects still rely heavily on public financing and funding.

The Ministry of Finance on the other hand has always tried to put the emphasis on the private sector participation in ITI, not only servicing, but also financing. However, the budgets have not changed and there are no big changes observed in terms of policy orientation. How the Ministry of Infrastructure and Environment decided to spend the allocated budget remains in their own hands.

### ◆ ***General taxation***

General taxation budget is the main source of funding for ITI investments in the Netherlands. The Port of Rotterdam does benefit a preferential tax treatment compared to other economic entities as it currently pays 0% charge on profits. However, this position might change in the near future as the expressed political intentions are in favor of the Port of Rotterdam paying corporate tax. The position of the port on this matter is that it is only fair that the port is treated as other competitive ports from the range (port of Antwerp, Hamburg), that are not subject of corporate taxation.

During the implementation of the thesis research a new piece of information became available. The European Union made a recommendation to the Netherlands to end selective tax exemption for public companies (European Commission, 2013). This proposal refers to public companies that perform economic activities in competition with private companies and that according to the Commission should be subject to corporate tax just as private companies are. This question was addressed to the representative from the Ministry of Finance if the preferential tax treatment of the port is going to be changed. This issue appears to be more complex and broader than initially expected and of fiscal nature. There are a various number of publicly owned companies, besides the port that are concerned, not only at national, but also at local level. The more fundamental problem is whether such companies should be owned by the state at all. It is very difficult to change the preferential tax treatment of public companies in the existing structure and such a decision is not expected in the short run. Moreover, all European guidelines must be taken into consideration.

ITI projects that are funded and financed through national general budgets such as the Betuweroute are difficult to assess individually and in the short run in terms of their economic impact for the port. However, the individual benefit of the Betuweroute for the Port of Rotterdam is estimated very high, as the lack of such a rail connection would be detrimental for the port. In more general

terms research has been done by the port on the impact of congestion problems in the port to the economy of the Netherlands as a whole. Such estimations are made by the Port of Rotterdam together with the research department of TU Delft. It has been concluded that each container that passes through the port has an added value of €150. Therefore the failure to transport one container to the hinterland via railway, road or barge amounts on average to €150 loss for the Dutch economy. Considering that the flow of containers in the Port of Rotterdam, including the Second Maasvlakte is estimated at 30 million per year in 2030, in a case of a bottleneck and inability to transport these containers would result in a significant loss for the Dutch economy.

The question of the abolishment of the dedicated road fund in the Netherlands in 1993 was addressed in terms of the lessons learnt. Currently there is a fund that runs until 2028. This allows better planning of expenditure. Usually a budget has a life of a year and if the budget money is not spent in this period, the money is being redistributed. ITI procurement requires a lot of planning (time, people, procedures) and delays can occur. A fund assures that the money for a budget year is not lost but transferred for the next year. Secondly, prioritizing projects is made easier and more flexible (in time and according to importance). Thirdly, consistency and reliability is assured and visible for the private sector (the pipeline is clear).

The portion of general budget that is allocated to infrastructure development can be traced in the annual budget. However, there is no specific rule for the annual amounts that need to be directed for ITI and the way this is determined remains unclear (at least according to the representative of the Research Institute for Mobility Policy). The reasoning behind it is most probably political. Earmarking of funds is not being discussed and there is no accounted specific reason why that is. The only situation when earmarking was investigated as an option was in the framework of user charging for infrastructure (see chapter IV-1. The Dutch Road Dilemma). At the time it was identified that earmarking might beneficially influence the public acceptance of road charging.

The question of earmarking has also been addressed to the representative from the Ministry of Finance who confirmed that earmarking of revenues is not favored by finance ministers. One of the fundamental principles of the current Dutch budgetary system is the clear separation between the income and the outcome cash-flows with freedom of expenditure. This allows for more conservative and reliable governmental expenditure because even if a tax income arises that does not mean that more income is going to be spent. In the same time this system does not allow for earmarking.

The decision for allocation of general budget money represents an entire procedure. The amount needed for new ITI projects are listed in the MIRT. The budget needed for existing projects (maintenance of ITI) are not part of the MIRT but are rather scattered. The total amount of money for new and existing projects is calculated together. On the basis of expert opinions from the Ministry of Infrastructure and Environment for pricing of projects (150 years of experience) the needed budget is being calculated. By PPP projects the private sector also needs to provide transparency on project costs. Therefore information on projects is becoming more detailed and transparent with the time (vis-à-vis normal roads). The aim of the ministries is to export the knowledge and success from DBFM on other projects as well (normal roads, railway, inland shipping).

The risk of abandoning ITI projects that are to be financed by general tax budgets exists in practice. It is unclear what the exact percentage of these projects is, but a recent example is the light rail

project in Groningen which was brought up to the phase of procurement and two days before the presentation of the final bids, the project was cancelled on the level of the aldermen. By traditional public financing schemes there is a government that has the money to invest and a sub-contractor (contracting company) that can implement the project. The risks of cancellation of a project in this case can be found at the level of:

- Government - lack of funding for the project;
- Government - change of political atmosphere or intentions;
- Contracting company - incapability to implement the project (due to for example bankruptcy).

However, this should not be used as an argument against public financing as concessions also bring cancellation and other risks with themselves. The introduction of a concessionaire brings more parties in the scheme which also increases the number of potential sources of risks. Also the types of risk change.

The Research Institute for Mobility Policy is currently not making calculations of the deadweight cost of taxation. The reason is partly contributed to the complexity of such calculations. To the knowledge of another interviewee (Ministry of Finance) deadweight cost of taxation is not being calculated in the Netherlands.

#### ◆ ***User charging (Tolling; Specific taxes related to the use of ITI)***

The introduction of new ways of taxation (specific road use related taxes) and/or user charging for the use of infrastructure, that would increase the total tax burden of users is seen as a detrimental by the port if it undermines the competitive position of the Port of Rotterdam vis-à-vis other competitive ports. However, taxation is considered less detrimental as it is usually easier to accept by port users than any direct charging. It is expressed that in any case port users will continue to take such charging aspects for the use of infrastructure into consideration when selecting the most optimal port of choice. On the benefit side from such funding schemes, it is acknowledged that incentives and penalties regimes for the use of ITI to influence user behavior must also be taken into consideration only if they will actually benefit the logistic process. The position of the Port of Rotterdam and the influence on the port by any road charging and pricing schemes would be tailored upon the exact chosen structure (roles and burden of all players in the funding scheme, level of charging, revenue expenditure, real positive effects on capacity, etc.). Congestion is the main problem identified by the port as a bottleneck in Dutch road capacity.

When tolling is concerned, an important aspect of the choice for this funding approach is the intended purpose of tolls and of the collected toll revenues. During the interview with a representative from the Directorate-General for Public Works specialized in PPP and project financing, it became clear that on average tolls in the Netherlands can generate approximately 25%-50% of the means supporting a project. This would mean that there are no projects that could be fully financed by toll income without any form of additional public funding such as grants or guarantees. This virtual impossibility to build a solid ITI business case solely based on tolls is also valid for projects outside the Netherlands. One exception would be if one has a virtual monopoly over a transport network in a densely populated area. Toll is therefore a useful tool for making

projects more payable and relieving the burden of public budgets, but are not a way to fully transfer the costs to users and to avoid public funding, as it is largely believed.

In the case of the Westerscheldetunnel (one of the two privately tolled tunnels in the Netherlands without counting shadow tolls), the preceding alternative mode of transportation was a ferry. The savings for the maintenance of the ferry were included in the budget for the construction of the Westerscheldetunnel. This facilitated the building of a robust business case that secondly included also user tolls. However, in the Netherlands by law tolls can be imposed only on new infrastructure as a way of funding and not on existing infrastructure.

The two shadow tolls in the Netherlands - Noordtunnel and Wijkertunnel were procured in a time when construction risk for ITI was borne by the public sector. Since then however the prospects of mobility changed and levels of mobility increased significantly and it was determined that there could be no limit to (shadow) toll revenues. This was an investment opportunity for the owners.

In terms of ownership of transport infrastructure such as tunnels, it was pointed that a distinction must be made between economic ownership and legal ownership of ITI. In any case when there is a mortgage, concessionaires do possess economic ownership during the life of the concession. The combination of economic and legal ownership represents full ownership of infrastructure which for ITI is rarely being given to private parties.

In the conversation with the Research Institute for Mobility Policy it was expressed that road pricing remains at present a sensitive matter and that it has been completely abandoned as a political topic by the current government. Therefore there is currently no research performed on the effects of road charging on mobility. In terms of railway charges, their main goal is to cover the operational costs of railway infrastructure, as fixed costs are too high. Tolling in general is part of the MIRT analysis, as is private financing although the results rarely show it as a feasible option.

There are however 3 projects in the pipeline (including PPP) for which the possibility for tolling is being investigated. One of the main issues with tolling in the Netherlands is that it is a very politically controversial subject. Secondly, toll revenue is not enough to cover the costs of an entire project and in the Netherlands there are many other good free (for the user) alternatives of funding. Moreover, it is very difficult to find a stand-alone piece of network to impose toll on. Public tolls (as opposed to private) have not been considered in the Netherlands for the same reasons. The current way of funding of PPP projects through a governmental subsidy is considered appropriate and successful. The subsidies to pay the private sector come from the MIRT (new projects) together with the budget for the existing maintenance projects. Fees to the private sector are being paid periodically from these subsidies.

Railway charges for the use of infrastructure in the Netherlands once more were discussed and there is a lack of clarity about the costs they are meant to cover. Prorail gets a budget for the maintenance of infrastructure and it is believed that there is no clear link between the received budget for maintenance and the separate income stream that comes from train charges.

#### ◆ **Donor government**

The TEN-Ts funding for ITI is a real option for ITI projects that concern the port, including the Calandspoorbrug alternative track. However, the European application procedures are complex and very time consuming. The EU funding is perceived as very bureaucratic, slow and not

unimportantly - costly. The TEN-T funding represents a certain percentage of the total project funding and this percentage depends on the type of transport network, the number of bottlenecks that could be solved, the number of European member states benefiting from it, etc. It is vital for the Port of Rotterdam that the cost-benefit relation from the administration of such a funding possibility remains positive after labor and other administration costs are taken into consideration.

During the conversation with Rijkswaterstaat it was expressed that funding from donor government is considered a viable and important option to consider, despite the heavy bureaucratic burden and tardiness of procedures.

The actual responsibility for TEN-T projects (administration and application) is left with the entities or local governmental institutions that have interest in a project funding from the EU. The Ministry of Finance does not have a direct role in donor funding although they have an advisory, consultancy and coordinating role with the main goal to assist Dutch entities in getting EU funding.

### ◆ ***Developer Contributions***

Arrangements between port authorities and their respective governments differ in different countries. In the case of German ports, the port of Hamburg for example has very heavy responsibilities towards the municipality of Hamburg in terms of its role in ITI maintenance. The Port of Rotterdam is currently responsible for all class B roads in the port while the Dutch government bears responsibility for the roads beyond the port area. The port is willing to invest in case the investments fit their scope and timing, but the basis of the port-governmental understanding as seen from the port point of view remains that road (and other) infrastructure beyond the port area remains state responsibility. Direct contributions from the port and from port users are also seen as an additional burden, as the tax burden for companies is already considered heavy. Therefore such type of legislation might harm the competitive position of the Port of Rotterdam vis-à-vis other ports.

Port contributions for ITI development in the Netherlands have been considered for the NWO project - Nieuwe Westelijke Oeververbinding or also known as de Nieuwe Waterweg and for the Calandspoorbrug. Discussions between the Ministry of Infrastructure and Environment, the Ministry of Finance and the port are taking place to establish if there are ITI projects for which the government does not have enough available budget and where there is a "clear" (to be investigated) policy gain for the port. The state is very open to consider budget from the Port of Rotterdam but the Dutch state is also a shareholder of the port and as such is looking at possible development contributions from the shareholder perspective (decreasing dividends). But subsidies from the port for ITI projects are an option if a trade-off of a sort takes place based on the business case - for example increased revenues.

