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A comparative case study of Public-Private Partnerships in road infrastructure projects: Spain and Norway

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Abstract:

This thesis aims to introduce a new approach to the Norwegian PPP scheme in infrastructure projects, the three first road pilot projects approved, through a solid and well-conducted benchmarking with a country with a well-established experience in the field as Spain. The focus is on two key issues that determine the performance of the projects; the procurement method planned by the authorities and more precisely on the risk allocation carried out. The base of this research is a comprehensive literature review addressing a set of economical, legal, political and technical data.

Keywords:

1. PPP
2. Procurement management
3. Risk allocation
4. Spain
5.Norway

Pedro Bustillo Alonso

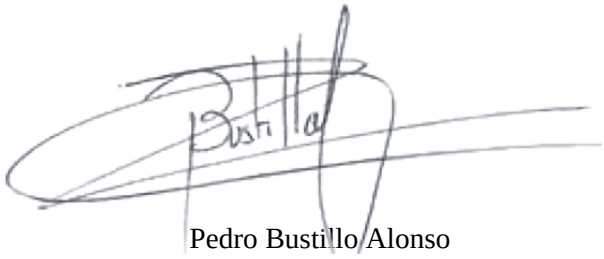
Preface

This Master Thesis has been written at the department of civil and transport engineering and aims to fulfill the objectives of the course TBA4910 in the spring of 2015. This course consists of 30 ECTS and it is intended to be the finishing work in the international master degree of project management (PROMAN) at the Norwegian university of science and technology.

The intention of the thesis is to deepen the performance of the Public-Private Partnership scheme in Norway in comparison with other countries as Spain, focusing in the road projects sector. Thus, a selected group of road projects from Spain are compared with the three pilot projects implemented up to date. The main content of this paperwork is based on an extensive and comprehensive literature review.

The author would like to thank his supervisor, Olav Torp and Ola Lædre, for the guidance with the work during the project. Additionally, the author would also like to thank the contributions made by Fernando Cañizal Bernini, Alejandro Ortega Hortelano, Jose Manuel Vassallo Magro and Felix J. Villalba Romero as well as the NPRA to the research presented.

Trondheim, June 10th 2015



Pedro Bustillo Alonso

MSc in Project Management

Abstract

Public-Private Partnership scheme in infrastructures is not a new concept that has come up in the last years; this is a strategy that has evolved adapting to the new necessities and requirements of the society. Over the last years, PPP has been more and more broadly used in many countries as a mean to achieve the numerous demands of a society within context of budgetary constraints. Norway has also initiated projects under PPP arrangements in 2001 when the first of the three road pilot projects was approved. Further, there are also planned three new road projects in the mid -term by the authorities, proving its bright future to support the development of infrastructures in Norway.

For this purpose, it is important to assess the current performance of the three pilot projects to ensure the feasibility of the PPP scheme. The proposal made for this analysis is to compare the Norwegian PPP frame with another country with more relevant experience in the field. Therefore, this thesis has proposed to conduct this using Spain as reference owing to its long and well-established experience after conducting more than 3000 km over 45 years.

Two key issues that define whether a PPP projects will be satisfactorily performed or not, are the procurement procedure conducted and more precisely the risk allocation. The former means the channel though which the potential of a certain project is managed while the latter distributes responsibilities and meaningful financial burdens between the stakeholders according to the principle of PPP of risk sharing in a long-term agreement.

In order to answer these challenges, the aim of this thesis seeks to:

1. Which are the main differences, if there are some, observed between the procurement procedures in PPP projects of Spain and Norway?

2. How do the Norwegian and Spanish PPP projects follow the procurement recommendations given by the European PPP expertise centre (EPEC)?

3. How the existing risks are allocated between the private and public sector in Norway and Spain and how is the risk allocation different between the countries?

Answering the questions outlined above has required an extensive and comprehensive literature review that includes economical, political, legal, technical and sociological perspectives around PPP arrangements. This has contributed to draw a solid ground theory to subsequently analysis and assess a group of 15 road projects in Spain and the three Norwegian pilot projects which were all conducted during the same time frame. Thus, a review of the procurement procedures used for each scenario were break down with the help of the EPEC guide to guidance to conduct, implement and deliver PPP in Europe as a reference for an ideal procedure to manage these arrangements. Special attention has been devoted to the risk allocation which could be distinguished as the one of the most relevant parts owing to the vast number of researches and studies already carried out.

Discussion launched before have focused on the consequences of the procedures and risks allocations selected within a global perspective that includes the economic downturn and the political context in the countries. The discussion also covers the distribution of risks realized. Finally, a conclusion is made discussion and some suggestions are suggested to strengthen the Norwegian PPP model.

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Abbreviations

AP-7 Al-Ca: Alicante Cartagena
AP-53: Santiago de Compostela-Alto Sto. Domingo
R-3:Madrid-Arganda
R-5:Madrid-Navalcarnero
AP-71: León-Astorga
AP-7 Ca-Ve: Cartagena-Vera
AP-61: Segovia-El Espinar
R-2: Madrid-Guadalajara
AP-71: Avila-Villacastin
AP-36: Ocaña-La Roda
AP-41: Madrid-Toledo
AP-7 Cir.Al: Circunvalacion Alicante
AP-46:Málaga-Alto las Pedrizas
E39 KB: Klett-Bårdshaug
E39 LF :Lyngdal-Flekkefjord
E18: Grimstad- Kristiansand

1. Introduction

The growing necessity to provide a set of infrastructures (hospitals, schools, railways, roads...) demanded by both the society and the economical agents, along with the budgetary constraints to reduce the public debt, has lead governments to seek the involvement of the private sector in the provision of these infrastructures (Vassallo Magro & Gallego 2005; EuropeanComission 2003; OECD 2008). This strategy has been known as Public-Private Partnership, since it pretends to bring together the various interests of both the private and public sector. It is noteworthy to add that Public-Private Partnerships, so-called PPP or P3, have been widely implemented around the world in countries as different as China, Chile, Canada, Spain, UK or India, among others (Vassallo Magro & Izquierdo Bartolome 2010).