In the case of Maasvlakte 2, the business case of the project is supported by funding from area development. The port in the role of land developer develops the area and rents it out to tenants. Part of the investment comes from equity and the rest must stem from project financing, including land development. Public funding is added if some parts of the project are considered unprofitable for project financing.

The Sijtwende project is an ITI project that combines ITI development (road and 3 tunnels) and development of real estate along the road. The responsible municipality at the time Voorburg did

not approve of the sole construction of a new road (N14) and it was agreed that parts of the road would be constructed under tunnels. The means from land development were included in the budget for the project in order to cover (to a certain extent) the increased costs from the construction of additional tunnels. This is an example of ITI investment where contributions from land developments are necessitated to relieve the financial burden of ITI procurement. Likewise, development contributions from business areas are required if the access to a new road is going to generate profits for the owner of the development area.

The Zuidas Amsterdam project (ZuidasDok) is a challenging ITI development project that involves road, rail and land development all together in a small area of 1 km in total. It involves expanding the Amsterdam Zuid public transport terminal, widening the A10 motorway and changing a section of the A10 underground. All elements combined it makes a unique project for which at present the possibility and the level of private sector involvement is being investigated.

The inclusion of land development as part of ITI developments is increasing. The MIRT approval system except for infrastructure and transport also stands for space development projects. The practice shows that such an integrated approach is becoming more common. However, the economic crisis has left its negative mark on the land development and real estate market. Viable business cases are missing. Therefore it is difficult to observe the incorporation of land development to ITI projects simply because land development is dormant. This is observed even in the Zuidas project where real estate prices and potential revenues are high, but money from land development and real estate for road development is still difficult to obtain. At present the current ITI projects are mainly relying on subsidies from the Ministry of Infrastructure and the money from land development is considered a bonus.

#### ◆ ***The Port Authority as possible investor in ITI***

The Dutch state is one of the shareholders of the Port of Rotterdam and as such is involved in investment decisions of the port. As a shareholder the state is assessing investment decisions through business models but is also considering the benefits for the tax payer, trying to optimize value for money.

In the case of Calandspoorbrug, the project has been identified as a possible TEN-T project. Although the calculations are very complex, it is expected that approximately 20% of the budget could come from European funding, the rest from the Dutch government and the Port of Rotterdam itself. This is the first project in which the Port of Rotterdam co-invests together with the Dutch government on a specific track which according to the port is not pure port responsibility. The only reason for this new role of the port authority as investor in ITI is that the port authority can construct its own business case for this project with specific conditions and benefits favoring exclusively the port. The Port of Rotterdam has identified that in the Calandspoorbrug project significant waiting times for vessels can be saved and the area in the vicinity of the bridge can be developed as a complete seaport. In this scenario the port expects increase in revenue from rent and port dues. Therefore the port is ready to co-invest only if its conditions (especially geographical positioning) for the construction of the track are met.

The answer to the question if the port authority could theoretically be an investor in ITI was comprised out of 2 sub-questions concerning the financial capability and the managerial culture in



the port. The answer to the question if the port has the financial capability to invest in ITI projects beyond the port area was positive – the port has a free cash flow of approximately €200-250 million in an year that could be used for investment purposes. The corporate culture factor however is not so straight-forward as the willingness to invest in ITI projects would depend on strict conditions – a distinct and direct benefit for the port from the investment. With the exception of the Calandspoorbrug, it is very difficult in practice to calculate the direct benefits for the port from a public ITI development project, as the character of such benefits is mostly indirect. Therefore, most ITI are still strongly considered a responsibility of the Dutch government and the port usually assumes a consulting role in identifying and assessing projects. The scope of the Port of Rotterdam was another argument put forward as a limitation to the potential investor role. The main function of the port, its main competences and capabilities are being a port authority and any bigger involvement beyond the port perimeter and beyond the landlord role (such as road concessions for example) would be too much out of scope. However, possible activities in line with these core competences are not excluded.

The same expectation was expressed when the question about a possible investment role in ITI of the terminal operating company ECT was addressed. Although some terminal operating companies worldwide have participated in various transport hinterland investments, it is expected that ECT would keep close to its core business.

As pointed in the conversation with the Research Institute for Mobility Policy, the national government assumes responsibility only for the main transport networks. The networks inside the port remain an issue of the port and its respective municipality.

#### ◆ ***Institutional investors and private financing***

Traditionally PPPs in the Netherlands have been financed by banks (the debt part). Although a new phenomenon in the Netherlands, there are already some examples of institutional financing in ITI in the country – examples mentioned by Bollen (2013) are the road works on N33 with investments by pension fund APG and the joint venture between BAM en PGGM. It was expressed that institutional investors such as pension funds and insurance companies are interested in assets whose contractual life can bear the financing. Therefore contractual factors such as early termination are of big importance and how governments regulate that in ITI investment projects might be a decisive factor for them to invest.

The double expansion of the N33 between Assen and Zuidbroek (provinces Groningen and Drenthe) involves the two biggest pension funds in the Netherlands. This project is an example of debt financing. APG is the fund manager of ABP pension fund that invests about 80 million in N33. The second fund participating in the financing is “Zorg en Welzijn”. Together, their financing share amounts to €130 million. The form of PPP chosen for this construction is DBFM and the project is currently in its tendering phase, with expected completion in 2015. According to Het Financiële Dagblad (2013) this is the first time in the Netherlands that a pension fund puts money in this way into infrastructure. Interesting in the project is that the government has provided a special compensation clause – an adjustment for inflation on the loans, in return for slightly lower interest rates. This provision is of big importance for pension funds as their aim is to maintain in time the value of their capital.

BAM PPP PGGM Infrastructure Coöperatie U.A. is the 50/50 joint venture between the construction and developer company BAM Group (experienced in PPP concessions) and the cooperative pension fund manager PGGM. In new infrastructure projects the investment responsibility will be divided 50/50 between the partners. In existing projects the biggest part of the investments will come from PGGM (PGGM, 2013). The joint venture invests in the equity of infrastructure and is an example of the equity side of a financing. Large part of the BAM portfolio has been transferred to the new joint entity whose focus will be PPPs in social and transport infrastructure in the Netherlands, Belgium, the United Kingdom, Ireland, Germany and Switzerland.

As every financing scheme is comprised out of two elements – equity and debt, one can determine the stability of a business case based on the mix. When a business case is robust, the financing is comprised of the two elements. If a business case is less robust then more equity is needed to complete the financing.

Institutional investor's involvement in ITI has been also discussed with a representative from the Ministry of Finance. At the end of 2010, in a progress report about the advice of Committee Ruding, it has been reported that institutional investors are quite hesitant. One of the reasons for this wavering was the expected returns for investors which were considered at the time too low. The situation is in any case constantly changing because institutional investors are faced with impossibility to invest in state government bonds and in South-European countries (higher risks) and are looking for new opportunities.

In terms of railways, there are no privately financed railway projects in the Netherlands. Institutional investors would aim at satisfying returns on their investments and these are not deemed to be high in the railway sector. On the debt side of financing it must be mentioned that institutional investors do not yet have the expertise to actually assess a project and get involved. Ideally institutional investors would like to invest money as they would if they buy government bonds, without getting involved in the actual project as banks do (time and budget monitoring). That would be true not only in the Netherlands but worldwide.

The introduction of Basil 3 (new capital requirement for banks) meant that banks have to match their risks better – if they lend long-term, a long-term match in assets is a must. Long-term loans are of course much riskier and less easily manageable than short-term lending because in 25-30 years time a lot can happen. This requirement led to the reluctance of banks to lend long-term and to the introduction of institutional investors as a crucial player for ITI investments. Pension funds from Europe (Germany, France, the Netherlands) have become increasingly active in the last years in getting involved in project financing where they see an opportunity. An attractive sight of these projects is that they are quite stable after the construction phase is over, especially if it is the government that pays the viability fees (as it is the case in the Netherlands). If a government is credit worthy is also a factor in this regard. Another major interest for institutional investors in ITI is that they have long-term liabilities and are looking for long-term investment opportunities that can match these liabilities. ITI seems to be a perfect match for this requirement.

In terms of the debt or equity side of financing the question was asked if there is a political preference for the one or the other. Currently there is no big need for equity investments in ITI, as equity is not the big issue. Debt financing on the other hand offers some opportunities but with restrictions, as it was mentioned above. From a political point of view there is no preference for

banks or institutional investors when debt is concerned, as long as there is private financing which hopefully disciplines the projects. Private financing remains a lot more expensive than public borrowing. Therefore the higher price of private financing is accepted in return of the role that the private sector pays – disciplining the project (time and budget). And who plays that role is of lesser importance.

In order to attract more institutional investors, already some measures have been done. An inflation compensation clause has been offered to institutional investors on their loans. Moreover, the tender guidelines and the standard contracts of the government have been adjusted for institutional investors as previously such documents have been accommodating exclusively banks. This change had already been in place for the project A1-A6 where institutional investors were involved in two of the three consortia. In one of the consortia the big German insurance company Alliance was involved. In the second consortium there was institutional investors' involvement through a product from ING called Pebble - a platform which facilitates the funding of Greenfield project financing by institutional investors such as pension funds and insurance companies.

#### ◆ ***PPPs for road and rail projects***

The transaction costs of PPP projects were discussed. When PPP are not actively used and there is not enough built experience, it could be expected that the transaction costs of such contractual forms are high. Important cost generators are the used contracts and procurement methods. When use of PPPs is in its infant stage of development in a country, contracts would most probably not be standard, but heavily negotiated and customized. This brings high transaction costs (related to lawyers and other parties vital for the transaction), especially with the first PPP contracts in a certain environment. The presence of PPP experience in transaction procedures (from all parties concerned) does not necessarily guarantee low transaction costs if these PPPs are from a different sphere (different from the ITI procurement). Standard documentations, standard procurement methods, policies and law are vital for lowering the transaction costs. In the Netherlands European law on the matter has been translated and adopted for the Dutch PPP purposes.

Transferring of risks to the private party has often been requested as a prerogative in PPP, but this is only possible for the risks that can be influenced and managed by the private party up to a reasonable degree. Otherwise, pricing of risks would be too high.

The actual number of PPP projects in the Netherlands that reached the actual implementation stage remains low, although there are many projects currently going through the procedural "pipeline". The intensification of PPP projects in the Netherlands began approximately with the research implemented by Committee Ruding in 2008 that was requested by parliament (at the time by Mr. Rutte – the current prime minister in the Netherlands). PPP ITI projects do take 2-5 years to be completed and this could explain the big interest, but the low number of PPPs in the Netherlands. However, if there are many projects waiting for their implementation in the pipeline, it would be worthwhile for the private sector to invest time and effort to increase their knowledge and expertise in PPP transactions. Even if not all projects can be won, a regrouping of knowledge can lead to pay off in the future.

The most dominant form of PPP in the Netherlands remains the concession form DBFM, although creation of new entity by the public and the private sector does occur as in the case of the Waardse

Alliantie. The Waardse Alliantie was set up for the construction of a track section from the Betuweroute - Sliedrecht-Gorinchem. The result from this innovative form of cooperation between client and contractor is considered positive.

The explanation for the fact that in the Netherlands PPP equals DBFM is offered in the conversation with the representative from the Ministry of Finance. There is a wide range of PPP contractual forms but DBFM is considered the most integrated one for transport infrastructure investments. This choice was made approximately 10 years ago when PPP were first introduced in the Netherlands and with the main reason to prove that PPP can bring more value for money to a project. It was considered that the most integrated form must be chosen that does not leave much room for spin-offs. DBFMO in contrast to DBFM would mean that operation of the asset is also assumed by the private sector and that tolls would be imposed for funding of the construction of the asset. The DBFMO form has not been used for financing of road and railway in the Netherlands, only for building constructions. If it happens then the question would be who would take the risk for these tolls - the government (shadow tolls) or the private sector. It must be noted that the private sector is reluctant to take this risk because they do not want their income to be dependent on expected traffic.

The “competitive dialogue” procurement method is the most used method for PPP procurement in the Netherlands. As required by law this procurement method is chosen when the project has some complexity. The “negotiated procurement” on the other hand is applied when pricing (of the project or of the risks) is uncertain.

In terms of timing, PPP as a way of procurement of ITI takes longer in their preparation and procurement phase than traditional public financing. This is due to the bigger number of actors involved and the time needed to tune the interests of the different parties. The implementation of the project however (implementation phase of PPP) could take less construction time than by the traditional public approach. The average pluses and minuses of PPP versus traditional financing are compared in value for money instruments (PPC “public-private comparator” and PSC “public sector comparator”). Besides the timing, another obtained result by means of these instruments is the quality of a project, which is deemed higher by PPP. However, the cost of private financing is always higher than the cost of public financing.

In terms of costs it must be noted that when comparing PPP and traditional public financing, the final price tag is what must be compared and not the individual cost elements.

In terms of value for money, private investments score as a whole quite high. Until this moment all projects above a threshold of €60 million have scored very well compared to the benchmark where the government would do it themselves. On average they have achieved between 10-15% gains in value for money.

The first PPP project in the Netherlands was implemented in 2001 and was a high-speed rail link between Amsterdam and the Belgian border. The private party was a consortium called Infrasppeed and composed of the project company of Fluor Daniel, Koninklijke BAM/NBM, Siemens, Innisfree and Charterhouse. The contract was a 30-year long DBFM for the designing, building, financing and maintenance of the track. In terms of infrastructure this project was a success, but in terms of software (the interface between the hardware and the software in the trains and for the safety systems, the delivery of the trains, etc.) the project received a lot of negative publicity and in its

entirety was considered a failure. After this project there haven't been any PPP projects in the railway sector. After the report of the Committee Ruding however, the conversation with the manager of the railway infrastructure in the Netherlands Prorail and the Ministry of Infrastructure and Environment have been revived with the aim to renew PPP procurement for railway infrastructure projects. At present a couple of PPC scans are being performed for a number of railway projects to determine if PPP brings value for money. The contractual form of these PPPs is the DBFM. One of the main difficulties in PPP for railway projects (in contrast to road projects) is that there is already a very large existing network system (security and safety, train management, etc.) and it is difficult to "isolate" a piece of the railway network and to manage the interfaces of this piece and the rest of the rail network. Therefore the government is investigating a couple of stand-alone projects where there is very little interference with the existing railway system. If there is value for money in such PPP, DBFM will be implemented and if not the PPP form will not be used for railway projects.

### ◆ ***Railway freight transportation***

Currently the port is using the Betuweroute as a main rail freight transportation track to the hinterland via Germany. However, the Betuweroute is not the only route used and the port makes use of mixed railway tracks as well, such as the Brabantroute. The question of capacity redistribution in this case is an ongoing discussion with Prorail. The main interest of the port is the availability of rail capacity and that this capacity can be controlled in the most optimal way by the capacity manager (from a logistic optimization point of view). The discussions with Prorail are therefore of big importance and progress has been made. It is also important to consider the transportation of cargo as a part of the entire logistical chain and not as a separate modal choice. A common partnership approach with Prorail is seen as a big plus and achievement in the frame of the complex legislative structure interconnecting Keyrail, Prorail and the port.<sup>21</sup>

### ◆ ***Economic crisis effects on financing and funding of ITI***

The economic crisis has left its mark; that can be seen in the way long-term financing needs are met. When there is a necessity for long-term financing it becomes more difficult to obtain it via traditional sources, e.g. banks. Therefore new approaches are needed which can be discovered in the face of institutional investors (life insurance companies; pension funds) as natural partners for infrastructure.

Although the system of analysis of ITI has not changed since the beginning of the crisis, the selection of projects has become more rigid. A positive social cost-benefit analysis ratio is no longer a sufficient reason to execute a project. Political selection plays a significant role in meeting political goals as the number of projects is high while the available budget is limited.

Since the beginning of the crisis the development in the financial markets was closely monitored by the Ministry of Finance and an open dialogue was kept with the private sector. At the same time the policies and guidelines of the government are very robust and consistent and the private sector finds comfort in this stability (standard, reliable, predictable tender guidelines, contracts and risk

---

<sup>21</sup> What is meant by complex structure is that the Port of Rotterdam is one of the shareholders of Keyrail (the railway operator of the Betuweroute), as is Prorail. In the same time Prorail is a publicly owned organization under private law and the Dutch state is also one of the shareholders of the Port of Rotterdam.

distribution). This predictability and consistency of the policy is considered the main reason why the financial close of large deals (more than 1 billion, including the A12 and A15 projects) was successful during the peak of the financial crisis. That proves that the quality of the Dutch processes and projects provide comfort to the private sector as well, not only from the Netherlands but also from abroad.

#### ◆ *Future visions of ITI procurement*

The main view on the Port of Rotterdam about investments in ITI is that the current dominant regime of general taxation funding should remain and ITI should remain publicly funded. The port authority is willing to consider co-investments if they contribute positively to the business case of the port, including and mainly timing and scope. The generation of revenues from ITI investment initiatives is not a priority. The benefits in any case must be quantifiable and specific to the port.

During the interview with the representative of Rijkswaterstaat it was expressed that the government is not willing to accommodate BOOT schemes (Build-Own-Operate-Transfer) in which full ownership of the ITI is also assumed by the private party. Moreover, the importance of infrastructure is that of a backbone of an economy and without it one does not get the means to speed the economy. Therefore ITI needs governmental involvement. If this implies full ownership by the private or by the public sector, it remains to be investigated.

During the interview with the representative of the Research Institute for Mobility Policy it was expressed that BOOT schemes are not likely to occur in the Netherlands in the foreseeable future. However, it was acknowledged that in time this might change. Private involvement in ITI must be investigated as a possibility before national government funding is put on the table. Governmental funding is especially viable in the situation of possible traffic deviation to alternative roads (competition between roads). The main focus must be - private involvement first, if not - traditional budget funding.

During the interview with the representative of the Ministry of Finance it was expressed that BOOT schemes are possible in theory but in practice the legal ownership of ITI should always remain with the government. It is the government that has to provide safety and quality in infrastructure and this legal responsibility cannot be transferred to the private sector. Moreover, it is not believed that the private sector will be interested in such schemes as they are too risky. With PPPs economic ownership and responsibility is being transferred and that is something that can be well managed via contracts. The private sector has proven its worth for private financing of ITI projects when value for money is concerned. However, the gap between cheaper governmental borrowing and an increased number of risks by private sector involvement remains big. The main issue in the coming years will be the increasing difficulty for the private sector to provide higher value for money that will compensate for 4-5% higher financing costs. The government is looking for ways to reduce the amount of private financing and to increase the amount of public financing (governmental financing until now has been on average 20%). It is assumed that this will not discourage private sector participation.

## **VI. CROSS-EXAMINATION UNDER THE THEORETICAL FRAMEWORK**

This section comprises the cross-analysis of the research findings under the knowledge from the previously built theoretical framework. The examination in this section represents the basis for the answer of the main research question of this thesis and namely who should pay in the future for the inland transport infrastructure (road and rail) connecting the Port of Rotterdam to the mainland. While the previous section contained the objective findings collected during the interviews, this one combines the most valuable lessons learnt from both the examined literature and the practical information. The purpose of this section is not to bring new information into the topic of ITI procurement. It is also not to completely replace the previous sections, neither it is to fully repeat the things that have already been explored. Therefore details are not going to be included and for more clarity the reader is required to explore the previous sections. The purpose of this part is to look at the information from another perspective that will be final and will bring the research to its final conclusions. Conclusions and recommendations, limitations and propositions for further discussions will be presented at the end of this section.

### **1. On public-private mixes for infrastructure**

The possible public-private mixes proposed by Nijkamp & Rienstra (1995) are based on the two variables - operation and financing of ITI. According to the authors achieving more economic benefits for governments is to be found at the level of operation of ITI. They make a connection between operational profits and financing of ITI - the financing may be (partly) private if the operational profits allow it. The differentiation of public-private mixes for infrastructure based on operation and financing is a useful one when one wants to identify the level of burden for the public sector in variable operational costs or fixed infrastructure costs. The sector that could benefit the most from such a distinction is the railway sector as it becomes clear from the chapter on railway sector organization in this paper. In the railway sector vertical separation of infrastructure and operations is a far more central topic for efficiency improvements than in other sectors. It is also true that in practice the nature of funding of ITI (public, private) might require the same type of operation. However, the performed research shows that these scenarios are not the best way to explain the procurement in ITI in its entirety as they do not reflect the origin of the financial means for investments. The framework proposed by the Ruding Committee (2008) is much more practically oriented and explains quite well what is happening in practice. The two main determinants used are financing and funding of infrastructure and combined they offer the full picture of procurement of ITI.

When funding of ITI is concerned, whether public or private, the decision to bring the examination of procurement of ITI to the lowest level of actual payers appeared to be the right way to go. The classification of financial schemes by actual payers was proposed by Nikagawa et al. (1998) as a way to compare financing sources of infrastructure between different countries. The actual payers identified in this paper (see chapter II-3.2. Stakeholders and sources of financing) are the following four main groups - general tax payers, users of ITI, specific beneficiaries and specific businesses (such as land developers, ports, etc.) and donor government. The two determinants - financing and

funding and the actual payers give us the full picture of procurement of ITI. This allows us to build a framework that offers four main theoretical scenarios in which all actual ITI projects in the Netherlands can be positioned – figure 21.

The figure is divided into horizontal levels with the bottom level being the level of actual payers, a level that comprises individuals and economic entities at national level. The fourth actual payer – donor government – is positioned at the supranational level above, as it stems from various transport funds from the European Union (including TEN-Ts). This is the only actual payer that is also an investment body at the same time. The framework does not make a distinction between different governmental levels as it would become significantly more complicated to represent it graphically. Moreover, differentiating taxation according to governmental levels is not the main focus of this research (for this you can see for example Nikagawa et al., 1998). The public sector (all governmental levels) and the transport network owners/operators from the private sector represent the investment bodies at national level that operate the collected funds from actual payers. The means of raising funds (identified in this paper in chapter II-3.2. Stakeholders and sources of financing) represent the second lowest horizontal level. The four possible public-private mixes of financing and funding of infrastructure are presented in the graph above and each quadrant contains an investment scenario mix.

The arrows represent flows of funds. The *black* arrows show the direction of collecting financial means for both financing and funding schemes. Not all actual payers have to contribute to the funding and the financing of a certain project, but because this is a theoretical framework, the aim is to reflect all possible scenarios and not only those happening in the Netherlands. The arrows coming from the investment bodies are two types: *orange* – representing the initial financing needed for investing in a project and *blue* – representing the funding or in other words how the means for the financing are collected and who the actual payer is. The practice shows that the funds coming from the donor government are usually additional to projects and are never the main source of funding (an example is the Betuweroute where funding from TEN-Ts represented a small part of the entire value of the project). Therefore the donor flows are represented with an *interrupted* arrow that shows that donor funding could potentially be an additional source for ITI projects. The numbers on the arrows allow to trace the flows from the actual payer level to the final project procurement. The four elements of projects (public or private financing and public or private funding) will be analyzed under the theoretical framework and the research findings in more detail in the following chapters.