Norway is also one of these countries that have undertaken the PPP experience which spreads out among diverse infrastructures, health care, transport, court, education, police, administration, recreation and fire department. The concept of Public-Private Partnerships or Offentlig-Privat Samarbeid (OPS) was introduced for the first time in 1998 for the transportation sector, and finally in 2001 the Storting approved three pilot road projects to test PPP (Solheim-kile et al. 2014).

In the last years, governments did not support any further measure to foster PPP within the transport sector. Nonetheless, after the elections held in 2014 the new government form by a coalition of right-wing parties have shown its willingness to retake the path of PPP in infrastructures. Even the current National Transport Plan (NTP) 2014-2023 approved by the previous labour government proved some movement towards this idea.

As a matter of principle, the NTP underlines explicitly the need for a **Predictable funding and efficient implementation** implying a new scheme of funding and organizing priority projects and finally adding below the idea of "streamlining through coordination" .It is meant that government is opened to new formulas of contracting services within the transport sector that lead to greater competition and thus lower prices by compiling various measures in larger tenders (Ministry of transport and communications 2014).More recently, the Storting has approved that three new road projects are going to be implemented under a PPP contract. Therefore, PPP experience in the road sector has still more to say in Norway in the long term (Bordal 2014).

Concurrently, Spain has a well-established experienced in managing PPP in road transport since 1967 (Vassallo Magro & Izquierdo Bartolome 2010). Under the figure of the concessions, there are 32 companies running around 3307 km of toll highways under PPP arrangements, granted by both the central and autonomic governments .Additionally it has to be added more than 1000km of highways upgraded within this scheme since 2006, but handled under a shadow toll mechanism (Subdelegación de sociedades concesionarias de autopistas de peaje 2013).

This experience has undergone several circumstances hampering its performance, inter alia oil crisis 1973 and the economic crisis of 1993 and 2008. In addition, others have entailed new legal frames for the sector and even a new currency, the euro, in the area (Vassallo Magro & Izquierdo Bartolome 2010). All of them along with those inherent to the projects provide a broad sample of cases to consider for study.

1.1 Purpose

For a better future of any PPP strategy, it is advisable to undertake a deeply analysis of the ongoing projects, assessing their weaknesses and strengths in the interest of avoiding eventual threats or achieving potential opportunities towards a higher value-for-money of the scheme.

Nonetheless, only putting the focus on the performance of the Norwegian pilot projects may not contribute to give a comprehensive outlook of the performance of this PPP scheme. Authorities may be able to compare their executions but using a scale which is mostly the same, since all the projects are tied by an identical law. Hence the following idea comes up, only through a comparison between markets contributes to complete the picture of the sector.

This thesis aims to contribute to analyze the future of the PPP within the Norwegian road sector. Consequently, the purpose is a better use of resources in the interest of achieving the maximum value-for-money though an appealing PPP scheme to the public sector Benchmarking is the key concept for this paperwork when it comes to compare "similar" projects operating under different frameworks (legal, economical, social, geographical and so).

Insofar as the paper pretends to conduct an evaluation as accurate as possible, it is though that the market to be used as a reference has to prove a wider experience than Norway, otherwise the study will have no remarkable impact. In addition, for a better comparability the cases of study, the markets should share some features. Thus, It comes naturally to contemplate the European Union as conducting framework to connect Norway to other markets in the continent since the **European investment bank** (EIB) has support the PPP program in Norway (European PPP expertise Centre 2015b)

The EIB has a wide experience in handling PPP projects in Europe. As a result, a special unit has been promoted solely to manage its significant database of PPP projects. **European PPP expertise centre** (EPEC) is thought to strengthen the capacity of the public sector members to enter into Public Private Partnership (PPP) transactions. Hence, the EPEC mission is to enhance the public sector abilities by helping state members to share experience and expertise, analysis and good practice (European PPP expertise Centre 2009).

Amongst the European countries, Spain has also received financial support from the EIB. And since this country has a large experience in implementing PPP projects., it has been selected to be analyzed along with Norway in this paper .The private sector and the public sector (mainly central government) have been working together promoting more than 3000 km of direct tolls, and more recently around 1000 km of shadow tolls (Subdelegación de sociedades concesionarias de autopistas de peaje 2013). Consequently, the available data support the suitability of considering Spain as a solid benchmark in which the Norwegian government can truly look with respect to the enhancement of the PPP scheme (Baeza Muñoz et al. 2011).

1.2 Research questions

Since a PPP is a relation between the private and public sector as a result of the government's scarce resources to accomplish entirely the current demand level of infrastructures, the focus is on how this

relation has been performed. In other words, the procurement procedure that will define the contract to be signed by the parties involved in the Project.

Further, there is still another basic characteristic inherent to PPP, the transfer or allocation of most of the existing risks in the project from the public sector to the private sector Therefore, risk allocation is key driver in the procurement process that cannot be overlooked. Indeed, only through an adequate assignation could be the project designed, built and operated successfully for both the public and private sector. On the contrary, the lack of a fair share of the burden among the participants bounds undoubtedly the project to a continuous turbulence along its life-cycle.