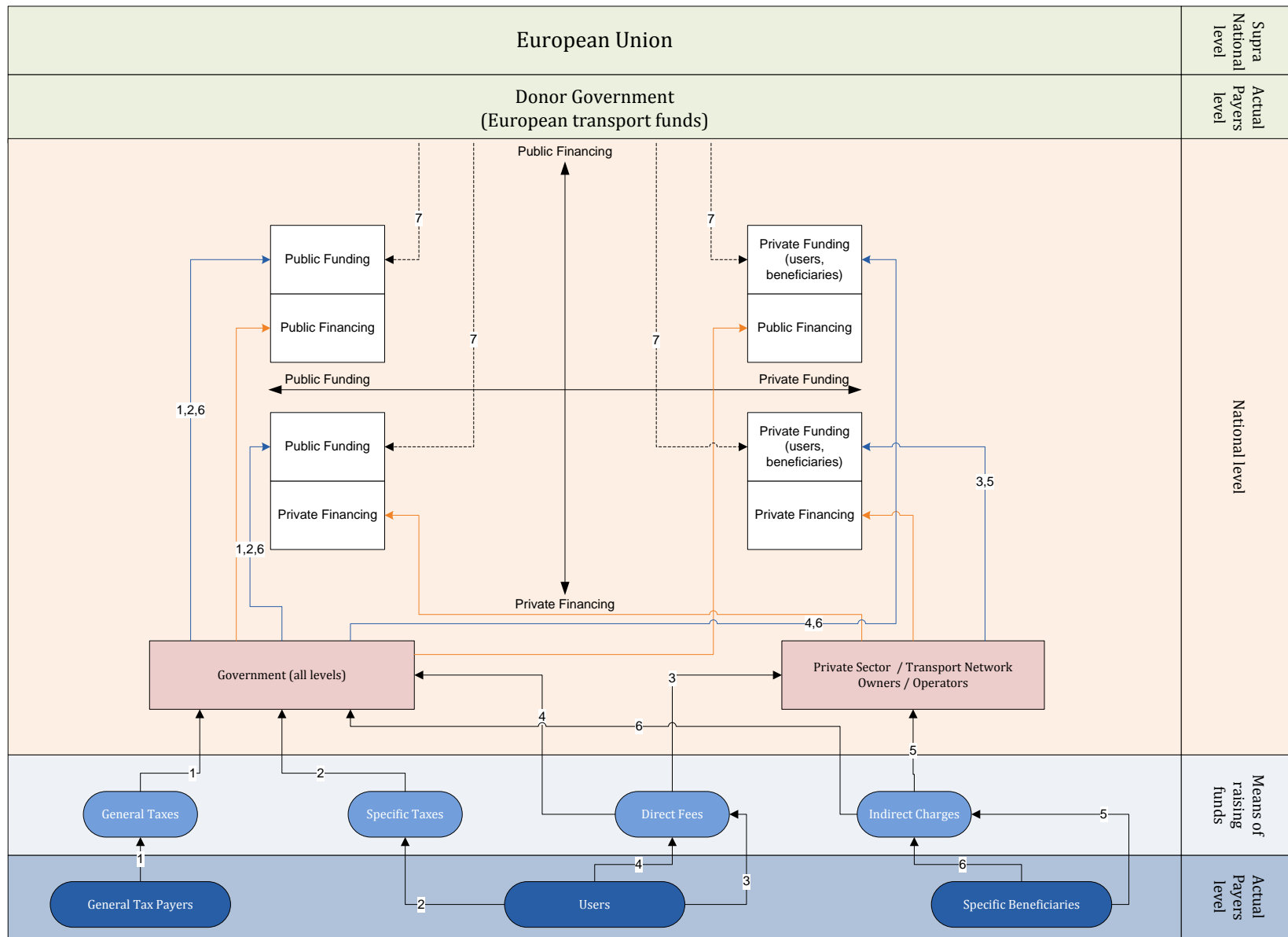


FIGURE 21: POSSIBLE MIXES OF FINANCING AND FUNDING OF INLAND TRANSPORT INFRASTRUCTURE AND SOURCES OF FINANCING, SOURCE: AUTHOR

As already mentioned, all possible and actual ITI projects in the Netherlands can be positioned in this framework. To illustrate this, in figure 22 some practical examples are positioned in the quadrant that actually corresponds to the mix of the project.

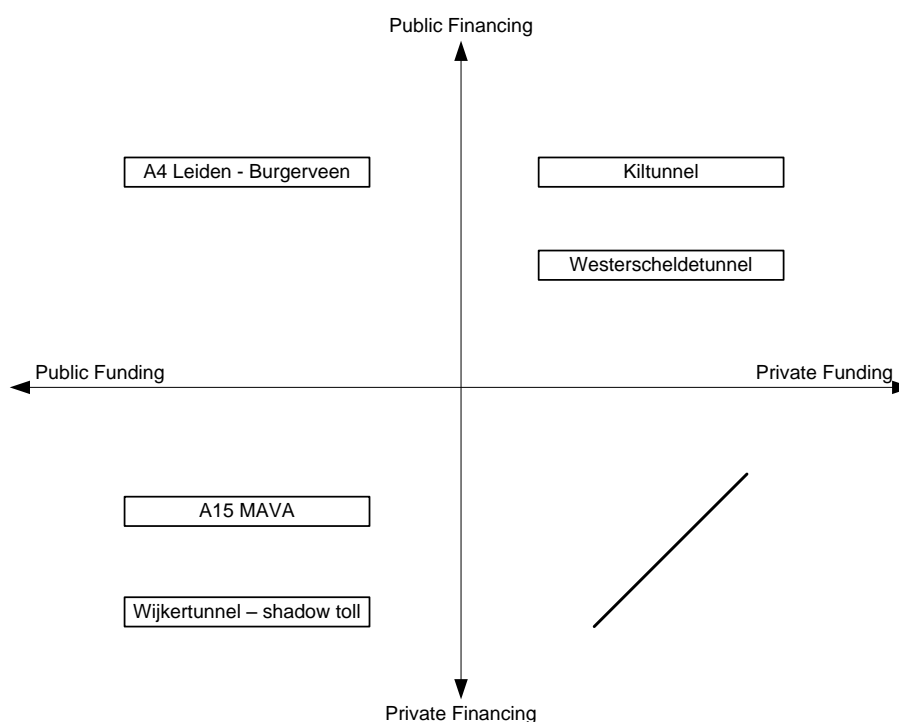


FIGURE 22: PRACTICAL EXAMPLES OF ITI PROJECTS IN THE NETHERLANDS CLASSIFIED BASED ON FINANCING AND FUNDING, SOURCE: AUTHOR

Public financing with public funding scenario represents the majority of ITI projects currently in the Netherlands. A typical example is the construction of highway A4 Leiden-Burgerveen with public money and funding by taxation. These types of projects are usually called “classic” or “classic approach”.

Public financing with private funding is present when it is considered that the public funding alone cannot cover completely the costs of a project. Examples are the only two privately tolled tunnels in the Netherlands - Westerscheldetunnel and Kiltunnel. The private funding in this case refers to funding through private exploitation of the network - when private users have to pay a toll to use the specific infrastructure and when other private beneficiaries (such as land developers that could also include ports for example) also have to pay contributions through indirect charges. Private funding cannot cover completely the costs of an infrastructure as it will be seen later in the paper and such projects usually are mix of private and public funding.

Private financing with public funding is the dominant form of PPPs in the Netherlands - DBFM. Example is the famous A15 MaVa project (Maasvlakte-Vaanplein) where the financing comes from the private sector but the operation of the network is public and the funding (the fees paid to the private sector) still stems from public sources. A second example is the Wijkertunnel on which shadow tolls are imposed (as opposed to private tolls). In this case the private financiers are compensated with fees from the government under the form of tolls (per vehicle passage). The sources of these tolls are public (taxation and eventually specific beneficiaries contributions) and this is why the project must be positioned in the public funding quadrant. Private financing with

public operation of the network is the situation for which Nijkamp & Rienstra (1995) state that it is unsure if one can speak of significant private participation in ITI because the private sector does not bear enough risk and there are no private tolls imposed. In such projects the government usually also guarantees debts which even more reduces the risk for the private sector.

Examples of private financing with private funding do not exist currently in the Netherlands. This is the situation where the private sector exploits the infrastructure. The private sector finances the project and recovers the costs through private funding (tolls paid by private users of the specific infrastructure and other private beneficiaries).

It must be noted that although this framework is quite comprehensive for ITI projects, it is not perfect. It does not reflect the possibility for donor funding of a project from TEN-Ts and also the various mixes of private and public funding as in the case of the Westerscheldetunnel. In practice ITI projects are very complex and can be positioned everywhere in this graph and can represent a ray of mixes. For example a project can be partially privately financed and the rest can come from various governmental subsidies (stemming from various actual payers). On the funding side - this same project can be publicly funded by taxation and privately funded through tolls. Last but not least this same project might be also partially funded by the TEN-T program.

## **2. Public financing**

Public financing of ITI remains the most common approach used to this day in the Netherlands and many other countries and the main reason for governments to look further for other options. The problem comes mainly when significant levels of means of financing need to be invested at once as the government finds it increasingly difficult to meet infrastructure needs with the available budget. In this regard the opinions expressed in the literature about the increasing difficulties to meet infrastructure needs with public financing are indeed confirmed.

The research also shows that there is a perceived (at port and governmental level) underinvestment in infrastructure, under the current financing regime. Many already evaluated projects that get positive social cost-benefit analysis cannot be realized because of lack of investments and there is an observed difference in the budget availability for investments in ITI at present as opposed to previous years. On another note it was also recognized that construction of new road infrastructure, disregarding the nature of financing, can create some leverage in capacity only in the short-run, for mobility levels to increase again short after.

Although it is suggested in the theory that by public financing the road and the rail sector might compete with each other and with other sectors (such as health and education) for budget allocation, this cannot be clearly seen in practice. The research findings show that all new ITI projects (road and rail included) are being passed through and rigorously assessed in the planning scheme for space, infrastructure and transport - MIRT. For publicly financed projects at the second step of the MIRT the "Market scan" and the PPC tools are used and the goal of the MIRT is to objectively estimate the value of any investment. Therefore the type of transport mode and the public or private nature of an investment are not the driving motivations for project implementation. Value for money is. The actual implementation of already evaluated ITI projects however involves a level of political decision making. The budget expenditure of the Ministry of

Infrastructure and Environment is in their own hands but there is no specific rule for the amount of budget to be granted to the ministry in a given year. This amount is determined based on the value of new projects listed in the MIRT together with maintenance projects that are not part of the MIRT. Possible competition with other public sectors for public money therefore cannot be completely excluded.

The risk of abandoning ITI projects that are to be financed through the budget exists in practice, but so does the risk of abandoning privately financed projects and it cannot be concluded if one is bigger than the other. The risk of cancellation of publicly financed projects lies at three different levels: at the level of the government in case of lack of funding; again at the level of the government in case of change of political intentions or atmosphere and at the level of the contracting company in case of incapability to execute (bankruptcy for example). By private financing on the other hand, with the introduction of concessionaires, more stakeholders are introduced into the scheme and in this way the number of potential sources of risk increases. Moreover, risks do not disappear, but simply the types of risk change.

Whether the financing remains public or becomes partially or completely private, all interviewees pointed that BOO (Build-Own-Operate) or BOOT (Build-Own-Operate-Transfer) schemes as in some countries, where also ownership of infrastructure is assumed by the private sector are not viable option for the Netherlands. Legal ownership is strongly believed to be a responsibility of the government in order to provide ultimate safety and quality of infrastructure. Moreover, it is believed that the private sector would not want to bear such a high risk.

It must be noted however that the research findings point that public financing is not likely to be completely replaced by private financing. It remains a fact that the government can borrow at lower cost than the private sector and this gap is deemed significant. The private sector has proven worthy for ITI financing schemes until now when value for money is concerned. But the coming challenge for the private sector will be to provide higher value for money that will compensate for 4-5% higher financing costs. Therefore the government is not only investigating the possibilities for private financing, but is also looking for ways to increase the amount of public financing above the current share of 20%. In other words, full dependence on private financing is not very probable.

For the railway sector, the public financing has been the only approach until now in the Netherlands with one exception – the first PPP project in the Netherlands in 2001. The “Infraspeed” DBFM rail project got significant negative publicity and in its entirety was considered a failure. PPC scans are being currently performed for a couple of railway projects to determine if PPP would bring value for money. These projects are somewhat stand-alone (with little interference from the existing railway network) that makes it easier to consider private financing for them. Although in theory private financing for railway projects is possible, it remains to be seen if this is applicable in practice.

The economic crisis effect on financing approaches has been one of finding new ways to secure long-term borrowing and this is where private financing offers better opportunities. These will be explored next.

### **3. Private financing**

Although the report of Ruding Committee (2008) was finished before the beginning of the economic crisis in the end of 2008, it appears to have come just in time to reflect the needs for private involvement in ITI that would emerge due to the financial downturn. The implemented research shows that the main recommendations of this report have been taken into consideration by the current government and according to the 2010 progress paper 80% of the recommendations have been applied. However, a possible reason for the remaining lagging 20% might be the used formulations and the lack of specificity in the report about practical execution of the advice. The difficult points to implement have been these related to more involvement of institutional investors in the financing of ITI, the reason being that institutional investors themselves are being quite hesitant to take part. The Ministry of Finance is at present putting the emphasis on private sector participation in ITI that goes beyond just servicing and includes financing as well. The budgets however have not changed and there are no big changes observed in terms of policy orientation. In order to stimulate institutional investors, the government is relying on:

- General measures - governmental tender guidelines and standard contracts have been adjusted specially to reflect the needs of institutional investors.
- Specific measures on contracts - for example, the inflation compensation clause has been offered by the Dutch government for loans from institutional investors. How “early termination” of contracts is regulated can have an influence as well.
- General credit stability and constancy of the public sector policies - the Dutch policies and guidelines related to ITI procurement are considered very robust, predictable and consistent by the private sector (domestic and foreign), including institutional investors. They find comfort in this stability. Credit stability of the government is a must.

These and more similar measures can be crucial for the financial involvement of institutional investors in ITI projects. As this is a new phenomenon and scientific literature on the matter is scarce to non-existing, one can only compare the motivations of parties for such involvement from different countries that have more experience. Foreign articles (Robertson & Horsman 2005; Euromoney Institutional Investor PLC 2006; Inderst 2010; Stanley 2011, Della Croce 2011) stipulate that institutional investors such as pension funds or insurance companies are interested in assets whose contractual life can bear the long-term financing. The research findings confirm this and infrastructure seems to be a natural match for institutional financing. Infrastructure offers long-term investment opportunities that match the long-term liabilities of institutional investors. Moreover, in terms of risks, DBFM projects become quite stable after the construction phase is implemented and especially if it is the government that pays viability fees, as it is in the Netherlands. Last but not least, institutional investors see fewer opportunities to invest in government bonds abroad (South-European countries) and redirect themselves to other countries, including the Netherlands.

Institutional financing can take two forms: debt financing and equity investment. The years after 2012 will bring a change in this regard for the Netherlands because there are already two new examples of institutional investors in the country, involved in infrastructure through PPPs. The first example is of debt financing - ABP and “Zorg en Welzijn” investing €130 million through a PPP DBFM project in road N33. The second example is equity investment - the joint-venture between construction company BAM and pension fund PGGM that invests in the equity of infrastructure

through PPPs. There are also other examples of institutional investors' involvement in the tendering phase of projects, although they did not win the tender. In the railway sector however, the situation is not so optimistic for private financing. Currently there are no privately financed railway projects in the Netherlands (neither through banks, nor through institutional investors). Institutional investors do not find the returns on investments attractive in this sector. In terms of equity investments, there is a lack of expertise in projects and lack of desire to get actually involved in projects beyond the investor role.

The research shows that equity investment is not the big issue at present, but long-term debt financing. The new capital requirement Basil 3 for banks put a strain on long-term bank financing and institutional debt financing seems now more crucial than ever. Whether bank or institutional financing, private financing remains more expensive than public financing. The reason why the Dutch government is accepting this higher price is the disciplining role of the private sector in terms of time and budget. Therefore private financing alone is not the ultimate goal, but the actual involvement of the private sector in ITI and the benefits from it. This "actual" involvement can only happen through PPPs.

The most common form of PPP used in the Netherlands and the form through which institutional investors can finance infrastructure is the concession form DBFM (Design-Build-Finance-Maintain). Creation of a new entity by the public and the private sector as formulated in the Green Paper of the Commission (2004) is much more rarely observed but does occur as in the case of the Waardse Alliantie. DBFM is preferred for its integrated form and has been strategically chosen for the introduction of PPPs in the Netherlands. Since then this has not changed. DBFMO (Design-Build-Finance-Maintain-Operate) has not been used in the transport sector and the reason for this might be found in the funding regime of such a scheme and the reluctance of the government to implement tolling. This will be explained in subchapter 5 about private funding in more detail.

An issue related to PPPs and expressed in literature is the higher transaction costs of such contractual forms. The general view is that the contractual form of PPP might be much more expensive than traditional public procurement due to its high transaction costs (see for example Soliño & De Santos, 2010). The research findings confirm this view. Firstly, this is explained with the young age of PPPs in the Netherlands. PPPs are still in their infancy and there is a lack of experience not only with contracts, but also with procurement methods, related policies and laws. Standardization of contracts is missing and the heavy contractual negotiation and customization brings with itself high transaction costs. Secondly, the most actively used procurement method in the Netherlands is the "competitive dialogue". This is a new approach that comes of use when the public party is not able to assess the technical, financial of legal requirements for the successful completion of a project (or in other words when there is a complexity associated with the project). All aspects of the project are discussed with the private sector candidates before the submission of the tenders. Although this is not the most expensive procurement method ("negotiated procurement" is), it is also not the cheapest. The procurement method is a focal point in the tendering stage of a project and according to Soliño & De Santos (2010) there is a room for shift of the costs exactly at this stage of a project. Their findings show that the "open tender" procurement method offers much room for cost savings that could amount to 7% of the capital value of a medium road project. Moreover, the "open tender" method enhances competition. However, the vital requirement for this procurement is that the public authority has a clear picture of its

objectives and the means to achieve the desired outcome. This brings us back to the question of practical experience with PPPs in the Netherlands. The expressed view that PPPs offer considerable benefits that in turn might lead to significant savings (in time and money) during the entire life span of the project is also confirmed. The research findings point out that when comparing PPP and traditional public financing, the final price tag is what must be compared and not the individual cost elements. The same is true for the time considerations of a project – while the procurement phase of PPP might take longer than the public approach, the construction of the project and the implementation as a whole could lead to significant time savings by PPP.

Although the first PPP project in the Netherlands was implemented in 2001 and the interest in this contractual form is big, the practice shows that the number of PPP projects that reached the actual implementation phase is still quite low. This confirms the view expressed by Koppenjan (2005). However, there is not enough evidence from the research findings to confirm the two main patterns formulated by Koppenjan that according to him lead to unsuccessful PPPs in the Netherlands (too ambitious projects with active private involvement or hesitant and risk-avoiding behaviour). The research findings point out that there are a lot of projects currently going through the “pipeline” and this together with the long time span (2-5 years) of PPPs might explain the low number of completed projects. This “slow” realization and the vast “pipeline” with projects however is a good opportunity for private companies to invest time and effort in order to expand their expertise in PPPs. This in turn could help resolving the issue of “infancy” of PPPs. Regrouping of knowledge (from both won and lost projects) can lead to pay-off in the future.

Value for money for PPP projects is examined through the instruments PPC and PSC in the MIRT. Considering that on average these projects have scored between 10-15% gains in value for money compared to the traditional public approach, it is easy to see how PPPs are becoming the form of the future and “the” way private financing in ITI will be achieved.

#### **4. Public funding**

The public sources of funding of infrastructure discussed during the thesis research were funding from the TEN-Ts of the European Union, general taxation (income, corporate and other general taxes) and specific taxes at the level of users of specific infrastructure (such as vehicle ownership and acquisition taxes, fuel excise duties, etc.). The two types of taxation form the total tax stream that is used in the Netherlands for the funding and financing of new transport infrastructures and the maintenance of existing ones. Developers contributions or specific businesses contributions can also be a potential source for public funding, but also for private funding and will be examined in the next subchapter. Just like with public financing, public funding remains to this day the main approach used in the Netherlands for most ITI projects.

From the research findings it became clear that except more market involvement in ITI procurement, another direction of change is emerging - more power is being given to local governments in the Netherlands as opposed to the national government. It is perceived that local governmental levels might have a better idea about the investment needs at local level and respectively the allocation of their budgets. Some of the authors that investigate the problems that arise when there is tax imposing competition between different levels of governments are Proost et al. (2007). Their findings cover also vertical competition between governmental levels - taxation or

subsidizing the users of the same ITI. This scenario is potentially problematic in the situation when local governments are required to fund ITI themselves, while in the same time national government imposes a high national user tax (such as fuel tax for example). This double-weight on the shoulders of users of ITI results in overcharging. One of the solutions of this problem is revenue sharing and redistributing between different levels of government. However, there is not enough data collected from the research to support or defend the thesis that such vertical competition is actually a problem in the Netherlands. During the interviews it was expressed that decisions about big ITI will remain the responsibility of the national government while smaller projects and investment decisions will be given to local governments.

General budgets allocation for ITI can happen through general funds or through dedicated road funds. Some benefits and disadvantages of having such a dedicated road fund have already been discussed in this paper (also by Nakagawa et al., 1998). With the Law on the Reform of Road Management introduced in the Netherlands in 1993, a shift was made from specific road funding (a road fund dedicated for road investments and maintenance) to general funding (municipality and provincial road funds) (see Jaarsma & Van Dijk, 2002). Currently there is an infrastructure fund at the level of the Ministry of Infrastructure and Environment that runs until 2028 and that covers not only road but also railway and waterway ITI. The budget for this fund is determined every year. The research findings show that this approach allows for better long-term planning of expenditure and prioritizing of future projects. The large horizon of the fund (2028) allows for diverse multiple future projects to be taken into consideration. Usually a budget has a life of one year before expiry, but the infrastructure fund of the Netherlands allows for the money to be transferred for next years and as a consequence - avoiding sporadic expenditure. The consistency, the reliability and the possibility to look into the future (coming projects) through such a fund are considered beneficial for market involvement in ITI.

Earmarking of revenues from user charging is a supported view in literature as already previously examined in this thesis. This was also an essential factor for the acceptance of user charging in the Netherlands (see chapter IV-1. The Dutch Road dilemma). As user charging and tolling fall under the private funding category, it will be not discussed here. However, it appeared only logical to investigate the current governmental position on earmarking of specific user taxes for ITI procurement and maintenance. The research findings show that earmarking of revenues (whether from general or specific user taxes) is not favored by finance ministers. The reason is the nature of the Dutch budgetary system that stands for clear separation between the income and the outcome streams of cash-flows. This allows for free and unburdened spending and again avoidance of sporadic expenditure (if a tax income arises this should not per se result in tax spending).

The benefits of public funding through specific user taxes versus private funding through direct user charges (tolls) has been explored by Ragazzi (2005). According to him there is a very limited number of situations in which tolls are justifiable vis-à-vis specific user taxes. In his research an important determinant is the calculation of deadweight cost of taxation weighted against the cost of collecting tolls. Moreover, the calculation of deadweight cost of taxation as a part of the public involvement in infrastructure has been explored in chapter II-3.4. Public involvement in infrastructure. The research findings show that such calculations are currently not being performed in the Netherlands. A possible reason is their complexity. The lack of such research makes it impossible to compare the cost of taxation versus the cost of tolling in practice and to use the



information in the choice for public or private funding. The research findings point out however that the introduction of new ways of taxation for the use of infrastructure is perceived as less detrimental because it is usually easier to accept by port users than any direct charging. In any case port users will continue to take such charging aspects into consideration when selecting the most optimal port of choice.

The only two cases of shadow tolls in the Netherlands are the Wijkertunnel and the Noordtunnel. As expressed earlier, shadow tolls in fact represent a public funding as the tolls are not paid by the users of infrastructure but by the government to compensate private financiers. This is the situation for which Nijkamp & Rienstra (1995) state that it is unsure if one can speak of significant private participation in ITI because the private sector does not bear enough risk and there are no private tolls imposed. Shadow tolls here actually represent a sort of funding for reimbursing “hidden” governmental borrowing. The implemented research shows that these tunnels were procured in a time when construction risk was borne ultimately and solely by the public sector. Since then mobility levels have changed significantly and this offers significant investment opportunities for the private sector (increased revenues from increased mobility). Therefore if shadow tolling is a viable opportunity for the future remains to be seen.