In consequence, the research questions proposed for the thesis seek to bring to light the influence of the procurement procedure and risk allocation on the performance of the projects. The research questions proposed are, namely:

4. **Which are the main differences, if there are some, observed between the procurement procedures in PPP projects of Spain and Norway?**

5. **How do the Norwegian and Spanish PPP projects follow the procurement recommendations given by the European PPP expertise centre (EPEC)?**

6. **How the existing risks are allocated between the private and public sector in Norway and Spain and how is the risk allocation different between the countries?**

2. Methodology

Research questions pretend to deepen the theme of PPP and its performance in infrastructures. As a matter of principle, PPP arrangements covers a broad set of issues, inter alia economy, legislation or political, which all go hand-in-hand to set a long-term relationship between the private and the public sector. Therefore it is important to understand what is sought and which means to achieve it are more suitable for this case.

2.1 Approach

First, it is logical to decide how to address the issue. The proposal is to understand this paperwork as a **comparative case study** since the intention is to compare two scenarios through projects already launched and run. A comparative case study is undertaken over time and emphasizes comparison within and across contexts. Comparative case studies may be selected when it is not feasible to undertake an experimental design and/or when there is a need to understand and explain how features within the context influence the success of program or policy initiatives (Zartman 2005).

As a matter of fact, the Zartman (Zartman 2005) defines that this approach is more suitable if:

- When 'how' and 'why' questions are being posed about the processes or outcomes of an intervention.

- When an understanding of the context is seen as being important in understanding the success or failure of the intervention.

As it is seen on the research questions, How is the driver of two of them whereas the first it could be place within the second statement. It is necessary to understand the whole picture that surrounds the projects before being able to draft any conclusion.

2.2 Choice of methodology

Therefore the approach conceived to undertake successfully this research is based on an extensive and comprehensive literature review following both a **qualitative and quantitative research**. The former is intended to answer preferably the first two questions since its aim is to provide insights into the setting of a problem that generates ideas and/or hypotheses for later quantitative research (Snapsurveys.com 2015).The latter is more suitable for the last question proposed owing to the fact that is intended to measure the incidence of various views and opinions in a chosen sample and further it could be followed by the qualitative research (Snapsurveys.com 2015).This review aims to focus on the areas more related to the questions proposed on the previous section, obtaining information from miscellaneous sources. More precisely, the philosophy of searching could be divided between the research questions as follows:

Research question 1; addressing this question entails not only an extensive research on the legal frame, but also on the situation and surroundings affecting these projects .For this reason it has been looked into news related to this issue, specialized magazines as the *magazine of public works*, web

pages and publications of institutions and agencies specialized on the issue, and finally books or research papers which have studied the PPP scheme.

Research question 2; research has been focused mainly on a in-depth analysis of the *"The guide to guidance"*(European PPP Expertise Centre 2012) published by the EPEC. Further other publications made by the institution have been included to address this issue, as a mean to enforce how PPP procurement is understood and engage by the expertises.

Research question 3; the existing literature on the topic is already enough extensive as it was proven by several authors (Taroun 2014; Irimia-Diéguez et al. 2014; Kovaka & Fiori 2005).Such research provide contribute to design the basis of the issue In Spain, authors as Vassallo, Baeza and Ortega have already been working on the issue and they are well-considered expertises to rely on. In Norway, *Statens vegesen* and the *transportøkonomisk institutt* ,tøi, have been used to gather information.

All data collected has been gathered and sorted through **Mendeley**, a database program for managing and sorting any sort of research paper.

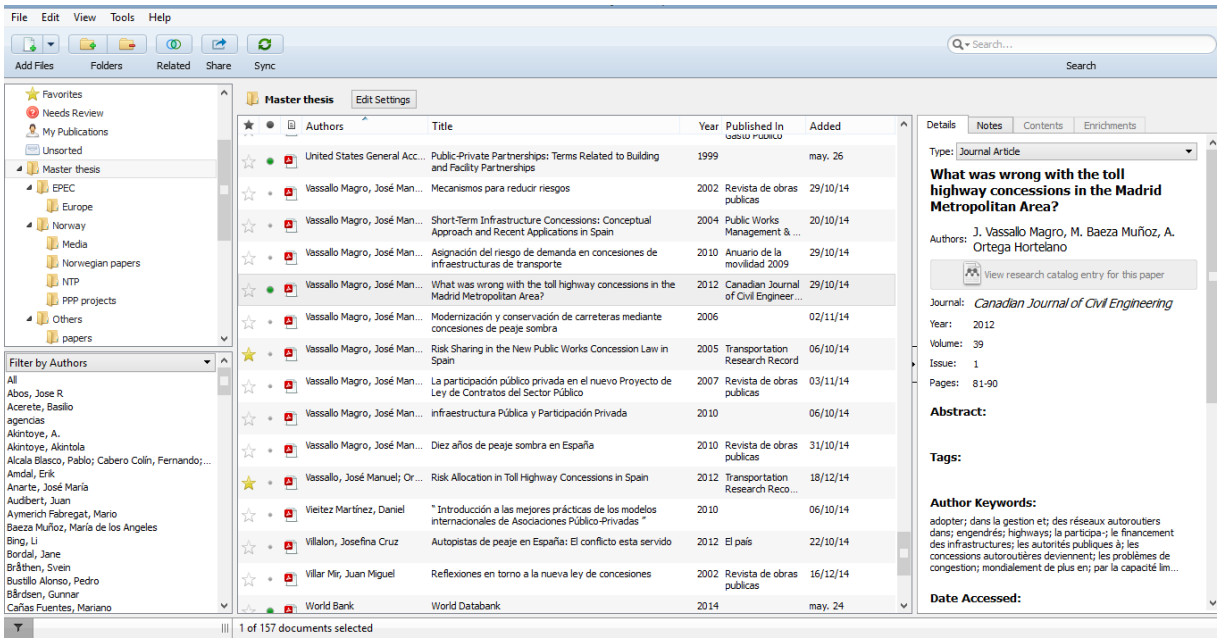


Figure 1: Mendeley interface

2.3 Limitations

The research is based mainly on data provided by the governments and the companies set for running the PPP projects. Therefore, the findings and conclusions presented along the report may be biased if the data gathered do not correspond to the real situation that the sector is undergoing in the countries of study.

Besides, it is noteworthy to keep in mind that most of the official reports made available for the public are issued with at least two years of delay. Hence, the picture presented does not cover completely the current situation, especially in modern economy in which trends and markets are highly variable.

3. Theory

3.1 Infrastructures and Public-Private Partnerships

There is no doubt about the crucial role played by transport infrastructure in the society. Roman roads, the Incan road system, imperial roads are just a few examples that expose how roads were thought to by different empires and countries as the mean to structure and control their territories and resources, usually together with the maritime transport . They were the essence of the exchange o people and goods, or to put in order words, the consequence of the needs of commerce and industry in any nation.

This role exposes that the welfare of a society is bound to the development of its infrastructures. Accordingly, a country is said to be not fully developed until its infrastructure is improved to a certain levels, though the cost of achieving this goal is colossal (Gutiérrez De Vera & Dodero Jordán 2007). Besides, there studies that support the idea of the potential benefits in the overall economy during the construction and the operation period of transport infrastructures, as in the case of highways. (Vassallo Magro & Izquierdo Bartolome 2010).So despite the fact that funds are not unlimited, governments are trying to keep their plans of investment in public infrastructure whilst they cut down the public sector debt , by implementing new formulas to finance these programs of infrastructures , among which is included PPP (Grimsey & Lewis 2002).

3.1.1 Infrastructure

There is no exact definition of infrastructure, since it is a concept that goes far beyond than just roads or highways. Indeed it is a widespread term that encompassed any sort of facilities that enable the performance of any organization .According to the Royal Spanish Academy; the term infrastructure is defined as:

> **"A set of elements or services considered necessary for the establishment and operation of any organization. Air, social, economic infrastructure."**

Grimsey and Lewis address the issue of defining what it is meant by infrastructure through the outcomes of an investment in it. (Grimsey & Lewis 2002)

> **"Infrastructure is easier to recognize than define. Investment in infrastructure is thought to provide basic services to industry and households, key inputs into the economy, and a crucial input to economic activity and growth"**

Besides, the aim of the infrastructure within the society allow to classify them into two broad categories, namely (Loosemore Martin, Ng 2007):

- **Social infrastructures**; education, prisons, health, tourism and recreational facilities.
- **Economical infrastructures**; Bridges, sewage treatments, telecommunications networks, road and rail transport.

Highways and roads are clearly allocated within the economical infrastructures category. These infrastructures are thought to enhance the industry and economy of a nation and consequently the welfare of the society. Nevertheless, this classical thought lacks of another fundamental outlook of their role in the society; they are instruments that structure not only economically but also socially a territory (Vassallo Magro & Izquierdo Bartolome 2010).

For these reasons the economy and society has become more and more dependent on them. Governments draft transport plans aligned with the aspirations of the country, despite the fact that the national funds are limited. , and therefore formulas to engage private sector expertise and funds more pro actively are sought (Vassallo Magro & Izquierdo Bartolome 2010). It is then when PPP scenario comes up.

3.1.2 Public Private Partnerships

PPP arrangements are a new contract figure in which the public interest of obtaining the maximum value-for-money goes hand in hand with the public sector goal to obtain the maximum profit possible (Loosemore Martin, Ng 2007). More precisely, **Public-Private Partnerships** can be defined as agreements whereby the public sector enter into long-term contractual relation with private sector for the construction or management of public sector infrastructure facilities by the private sector entity, or the provision of services (using infrastructure facilities) by the private sector to the community on behalf of a public sector (Grimsey & Lewis 2002).

In addition, this scheme is based on four fundamental principles (Vassallo Magro & Izquierdo Bartolome 2010):

- There are a set of goods and services of general interest, since there are market failures that have to be supervised by the public sector.
- The private sector could improve enormously the efficiency and quality in the allocation of public funds.
- The need of defining an adequate redistribution of risks between the public and private sector for the improvement of the relation.
- The engagement of the private sector along all the project life-cycle could enhance the procurement of public services and goods.

In consequence, PPP strategy has been designed by governments struggling to offer an appealing market whereby private resources are displayed in the provision of certain infrastructures, and thus the public authorities are capable to meet their commitments in the short term (Maté Sanz 2004). Even though, this does not mean that PPP scheme has to be implemented at any cost, the public sector goal is therefore to achieve a better value-for-money through any procurement procedure. For this purpose, there are tools like the public sector comparator (PSC) to test whether a private investment proposal offers value for money in comparison with the most efficient form of public procurement (European PPP Expertise Centre 2012).

It is noteworthy to explain that size and time frame of PPP are likely to be large; the relations among the stakeholders have to be addressed differently. Accordingly, a one-off firm is set up, known as the **special purpose vehicle** (**SPV**) that is formed by a **joint venture** (**JV**). The latter concept refers to a conglomerate of several organizations that could include the contractor, banks, suppliers, public authorities and so on. SVP is responsible to run the asset and to receive a financial compensation either by the government, the users or a combination of both (Loosemore Martin, Ng 2007).