Donor government funding from the European Union (TEN-Ts) is identified as a real option for Dutch cross-border ITI projects. Such a funding is considered complementary and an opportunity that must not be left unexplored. However, such projects have to be investigated and assessed individually and it is very difficult to come with a general rule for the majority of them because of their diversity, complexity and the high number of interested parties involved. From the explored case of the Betuweroute it becomes clear that no big percentage of the project’s budget has to come from TEN-T funding for this project to be listed in the TEN-T program. Whatever the percentage of contribution, European application procedures remain very heavily bureaucratic, slow and costly. For the Port of Rotterdam (and it is believed also for other interested entities) it is of vital importance that the cost-benefit relation from the administration of such a funding remains positive.

## **5. Private funding (by private users of the ITI and other private beneficiaries)**

The private sources of funding discussed during the thesis research were funding from the use of infrastructure by private users (tolls) or from experiencing private benefits from infrastructure (specific beneficiaries contributions). Tolls for the use of infrastructure are a rare event in the Netherlands as there are only two tolled tunnels that are publicly financed and operated. Private financing with private funding (tolls) do not take place in the Netherlands. Developer contributions however are applicable and they can be sources not only for private funding, but also for public funding (see figure 21).

As pointed earlier, according to Ragazzi (2005) there is a very little justification of tolling vis-à-vis taxation as a way of funding. One of the situations when they are justifiable is charging for congestion which was the main road bottleneck identified during the research interview with the Port of Rotterdam. According to Ragazzi, when specific taxes (for example fuel tax) cannot

differentiate between levels of damage to roads caused by different types of vehicles, tolls on trucks like in Switzerland and Germany, are a viable option. But in order for the transport flows not to be diverted to other “free” roads, tolls should be imposed on all roads (like in Switzerland) and according to the degree of congestion. Research findings show that such public imposition of tolls is not considered in the Netherlands.

There are only two road infrastructures in the Netherlands where private tolls are used as a funding mechanism – Westerscheldetunnel and Kiltunnel. In these projects toll funding was used to support the business case but was not self-sufficient and classical public funding was needed as well. According to the research findings tolls can generate only 25 to 50% of the means supporting a project and there are no projects that could be fully financed by toll income without any form of additional public funding (grants, guarantees, etc.). One exception would be if one has a virtual monopoly over a transport network in a densely populated area.

From the performed research it becomes clear that tolls in general are not considered beneficial or a viable option for the future. First, it is believed that they will increase the total user burden which is deemed detrimental by the Port of Rotterdam. Second, at public level tolls are not part of the agenda of the current government because of lack of public support. This confirms the view expressed in literature about the importance of public acceptance of new financing schemes (see chapter II-3.1. Public acceptance of new procurement schemes). Third, tolls cannot cover the full costs of a project while in the same time they remain politically controversial. Fourth, it appears to be very difficult in practice to find a stand-alone piece of network to impose tolls on. And finally, in the Netherlands by law tolls can be imposed only on new infrastructure as a way of funding, which does not allow their usage on existing networks. Because they are at present not part of the public agenda, there is also virtually no research implemented on the effects of road charging on mobility (at governmental level). There are currently only three projects (including PPPs) in the MIRT pipeline for which tolling is being investigated as a possible funding alternative.

The situation with charges for the use of the railway infrastructure as a way of funding appears to be much vaguer. The theoretical framework on railway sector organization points that the collected variable charges per train-kilometer for the use of infrastructure are meant to cover traffic management and maintenance costs in full, but not costs of infrastructure renewals and investments (ECMT 2005). The research lacks data to confirm or reject this statement as an interview with the infrastructure manager Prorail was not implemented. However, one respondent from the interviews expressed the belief that there is no clear link between the received budget for maintenance of railway infrastructure and the separate income stream that comes from charges.

The logic of a land developer charging for infrastructure use lies in the assumption that the property of the developer in the vicinity of the infrastructure project benefits (in value) from the transport improvement. The research findings show that developer contributions are indeed a viable source of financing for ITI. Moreover, land developments are increasingly more often included as a part of infrastructure developments, as was recommended in the report of Committee Ruding (2008). Practical examples from the research findings are the Sijtwende project (road, tunnels and land development) and the Zuidas Amsterdam project (road, rail and land development). This integrated approach is becoming more common but the effect of the economic crisis on the real estate market appears to delay this development. Therefore private funding from

land developers' contributions is only a supplementary source of funding to governmental subsidies.

Another type of specific beneficiaries besides land developers are ports. The logic of such contributions can be found where infrastructure developments (enhancements, upgrades) are necessitated by port projects and the ports are required to contribute to the costs. The literature on the matter mentions the UK as an example of such funding mechanism. In the paper of Asteris & Collins (2010) various drawbacks are mentioned for this type of charging of ports. One of these disadvantages is the competitive factor - if competitors of the contributor port are not required to contribute to the costs of port-associated transport enhancements that might lead to a financial disadvantage for the charged port. The research findings confirm this view as the Port of Rotterdam sees such potential port contributions as an additional burden that might harm its competitive position. Port contributions for ITI development in the Netherlands have been considered for specific projects (for example Nieuwe Westelijke Oeververbinding). A key in such a decision is if a clear port gain can be determined. The difficulty in this situation is however the fact that the Dutch government is also a shareholder of the port, which leads to double interests. On one hand the government is in its role of state, trying to achieve value for money in ITI and to prioritize sources of financing (including port contributions). On the other hand the state is one of the shareholders of the port and as such, port contributions might decrease dividends. This leads to the broader issue of state participation in public companies which will find its place in the next subchapter 6.

## **6. The Port of Rotterdam and inland transport infrastructure**

In terms of involvement of the Port of Rotterdam in ITI decisions, the assumption expressed in the beginning of this paper is confirmed – the port does not have a direct decision power. Instead it has an extensive lobbying position through which it can influence governmental decisions related to infrastructure procurement, if these decisions affect its interests. This lobbying position is on two levels – first, the state is one of the shareholders of the port and second, the positioning of the port as a vital factor for the economic competitiveness for the Netherlands. The lobbying is executed not only through port documents and discussions with the public sector, but also through research conducted for the expense and on initiative by the port. The lack of influence on the foreign sight of cross-border projects is currently the biggest threat for the port, as in the case of the third track of the Betuweroute in Germany. This represents a significant time and scope risk.

In terms of governmental policy related to the port, a change of political direction is observed. The new governmental policy plan SVIR for infrastructure and space puts the current focus on regions and areas that are most economically dynamic and important for the competitive position of the Netherlands, including mainports. This is a shift from previous approaches where all kinds of infrastructure had to be pushed forward. As a result port related developments are expected to benefit from this shift.

The general budget remains the biggest source of funding for ITI in the Netherlands. General tax payers and users of infrastructure (through specific taxes) contribute the most to the funding flows for infrastructure maintenance and new developments. It is therefore very interesting to note that the port that is one of the biggest users of inland infrastructure to the mainland is not contributing

through general taxes to the funding pool. The Port of Rotterdam enjoys a preferential tax treatment and is not paying corporate tax (0% charge on profits clause). During the research phase of this thesis a new piece of information became available from the European Union that is urging the Netherlands to remove preferential tax treatment of publicly owned companies that operate in competitive markets (European Commission, 2013). The research findings show that such a decision affects many other public companies besides the port and such a significant change is not likely to happen in the near future. The position of the port authority on this matter is based on the competitive advantage argument – different treatment from that of competitive ports might harm the competitive position of the Port of Rotterdam. The same argument is used to express the port's position for port contribution charges for ITI development and tolling of infrastructure. The port position on congestion charges or other altering behavior regimes would be rigorously tailored according to the exact chosen structure of such schemes and on real positive effects on mobility.

Probably the most important role of the Port of Rotterdam in ITI procurement in the future would be the one of actual investor in infrastructure. This is a new phenomenon in the Netherlands and the pioneering project is the Calandspoorbrug (also a possible TEN-T project). This is the first project in the Netherlands in which the port authority co-invests together with the government in a specific track of ITI that is not a direct responsibility of the port. The theoretical framework about possible involvement of port authorities beyond the landlord function proposed in ESPO (2011) was tested during the research. The findings show that the port has the financial capability and the right corporate culture to invest in inland infrastructure but only under strict conditions – scope relevance and distinct, direct and quantifiable benefits for the port from the investment. Revenue generation is not a priority.

Maybe an even more important issue for the future would be the capacity optimization and traffic control of transport networks instead of procurement of new infrastructure. The findings show that already a big progress has been achieved in this regard with the communication with Prorail.

## **7. Conclusions and recommendations**

This thesis represented an explorative, qualitative and critical study on the topic of inland transport infrastructure of seaports. The focus was reduced to road and railway infrastructure in particular and the point of view was kept close to the interests of the Port of Rotterdam. However, as investment approaches are not exclusive to specific countries or ports, it was also acknowledged that the findings of this paper might appear useful for other stakeholders as well.

During the first sections of the thesis a solid theoretical and conceptual framework was built based on scientific literature and official papers. Examples of provision of inland transport infrastructure from various countries were explored, including the Netherlands. The knowledge gathered during the building of the framework laid the way for the qualitative research and the formulation of the research questions. Interviews were performed with identified interested parties from the Port of Rotterdam itself and outside the port – policy makers, economic and financial experts that have a vast expertise in the various funding and financing methods for inland transport infrastructure procurement. The research results were objectively presented and afterwards examined under the theoretical framework. These steps aimed to logically follow the development of the main research question of this paper and namely: who should pay in the future for the inland transport

infrastructure connecting the Port of Rotterdam to the mainland. As the nature of inland transport infrastructure of seaports is complex, the answer can also not be straight-forward but comprises various variables.

The implementation of the thesis shows that one cannot present a satisfying and complete picture of provision of ITI unless the two main aspects of ITI procurement are explored and combined - financing and funding of ITI. They are like the two sides of a coin and while both are crucial for the provision of ITI, one cannot exist without the other. For this purpose, identifying the main stakeholders for financing and funding and going deep to the level of actual payers was a crucial step for this research. By using the two main variables - financing and funding, a comprehensive theoretical framework was build (see figure 21) that offers four main scenarios in which all actual ITI projects in the Netherlands can be positioned.

The public financing with public funding scenario is still the dominant form of infrastructure procurement in the Netherlands. Despite the difficulties of meeting needs with general budgets, this is not likely to change *dramatically* in the near future. The research shows that the perception of the transport network as a responsibility solely of the public sector is still very strong in the Netherlands.

Another reason why public financing in particular remains strongly present is the attempts of the government to avoid complete dependence on private financing. The government is not only investigating the possibilities to increase market participation in infrastructure, but in the same time is trying to increase the public financing share, mainly because of the lower cost of public borrowing.

The research on public funding on the other hand shows that all identified actual payers groups are contributing to the funding pool, although some more than other. Payers of general taxes and users that pay specific taxes directly or indirectly related to the use of infrastructure contribute the most and this is not likely to change.

Developer contributions' share is increasing, partially due to the recommendation made by Committee Ruding in 2008 for more inclusion of land developments in ITI projects. The economic downturn however has left its mark on the real estate sector and this will delay this development. Contributions from ports are sporadically considered for separate projects in the agenda, but there is a clear conflict of interest at the level of the government. On one hand the government is in its role of state, trying to achieve value for money in ITI and to prioritize sources of financing (including port contributions). On the other hand the state is one of the shareholders of the port and as such, port contributions might decrease dividends. This leads to the broader issue of state participation in public companies. This issue is not only relevant for port contributions in ITI but also for the topic of general taxation as a main way of funding of infrastructure. Currently the port is one of the biggest infrastructure users but is paying 0% charge on income. The European Commission has urged the Netherlands in 2013 to remove the preferential tax treatment for publicly owned companies that operate in competitive markets. The research findings show that such a change is not likely to occur in the near future. However, the equity principle in economics requires that such practices are investigated and re-evaluated and this would be an interesting development for the future.

Donor government funding from the European Union is a very viable option for Dutch cross-border transport projects. However, interested parties are not eager to cover too high administration costs. Such a funding usually plays only a complementary role to the projects' costs. The main load is still being carried by national public and private funding pools. Lack of influence on the foreign side of cross-border projects represents the biggest risk for the Port of Rotterdam. In the future it would be interesting to explore if the inclusion of projects in the TEN-T program decreases this risk.