The payment mechanism for roads and highway under PPP arrangement could be done mainly by shadow toll and direct toll (Vassallo Magro & Izquierdo Bartolome 2010). The former is paid directly from the government and it is based, at least in part, on the volume of traffic registered on the road along with other quality, availability and accidents criteria, whereas the latter is based on direct payment by the users, so-called toll roads or toll highways (Vassallo Magro & Izquierdo Bartolome 2010).

3.1.2.1 Types of PPP

PPP are developed under several sorts of arrangements which are planned to suit the miscellaneous needs of the public sector. The General accounting office of the United states provided a list with most of these figures (United States General Accounting Office 1999). The following ones are the most representatives for infrastructures:

- **DBO: Design-Build-Operate .**A single contract is awarded for the design, construction, and operation of a capital improvement. Title to the facility remains with the public sector unless the project is a design/build/operate/ transfer or design/build/own/operate

- **DBOM: Design-Build-Operate-Maintain** is an integrated partnership that combines the design and construction responsibilities of design-build procurements with operations and maintenance. These project components are procured from the private section in a single contract with financing secured by the public sector. The public agency maintains ownership and retains a significant level of oversight of the operations through terms defined in the contract.

- **DBFOM: Design-Build-Finance-Operate-Maintain** the responsibilities for designing, building, financing, operating and maintaining are bundled together and transferred to private sector partners.

- **DBFOMT: Design-Build-Finance-Operate-Maintain-Transfer** is the same as a DBFOM except that the private sector owns the asset until the end of the contract when the ownership is transferred to the public sector.

- **BOT: Build-Operate-Transfer.** The private partner builds a facility to the specifications agreed to by the public agency, operates the facility for a specified time period under a contract or franchise agreement with the agency, and then transfers the facility to the agency at the end of the specified period of time. In most cases, the private partner will also provide some, or all, of the financing for the facility, so the length of the contract or franchise must be

sufficient to enable the private partner to realize a reasonable return on its investment through user charges.

- **BOO: Build-Own-Operate.** The contractor constructs and operates a facility without transferring ownership to the public sector. Legal title to the facility remains in the private sector, and there is no obligation for the public sector to purchase the facility or take title.

- **BBO: Buy-Build-Operate.** This is a form of asset sale that includes a rehabilitation or expansion of an existing facility. The government sells the asset to the private sector entity, which then makes the improvements necessary to operate the facility in a profitable manner.

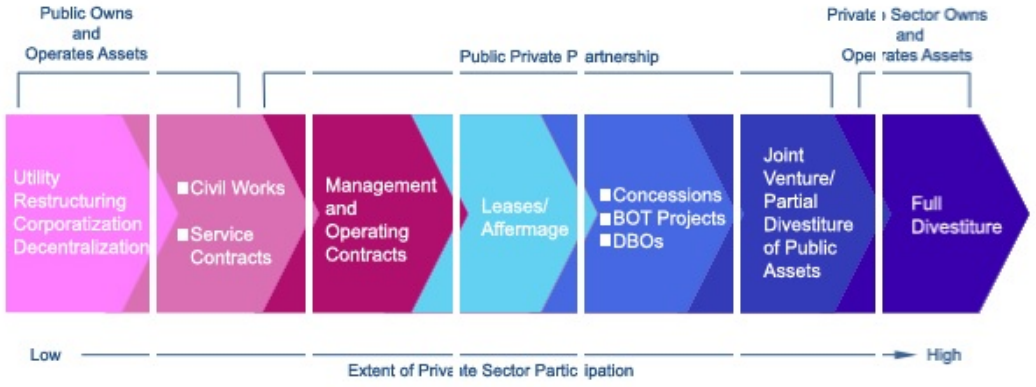


Figure 2: Spectrum of PPP agreements**.**World Bank

3.1.2.1 Advantages and drawbacks

The World Bank (World Bank 2011) has prepared a list of some positive and harmful characteristics of PPP projects in general. Among the PPP potential benefits for governments are highlighted:

- Exploring PPPs as a way of introducing private sector technology and innovation in providing better public services through improved operational efficiency

- Incentivizing the private sector to deliver projects on time and within budget

- Imposing budgetary certainty by setting present and the future costs of infrastructure projects over time

- Extracting long-term value-for-money through appropriate risk transfer to the private sector over the life of the project – from design/ construction to operations/ maintenance

However, the institution also points out some harmful effects of this initiative:

- Private sector will do what it is paid to do and no more than that .Therefore incentives and performance requirements need to be clearly set out in the contract.

- There is a cost attached to debt .While private sector can make it easier to get finance, finance will only be available where the operating cash flows of the project company are expected to provide a return on investment.

- Some projects may be more politically or socially challenging to introduce and implement than others - particularly if there is an existing public sector workforce that fears being transferred to the private sector.

3.2 Risk in PPP infrastructure projects

The basic principle of the PPP is the reallocation of the inherent risk of any road project between the private and public sector. Risk has to be understood as an uncertain event or condition that, if it occurs, has an effect on at least one project objective , either negative or positive (Project management Institute 2008), or to put in other words, any uncertainty but quantifiable consequences (OECD 2008). Uncertainties are said to be defined through probability functions to determine how they are likely to occur. Therefore, risk could be written as:

$$Risk = probability\ of\ occurrence \times Potential\ loss$$

Risk is a cost which entails a financial burden borne by the agent who is responsible to control that risk. Since any project is risk-free, stakeholders have to face with the fact that risk cannot be eliminated; otherwise there is no point to discuss about risks (Peckiene et al. 2013; Ortega Hortelano & Baeza Muñoz 2012; Vassallo Magro & Baeza Muñoz 2010). Risk can only be transferred, mitigated or assumed by another agent (Lam et al. 2007). Moreover, Risks are also changing; they are not evenly distributed along the lifespan of the project, they evolve as the project does (OECD 2008).

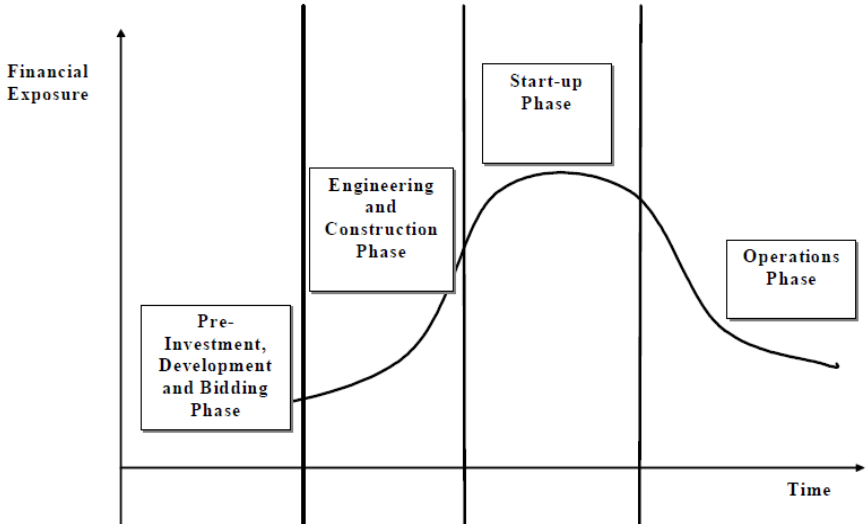


Figure 3: Levels of risk along the life-cycle of an infrastructure project (OECD

The project feasibility will depend on the level of risk inherent to it according to the cost of debt. The cost of debt of a project is the effective rate that a company pays on its current debt and is one part of the company's capital structure which also includes the **cost** of equity (Investopedia 2015). More simply, the debt of cost for a project finance could be estimated through (Vassallo Magro 2002)

$$\text{Cost of debt} = \text{Financial cost} + \text{Financial market of the institution} + \text{Risk spread}$$

The value of the rate for risk spread pretends to cover the lenders from the occurrence of events that change the value of the asset. This depends on the project itself, its inherent risks, and the contractual clauses defined in the contract (Vassallo Magro 2002).

3.1 Classification of risks

Risks classification has been a recurrent discussion that represents the complexity of the issue. Authors have proposed disparate categories within which specific types of risks are sorted according to defined criteria like the causes, outcomes or impacts. It is noticeable how risk analysis and management is remarkably influenced by the approach made through a risk classification (Project management Institute 2008).

Therefore, it is worthy to note some classification thought to be outstanding reference for the thesis. At first sight, the simplest categorization could be addressed from the perspective of which risks are associated to the project performance and which ones to its surrounding environment. This view conducts to a two principal categories according to Loosemore (Loosemore Martin, Ng 2007):

- **Project risks** arise from the way a project is managed or from events in its immediate microenvironment. They may include natural risks such as ground problems and weather conditions, technical problems associated with designs, plant and equipment, materials problems associated with suppliers, organizational etc.

- **General risks** are not directly associated with project strategies, yet can have a significant impact on its outcome. These normally arise from natural, political, regulatory, legal and economic events in the general macro environment surrounding the project.

From a strategy approach, risk could be grouped in a meta classification of three risk levels according to Li Bing, that could facilitate the performance of the process of risk management during the project life cycle (Li et al. 2001; Bing et al. 2005)

- **Macro level** refers to exogenous risk, specially risk at a national or industry level, and upon natural risks. The risks at this level are often associated with political and legal conditions, economic conditions, social conditions and weather.

- **Meso level** includes risks sourced endogenously, representing the PPP implementation problem and involving issues such as project demand/usage, location, design and construction and technology.

- **Micro level** represents also endogenous risks but based on the evolution of the relationships between the stakeholders along the procurement process. Its cause is the inherent differences between the public and private sectors in contract management.

A more comprehensive categorization of risks has been described by Vassallo and Izquierdo (Vassallo Magro & Izquierdo Bartolome 2010) that includes three different categorization of risks depending whether the reference is economical, their sources or the agent who bears them.

The first approach is based in the economic equilibrium of the project, to put in other words, the cash flow generation by the asset:

- **Initial investment risks;** it refers to any event that impact the investment at the early stage of the project; specifically cost and time overrun risk.

- **Revenue risks**; it points to the sources that generate cash inflows from the future operating activities.

- **Operational and financial costs risks;** they include expenses that the private sector has to assume along the life cycle of the project.

The second approach points out the source of the risks, namely:

- **Market risk**; those caused by the actual business activity of the asset run by the private sector.

- **Force majeure risk**; they arise from unforeseen events and acts-of-god

- **Political and legislative risks**; any change of both political and legislative work frame that leads to an impact on the economic equilibrium of the project.

Finally, depending on who is accountable of bearing the risk, the classification is as follows:

- **Project risks;** those which are borne directly by the private agent and in consequence their repercussion is considered on the financial cost of the risk spread.

- **Risks transferable to third parties;** they are transferred to other entities that are supposed to have better capacity to control and monitor them.

- **Insurable risks;** events that can be covered though insurance policies.

- **Risks assumed or mitigated by the granting authority;** those which are thought to be better handled by public entities.