The lack of a dedicated road fund and the use of general infrastructure fund that runs until 2028 are considered a big success in the Netherlands and earmarking of revenues for infrastructure is not a favored policy by finance ministers.

A very surprising note is that calculation of deadweight cost of taxation is not performed in the Netherlands. The lack of such knowledge leaves out any possibility of sound economic comparison between economic loss of taxation and costs of tolling. The expressed reason is the complicated nature of such calculations but it is also possible that the reasons are political as deadweight costs of taxation are rarely taken into consideration by politicians.

Public financing with public funding of new infrastructure remains the main viable option also for the railway sector. Currently it is being investigated if private financing through PPPs can be introduced in the railway sector, but this would depend on the value for money score and on the "isolation" of the railway projects from the rest of the railway network. Considering the fact that institutional investors do not find the returns on investment in this sector satisfying, it is easy to understand why the expectations are not very optimistic.

Although public financing and funding is unlikely to disappear from the ITI procurement picture, private participation in the road sector is increasing by the day. This makes private financing with public funding the second most dominant scenario for the future of the roads in the Netherlands. PPPs are occupying a more dominant position with MIRT scans scoring 10-15% increase in value for money compared to the public approach. This contractual form is expected to bring spill-over effects not only for motorways, but also for normal roads, as the government is planning to use the collected knowledge also for the rest of the road network. The dominant PPP form in the Netherlands remains the DBFM and the "safety" associated with it is preventing other forms of PPP from emerging. More attention should be given to the other form of PPP that is happening much more rarely in the Netherlands - creation of new public-private entity as in the case of the Waardse Alliantie. The high transaction costs of PPPs as an argument against this contractual form is refuted when one considers the totality of costs (in both time and money). More experience with PPP at national level is needed as this will bring the high transaction costs with time down (standardization of contracts and procedures). However, there are lessons to be learnt as the current most used procurement method in the Netherlands "the competitive dialogue" is not the most optimal in terms of costs. The "open tender" procurement method must be explored and applied more often as it offers much room for cost savings that could amount to 7% of the capital value of a medium road project. Involvement of institutional investors also happens via PPPs and a lot of measures have been already implemented at governmental level to accommodate the needs of pension funds and insurance companies. This development in the road sector seems quite beneficial for all parties because institutional investors prove to be natural "allies" for infrastructure projects. Moreover, debt financing vis-à-vis equity investment is where they are the most needed and there

are already such examples of institutional involvement in infrastructure in the Netherlands. All factors point in the right direction but as this development is quite new, only the future can tell if this match is successful in the long run.

Projects with shadow tolls imposition also fall under the private financing with public funding scenario. The research shows that the construction of the tunnels that have shadow tolls has taken place in a very different historical period. Nowadays mobility levels and credit background in the Netherlands are quite different and it is unlikely that shadow tolls would be a dominant funding form in the future.

The public financing with private funding and the private financing with private funding are the scenarios in the minority. The first one involves tolls imposed by the government (also known as public tolls) and the second one tolls imposed by the private sector. There are no examples of the second scenario at present in the Netherlands. There are only two tunnels in the Netherlands on which tolls are imposed by the government. The research findings show that the only justification for such funding approach is if tolls are “complementary” and help to build a more robust business case. Another justification of public charging is in the case of road congestion but only if the charges are differentiated per vehicle type and imposed on the entirety of the road network, as in Switzerland. However, tolls in general in the Netherlands are not considered advantageous or a viable option for the future. The two main restrictions associated with tolls are the prohibition by law to impose tolls on existing infrastructures and the impossibility to cover fully the costs of projects with tolls.

Although economical and institutional factors may differ greatly from country to country, finding the “best” approach for the Netherlands requires a broad overview and the ability to draw lessons from foreign experience. The experience of different countries like France and China in the procurement of ITI shows that historical development and background play a very big role in a country’s financing and funding schemes. For example, the Netherlands has never had the experience with tolling systems that in France has its infancy almost together with the construction of the first motorways. The main view in the Netherlands remains that the importance of infrastructure is that of a backbone of an economy. In this concept the government remains the ultimate provider and owner of infrastructure and schemes that provision private sector ownership of infrastructure (such as BOOT) are not applicable for the transport sector in the Netherlands.

Probably the most important role of the Port of Rotterdam in ITI procurement in the future would be the one of actual investor in infrastructure. Although it would be a challenge to identify projects that satisfy all conditions of the port for such involvement, the findings show that the port has the financial capability and the right corporate culture to invest in inland infrastructure, which is already happening.

#### ◆ ***Possible limitations and discussions***

The experiences collected and reviewed from various countries, modes and budget systems show that procurement of ITI, no matter rail or road, cannot simply be argued as “public versus private” involvement or one investment mix above the other. The choice of investment scenario should vary per case and situation, taking into consideration all possible variables of the project in question – country, budget cycle, political incline, transport mode, financial, strategic, economic,

social and environmental objectives, etc. No matter the chosen strategy, in practice the public-private mixes are never black or white, as experience shows. This thesis has tried to reflect this but only as far as scientific research can reflect real life. The best chosen financing and funding approach for a piece of ITI must be a highly customized version that covers all needs of the end-users in the Netherlands, the Port of Rotterdam included. Private financing with public funding or public financing with private funding are very plausible options, but nevertheless with a solid amount of public involvement as the case of the two tolled tunnels in the Netherlands shows. The mix is complete if donor government funding is also considered, wherever applicable.

Another group of limitations of this thesis derive from the nature of the chosen research method – qualitative research through interviews. Although the research findings were presented as objectively and fully as possible, the findings are strongly dependent on the exact position of the interviewee in the organization that they work for. Therefore, interviewee subjectivity cannot be fully avoided. It would have been interesting to include lenders' point of view on the topic of private financing to complete the picture, but interviews with bankers could not be scheduled due to lack of responsiveness.

An interesting question of discussion for the future would be: what is the actual interest of full ownership versus economic ownership of transport infrastructures, for both the public and the private sector? Is full ownership of transport systems of real interest or is economic ownership enough? What would be the added value of full ownership of transport infrastructure by the private sector and would that guarantee reliable transport systems? Some roles (public, private) are determined by tradition and are these roles going to change in the future?



# APPENDICES

## Bibliography

- Algemene Rekenkamer voor Tweede Kamer der Staten-Generaal. (2001). *Aanleg Betuweroute Projectbeheersing en financiering*. 's-Gravenhage: Sdu Uitgevers.
- Asteris, M. & Collins, A. (2010). UK container port investment and competition: Impediments to the market. *Transport Reviews*, 30-2 , 163-178.
- Betuweroute Exploitiemaatschappij B.V. (sd). Opgeroepen op April 12, 2013, van Keyrail: [www.keyrail.nl](http://www.keyrail.nl)
- Bollen, M. (2013, April 26). Strategic Advisor, Rijkswaterstaat. (L. Stijnen, Interviewer)
- Bonnafous, A. & Jensen, P. (2005). Ranking transport projects by their socioeconomic value or financial internal rate of return? *Transport Policy* 12 , 131-136.
- Borgnolo, C. & Rothengatter, W. (2005). Concessions versus network-wide tolling schemes, the community framework for motorway tolling in Europe. *Research in Transportation Economics* 15 , 29-40.
- Byrne, M., Sipsas, H. & Thompson, T. (1996). Financing Port Infrastructure. *International Advances in Economic Research*, 2-4 , 471-476.
- Cabinet Rutte-Asscher. (2012, October 29). *Coalition Agreement*. Opgeroepen op April 04, 2013, van [government.nl](http://www.government.nl): <http://www.government.nl/government/coalition-agreement/xii-spatial-planning-and-mobility>
- Cantos, P, Pastor, J.M. & Serrano, L. (2010). Vertical and horizontal separation in the European railway sector and its effects on productivity. *Journal of Transport Economics and Policy*, 44-2 , 139-160.
- Centraal Bureau voor de Statistiek. (2013). CBS. Opgeroepen op April 25, 2013, van [www.cbs.nl](http://www.cbs.nl)
- Commissie Ruding. (Mei 2008). *Op de goede weg en het juiste spoor - Advies van de Commissie Private Financiering van Infrastructuur*. Den Haag: Commissie Private Financiering van Infrastructuur.
- De Lathauwer, W. (1995). Scenarios for the transport infrastructure of Europe: Planning and Financing. *Tunnelling and Undergrouml Spare Technology*, 10-1 , 45-51.
- Della Croce, R. (2011). *Pension Funds Investment in Infrastructure: Policy Actions*. OECD Working Papers on Finance, Insurance and Private Pensions, No. 13, OECD Publishing.
- ECMT. (2005). *Railway reform and charges for the use of infrastructure*. Paris, France: OECD Publications.
- ECMT. (2001). *Railway reform: Regulation of Freight Transport Markets*. Paris, France: OECD Publications.
- Economic and Social Commission for Asia and the Pacific. (2006). *Emerging issues in transport: Financing of transport infrastructure and public-private partnerships*. Busan, Korea: Unated Nations Economic and Social Council.

- EPEC. (2009). *The financial crisis and the PPP market: Potential Remedial Actions*. Luxembourg: European PPP Expertise Centre (EPEC).
- ESPO. (2011). *European Port Governance - Report of an Enquiry into the Current Governance of European Seaports*. Brussels: European Sea Ports Organisation.
- Euromoney Institutional Investor PLC . (2006, December 2005-January 2006). Infrastructure equity - Getting in on the ground floor. *Global Investor* , p. 1.
- European Commission. (2004). *Green paper on public-private partnerships and community law on public contracts and concessions*. Brussels: Commission of the European Communities.
- European Commission. (2013, May 02). *State aid: Commission invites the Netherlands to end selective tax exemption for public companies*. Opgeroepen op May 05, 2013, van European Union: [http://europa.eu/rapid/press-release\\_IP-13-395\\_en.htm](http://europa.eu/rapid/press-release_IP-13-395_en.htm)
- European Commission's Directorate-General for Energy and Transport. (2005). *Trans-European Transport Network - TEN-T priority axes and projects 2005*. Brussels: European Commission, Energy and Transport DG.
- Fayard, A., Gaeta, F. & Quinet, E. (2005). French Motorways: experience and assessment. *Research in Transportation Economics*, 15 , 93-105.
- Fremdling, F. (2000). The Dutch transportation system in the nineteenth century. *De Economist*, 148-4 , 521-537.
- Grimsey, D. & Lewis, M.K. (2002). Evaluating the risks of public-private partnerships for infrastructure projects. *International Journal of Project Management* 20 , 107-118.
- Guasch, J. (2004). *Granting and renegotiating infrastructure concessions - doing it right*. Washington, D.C.: The International Bank for Reconstruction and Development / THE WORLD BANK.
- Hensher, D.A. & Puckett, S.M. (2005). 2. Road user charging: The global relevance of recent developments in the United Kingdom. *Transport Policy* 12 , 377-383.
- Het Financiële Dagblad. (2013, April 10). *Rijk verleidt pensioenfondsen met inflatielening bij N33*. Opgeroepen op May 02, 2013, van Het Financiële Dagblad: <http://fd.nl/economie-politiek/900047-1304/rijk-verleidt-pensioenfondsen-met-inflatielening-bij-n33>
- Inderst, G. (2010). Pension fund investment in infrastructure: What have we learnt? *Pensions*, 15-2 , 89-99.
- Jaarsma, C.F. & Van Dijk, T. (2002). Financing local rural road maintenance. Who should pay what share and why? *Transportation Research Part A*, 36 , 507-524.
- Koppenjan, J.F.M. (2005). The formation of public-private partnerships - lessons from nine transport infrastructure projects in The Netherlands. *Public Administration*, 83-1 , 135-157.
- Loo, B. P. (1999). Development of a regional transport infrastructure: some lessons from the Zhujiang Delta, Guangdong, China. *Journal of Transport Geography*, 7 , 43-63.
- Loosemore, M. (2007). Risk allocation in the private provision of public infrastructure. *International Journal of Project Management*, 25 , 66-76.