- **Risks covered or mitigated by the project´s partners;** they are also endogenous events of the project for which the project´s partners are committed to cover them as a guarantee for the funders.

Each of the above categories of risks is not isolated from the others, but they are interrelated. Indeed the authors are the ones who highlight the existing bonds between the groups that strength the final purpose of allocation of risks.

Table 1: Risk classification in a concession of transport infrastructures

Effects on the project´s economic equilibrium	Risk source		
	Market risk	Force majeure risk	Political and legislative risk
Initial investment	project	Granting authority Partly insurable	Granting authority Partly insurable
Revenues	Private partners project Granting authority	Project Granting authority	Project Granting authority
Operational and financial costs	Private partners project	Project Granting authority Partly insurable	Project Granting authority

Source: (Vassallo Magro & Izquierdo Bartolome 2010)

3.2Types of risks

There are several types of single and particular risks surrounding a project. However, these specific risks could be grouped within general categories of risks. In the case of infrastructure projects, institutions around the world have proposed their ideas about which risks are the most significant area that may jeopardize the performance. Among these institutions, OECD in its report (OECD 2008) highlighted the following categories:

- **Design or technical risk***;* problems resulting from design failures or from inadequate engineering. An example could be that a design is chosen that, during some future period, will result in high maintenance costs.

- **Construction risk** *;* whether or not the project gets built in a diligent way, on time and within budget

- **Availability risk***;* whether the infrastructure is available for use as required. This also includes performance problems, such as inferior quality and safety.

- **Demand risk***;* variations of future demand and whether the use of the infrastructure and resulting revenues is in keeping with the projections before it was built. Demand above expectations may also make future maintenance costs higher than expected.

- **Operating risk***;* changes in the projected costs of operation and maintenance. This may, for instance, be due to the fact that the construction design, after a few years, proves to be inappropriate and requires more spending than anticipated.

- **Encashment (Enforcement) risk***;* ensuring that users pay when they are supposed to.

- **Financial risk***;* inadequate budget and financial management of outstanding debt, and variations in financial circumstances.

- **Political risk***;* changes in the political situation, altering the terms under which the infrastructure is provided or used.

- **Environmental risk***;* unforeseen adverse environmental impacts resulting from the creation or use of the infrastructure.

- **Force majeure***;* unforeseen events that impact on the infrastructure and its use, including natural disasters.

Additionally, other relevant institution as the State government of Victoria(State government of Victoria 2001) has also proposed its categories, some of them different from the OECD. These are:

- **Site risk** is defined as the risk that the project land will be unavailable or unable to be used at the required time in the manner or at the cost anticipated.

- **Sponsor risk** is considered as twofold type of risks. First it is a risk where the SPV and/or its sub-contractors are unable to fulfill their contractual obligations to government, government will be unable to enforce those obligations against the sponsors .Secondly it is a risks that the sponsor is, for security or other probity reasons, inappropriate or unsuitable to be involved in.

- **Network risk** is the risk that the network needed for the private party to deliver the contracted services will be removed, not adequately maintained or otherwise changed.

- **Interface risk** is said to be the risk that the method or standard of delivery of the contracted services will prevent or in some way frustrate the delivery of the core services or vice versa.

- **Asset ownership risk** is the risk that events such as loss events, technological change, and construction of competing facilities or premature obsolescence will occur, with the result that the economic value of the asset may vary, either during or at the end of the contract term, from the value upon which the financial structure of the project is based.

As a matter of principle, these definitions pretend to provide a better approach towards the analysis of the risks surrounding any PPP in infrastructures. This is called risks identification and it is considered crucial in development of any project (Project management Institute 2008).

3.3 Risk allocation

This financial burden described has triggered several researches and studies about risk allocation and thus it turns out to be a remarkable evidence of how meaningful this activity has become (Taroun 2014).Moreover, because of the large number of actors involved, it has become a high time-consuming activity during the procurement procedures. PPP contracts are founded on lengthy and complex tendering arrangements and are likely to undergo post tender negotiations owing to, inter alia, the large number of stakeholders. It also has been argued that the complexity of these arrangements increase public sector risk rather than (Loosemore Martin, Ng 2007)

Firstly, it is required to look at the definition of what is understood as risk allocation. Generally speaking, it is the definition and division of responsibilities associated with a possible future loss or gain, and seeking to assign responsibility for a variety of hypothetical circumstances should a project not proceed as planned (Lam et al. 2007).In the case of PPP , these are thought to transfer some of the existing risk from the public to the private sector to achieve a better value-for-money (Grimsey & Lewis 2002). Although, it has to be emphasized also that even thought that the private sector has to bear most of the risk; there are some variables and events on which it has none or too little control. Nonetheless, insofar as possible, the risk should be allocated to the agent who (Loosemore Martin, Ng 2007):

- Has the greatest capacity (expertise and authority) to manage the risk effectively and efficiently (and thus charge the lowest risk premium).
- Has the capability and resources to cope with the risk eventuating.
- Has the necessary risk appetite to want to take the risk.
- Has been given the chance to charge an appropriate premium for taking it

Hence, capacity, resources, appetite and premium are considered the key drives to conduct a fair distribution of risks. Although it has to be borne in mind the difference between master and control a risk by any agent. Since mastery means that risk no longer exist as uncertainty ,whereas control means that efforts made will influence the outcome of the uncertainty (Ortega Hortelano & Baeza Muñoz 2012).

Although the principles numerated are concise, the reality has proved a higher complexity than the theory. The decisive issue is how to determine how an agent has a fair control over certain risk. Because, by no means, risk allocation should be done through the prism of only one of the parties, but it has to employ cooperative game theory (Peckiene et al. 2013).