- Ministerie van Financiën, Rijkswaterstaat en de Rijksgebouwendienst. (2013). *PPS bij het Rijk*. Opgeroepen op April 17, 2013, van [www.ppsbijhetrijk.nl](http://www.ppsbijhetrijk.nl): [http://www.ppsbijhetrijk.nl/PPS\\_Algemeen](http://www.ppsbijhetrijk.nl/PPS_Algemeen)
- Mizutani, F. & Uranishi, S. (2012). Does vertical separation reduce cost? An empirical analysis of the rail industry in European and East Asian OECD countries. *J Regul Econ*, 43, *Springer Science+Business Media*, 31-59.
- Moles, P. & Williams, G. (1995). Privately funded infrastructure in the UK: participants' risk in the Skye Bridge project. *Transport Policy*, 2-2, 129-134.
- Musso, E., Ferrari, C. & Benacchio, M. (2006). Port investment: profitability, economic impact and financing. *Transportation Economics*, 16, 171-218.
- Nakagawa, D., Matsunaka, R. & Konishi, H. (1998). A method of classification of financial resources for transportation based on the concept of actual payers. Theoretical framework. *Transport Policy*, 5, 103-113.
- Nationaal Platform Anders Betalen voor Mobiliteit. (Mei 2005). *Nationaal Platform Anders Betalen voor Mobiliteit*. Platform Anders Betalen voor Mobiliteit.
- Nijkamp, P. & Rienstra, S.A. (1995). Private sector involvement in financing and operating transport infrastructure. *The Annals of Regional Science*, 29, 221-235.
- OECD. (2013). "Goods transport", in *OECD Factbook 2013: Economic, Environmental and Social Statistics*. OECD Publishing.
- PGGM. (2013). *BAM en PGGM gaan joint venture aan*. Opgeroepen op May 02, 2013, van PGGM: [http://www.pggm.nl/Over\\_PGGM/Pers/Persberichten/Nieuws\\_en\\_persberichten/110519\\_BAM\\_enPGGMgaanjointventureaan.asp](http://www.pggm.nl/Over_PGGM/Pers/Persberichten/Nieuws_en_persberichten/110519_BAM_enPGGMgaanjointventureaan.asp)
- PIARC. (2012). *Financing, Contracting and Managing of Road System Investment*. Paris: World Road Association PIARC.
- Port of Rotterdam Authority. (2012). *Annual Report 2012*. Rotterdam: Port of Rotterdam Authority.
- Port of Rotterdam Authority. (2012, October 24). *Investing in infra and transport for economic growth*. Opgeroepen op November 19, 2012, van Port of Rotterdam: <http://www.portofrotterdam.com/en/News/pressreleases-news/Pages/investing-infra-transport-economic-growth.aspx>
- Port of Rotterdam Authority. (2012, November 21). *Port Authority and Deltalinqs: invest in European infrastructure*. Opgeroepen op November 27, 2012, van Port of Rotterdam: <http://www.portofrotterdam.com/en/News/pressreleases-news/Pages/port-authority-deltalinqs-invest-european-infrastructure.aspx>
- Port of Rotterdam Authority. (2011). *Port Statistics - Containers*. Opgeroepen op November 27, 2012, van Port of Rotterdam: [http://www.portofrotterdam.com/en/Port/port-statistics/Documents/modal\\_split\\_containers\\_eng\\_2011\\_2007.pdf](http://www.portofrotterdam.com/en/Port/port-statistics/Documents/modal_split_containers_eng_2011_2007.pdf)
- Port of Rotterdam Authority. (2012). *Road Transport*. Opgeroepen op November 27, 2012, van Port of Rotterdam: <http://www.portofrotterdam.com/en/Business/about-the-port/connections/Pages/rail.aspx>

- Proost, S., De Borger, B. & Koskenoja, P. (2007). Public finance aspects of transport charging and investments. *Research in Transportation Economics*, 19 , 59–80.
- Proost, S., Dunkerley, F., De Borger, B., Gühneman, A. & Koskenoja, P. (2011). When are subsidies to trans-European network projects justified? *Transportation Research Part A-45* , 161-170.
- Ragazzi, G. (2005). Tolls and project financing: a critical view. *Research in Transportation Economics*, 15, 41–53 , 41-53.
- Rees, J.H. (2005). Trans-European Networks: EU infrastructure proposals. *Research in Transport Economics* , 67-73.
- Rijksoverheid. (2013). Opgeroepen op April 13, 2013, van [www.rijksoverheid.nl](http://www.rijksoverheid.nl): <http://www.rijksoverheid.nl/onderwerpen/goederenvervoer-per-spoor/betuwroute>
- Rijkswaterstaat. (2012, January 13). Opgeroepen op April 15, 2013, van [http://www.rijkswaterstaat.nl/images/Totaaloverzicht%20Rijksweg tunnels%20%28stand%2013%20januari%202012%29\\_tcm174-314755.pdf](http://www.rijkswaterstaat.nl/images/Totaaloverzicht%20Rijksweg tunnels%20%28stand%2013%20januari%202012%29_tcm174-314755.pdf)
- Robertson, B. & Horsman, K. (2005, February). Getting real with infrastructure. *Benefits Canada*, 29.2 , pp. 25-29.
- Rogers Publishing Limited. (1998, June). The Caisse financial group forms infrastructure fund. *Benefits Canada*, 22.6 , p. 95.
- Short, J. & Kopp, A. . (2005). Transport Infrastructure: Investment and planning. Policy and research aspects. *Transport Policy*, 12 , 360-367.
- Smith, K. (2010, December). Canadian pension funds acquire British HS line. *International Railway Journal*, 50.12 , p. 6.
- Solino, A.S. & De Santos, P.G. (2010). Transaction costs in transport public-private partnerships - comparing procurement procedures. *Transport Reviews*, 30-3 , 389-406.
- Stanley, M. (2011). Investing in Infrastructure: Getting the Conditions Right. *OECD Journal: Financial Market Trends*, Volume 2011, Issue 1 , 111-117.
- TEN-T Executive Agency. (2013). Opgeroepen op April 24, 2013, van Trans-European Transport Network Executive Agency: <http://tentea.ec.europa.eu/>
- The World Bank. (2010). *Procurement arrangements applicable to Public-Private Partnerships (PPP) contracts financed under World Bank projects*. Opgeroepen op April 18, 2013, van PPP in Infrastructure Resource Center: <http://ppp.worldbank.org/public-private-partnership/library/procurement-arrangements-applicable-public-private-partnerships-ppp-contracts-financed-under>
- Van Den Bosch, F.A.J, Hollen, R., Volberda, H.W. & Baaij, M.G. (2011). *The strategic value of the Port of Rotterdam for the international competitiveness of the Netherlands: a first exploration*. Erasmus University Rotterdam, Rotterdam School of Management (RSM). Rotterdam: Port of Rotterdam.

## Figures & Tables

FIGURE 1: DIRECT PROFITABILITY AND SOCIAL UTILITY OF INVESTMENT, SOURCE: MUSSO ET AL. (2006) .....	13
FIGURE 2: STAKEHOLDERS AND SOURCES OF FINANCING IN ITI INVESTMENT CLASSIFIED BY ACTUAL PAYER, SOURCE: AUTHOR.....	18
FIGURE 3: FUNDING RESPONSIBILITY BY ROAD TYPE, SOURCE: PIARC (2012).....	21
FIGURE 4: HORIZONTAL TAX COMPETITION 1, SOURCE: ADAPTED BY AUTHOR FROM PROOST ET AL. (2007).....	22
FIGURE 5: HORIZONTAL TAX COMPETITION 2, SOURCE: ADAPTED BY AUTHOR FROM PROOST ET AL. (2007).....	22
FIGURE 6: VERTICAL TAX COMPETITION, SOURCE: ADAPTED BY AUTHOR FROM PROOST ET AL. (2007) .....	23
FIGURE 7: PUBLIC-PRIVATE SECTOR INVOLVEMENT IN FINANCING AND OPERATION OF ITI, SOURCE: NIJKAMP & RIENSTRA (1995) .....	26
FIGURE 8: PUBLIC-PRIVATE SECTOR INVOLVEMENT IN FINANCING AND FUNDING OF ITI, SOURCE: AUTHOR, ADAPTED FROM COMMISSIE RUDING (2008) .....	27
FIGURE 9: TYPES OF PRIVATE PARTICIPATION IN INFRASTRUCTURE, SOURCE: GUASCH (2004).....	28
FIGURE 10: LOGIC OF CONNECTION VS. LOGIC OF DIVISION IN PPP PROJECTS, SOURCE: KOPPENJAN, (2005) .....	31
FIGURE 11: THE DEVELOPMENT OF TRANSPORT IN THE EU 15, SOURCE: REES (2005) .....	39
FIGURE 12: VERTICAL AND HORIZONTAL SEPARATION IN THE RAILWAY SECTOR, OWNERSHIP OF THE INFRASTRUCTURE AND USER CHARGING, SOURCE: AUTHOR [ADAPTED FROM ECMT (2001), ECMT (2005), CANTOS ET AL. (2010) AND MIZUTANI & URANISHI (2012)] .....	51
FIGURE 13: INLAND GOODS TRANSPORT IN THE NETHERLANDS IN BILLION TONNE-KILOMETRES, SOURCE: OECD (2013) .....	53
FIGURE 14: MOTORWAYS LENGTH PER COUNTRY AND YEAR IN KILOMETRES, SOURCE: UNECE TRANSPORT DIVISION DATABASE.....	55
FIGURE 15: FINANCIAL FLOWS FOR ROAD MAINTENANCE IN THE NETHERLANDS AFTER THE INTRODUCTION OF THE LRRM IN 1993, SOURCE: JAARSMAN & VAN DIJK (2002) .....	56
FIGURE 16: EXPECTED RESULTS FROM INVESTIGATED ROAD CHARGING ALTERNATIVES, SOURCE: MINISTRY OF TRANSPORT, PUBLIC WORKS AND WATER MANAGEMENT (MINISTERIE VAN VERKEER EN WATERSTAAT) .....	57
FIGURE 17: EFFECTS OF KILOMETER CHARGE, DIFFERENTIATED ON THE BASIS OF TIME, PLACE AND ENVIRONMENTAL CHARACTERISTICS, SOURCE: MINISTRY OF TRANSPORT, PUBLIC WORKS AND WATER MANAGEMENT (MINISTERIE VAN VERKEER EN WATERSTAAT) .....	58
FIGURE 18: BETUWEROUTE, SOURCE: TEN-T EXECUTIVE AGENCY (TEN-T EXECUTIVE AGENCY, 2013) .....	59
FIGURE 19: BETUWEROUTE COSTS EVALUATION, SOURCE: EUROPEAN COMMISSION'S DIRECTORATE-GENERAL FOR ENERGY AND TRANSPORT (2005) .....	60
FIGURE 20: AVERAGE NUMBER OF TRAIN MOVEMENTS ON THE PIECE OF BETUWEROUTE PARALLEL TO HIGHWAY A15 (LOCOMOTIVES AND MAINTENANCE TRAINS EXCLUDED), SOURCE: (BETUWEROUTE EXPLOITATIEMAATSCHAPPIJ B.V.) .....	61
FIGURE 21: POSSIBLE MIXES OF FINANCING AND FUNDING OF INLAND TRANSPORT INFRASTRUCTURE AND SOURCES OF FINANCING, SOURCE: AUTHOR .....	80
FIGURE 22: PRACTICAL EXAMPLES OF ITI PROJECTS IN THE NETHERLANDS CLASSIFIED BASED ON FINANCING AND FUNDING, SOURCE: AUTHOR ..	81

## *List of Interviewees*

- ◆ Mr. Teije Smittenaar, Head of Investment and Risk Management, Port of Rotterdam Authority
- ◆ Mr. Marc Bollen, Strategic Advisor (with specialization in PPPs and project financing), Directorate-General for Public Works (Rijkswaterstaat)
- ◆ Mrs. Pauline Wortelboer-van Donselaar, Senior Researcher, Research Institute for Mobility Policy (Kennisinstituut voor Mobiliteitsbeleid)
- ◆ Mr. Erik Jan Snik, Coordinator DBFMO, Department Public Private Investments, Ministry of Finance