Insofar as the risk is thought to be far beyond the boundaries of the project, it becomes less controllable by any of the agents, and then discussions arise (EuropeanComission 2003). Neither authors nor governments have agreed on this matter, and as a result the each country or institution has its own references to conduct it. Nevertheless, besides guidelines and principles, each project is said to have a unique combination of risk and hence risk allocation is also particular for a project.(European PPP Expertise Centre 2012)

3.4 Balance sheet treatment of PPP

National debt is considered a severe challenging issue for modern governments which are struggling to cut it down. As a result of these policies, the deficit treatment of PPP in the government balance sheet has become critical for authorities (European PPP Expertise Centre 2012). The questions that follows is how is possible to determine whether a PPP project is part of the national debt or not.

European union has not been an exception, and therefore the statistical office of the European Union (Eurostat) has required that debt and deficit treatment follows the European system of accounts, ESA95 (European PPP Expertise Centre 2012). The decisive criteria to judge a PPP, in terms of national balance sheet, is described as the analysis of the risk and reward structure, or more precisely, the allocation three fundamental risks, namely: Construction, demand and availability. Note that these risks are explicated named in the OECD classification.

In other words, it turns that risk allocation has undoubtedly a decisive economic role. However, this could be also a double-edged sword if governments use it indiscriminately as a financial engineering instrument. Governments could be encouraged to undertake unnecessary infrastructures since the financial burden will be shifted to future generations (Vassallo Magro & Izquierdo Bartolome 2010).

Table 2: Accounting treatment of a PPP according to ESA

	RISK TYPE			
	Construction risk	Demand risk	Availability risk	Government balance sheet
Who bears the risk?	Government	Government	Government	ON
			Private	ON
		Private	Government	ON
			Private	ON
	Private	Government	Government	ON
			Private	OFF
		Private	Government	OFF
			Private	OFF

Source:(European PPP Expertise Centre 2012)

3.3 Markets of PPP in infrastructures

The PPP phenomenon has been widely implemented all over the world. It has proven itself as a reliable strategy to boost developing economies towards better services, and for the richest economies, such as the United States, European Union or Australia, it is considered a supporting tool to maintain a steady policy of investments (Vassallo Magro & Izquierdo Bartolome 2010). In the European case, private finance initiatives (PFI) were introduced by the conservative government in the UK in 1992, whereas in Spain the first highway concession started to be built in 1969 (Grimsey & Lewis 2002; Vassallo Magro & Izquierdo Bartolome 2010). Besides, in the last years, the European commission has been encouraging the implementation PPP policy in all the countries of the union (EuropeanComission 2003).

It needs to be remarked that launching a concessionary program in the infrastructure market is not only a matter of economy, but also a question of a reliable legislation that protects the rights of the private sponsor. Hence, risk allocation could be solely undertaken successfully within a trustful regulatory framework. The key behind this statement is defined through the relations between three parties: Authorities, economic sector and the construction/contractor sector(Maté Sanz 2004).

Therefore, the potential of a transport market is based on the fact that the characteristics to be met, as proposed by Maté (Maté Sanz 2004), depend on the role played by the aforementioned stakeholders .Firstly, the authorities have to develop legislation and policies though to fulfil:

- The country developing the concessionary system has a legal system which clearly defines the rights and obligations of both the concession authorities and the private concessionaires for transport infrastructure works.

- The country's legal system ensures the observance of contracts.

Secondly, the national market should have the following characteristics:

- The country has sufficiently developed capital markets. This requires the presence of negotiated financial/ assets for periods of over ten year. These financial assets may include those derived from interest or exchange rates.

- There is macroeconomic stability in the country or suitable mechanisms, whether internal/ or through multilateral organizations, to safeguard against any instability which may occur.

Thirdly, the contractors should fulfil:

- The presence of a concessionary sector which has the technical know-how to ensure the correct maintenance of infrastructures in the short term and with long term cost reduction criterion.

- The tender processes for infrastructure concessions are capable of attracting the most efficient operator.

- The country has its own or imported R+D in terms of construction materials and processes, and the conservation and maintenance infrastructures based on achieving a fixed level of service quality at a minimum cost.

- The construction sector has experience a large scale of works and the required technology to ensure correct construction in terms of both quality and time scale.

When a country is said to have reached the ground conditions described, PPP in infrastructure market could be developed safely and completely for the benefit of the society.

3.3.1 European Union

The European Union has been always discussing about the engagement of private funds in the provision of transport infrastructures in pursuance of creating a common market .Nevertheless, it was not until the **Trans-European Transport Networks (TEN-T)** plan came up when the authorities became more concerned about the crucial role of private financing to undertake this program TEN-T plan seeks to build up , from a communitarian perspective , a global European transport network based on interoperability and interconnection of the transport modes(Vassallo Magro & Izquierdo Bartolome 2010) .Accordingly, to pursue this objective, the communitarian authorities have strongly encouraged the state members to implement this strategy, but with little success. Only few countries, such as Spain, Portugal, Ireland and UK have already spread the PPP scheme (Vassallo Magro & Izquierdo Bartolome 2007).

The European commission has sought to create a common PPP framework in the union as a mean to enhance the performance of the transnational market. As a result, a green paper was presented by the commission in 2004 as an attempt to outline a common PPP frame in compliance with the general principles of the community law, though this paper admits that its conclusions are merely reflections(European commission 2004).

In connection with the foregoing, the green paper remarks the idea that infrastructures are also no risk-free projects (Taroun 2014) while entering new actors in this field leads to analysis which new risks may come up. Although infrastructures are said to be one-off projects(Taroun 2014), they also share some common features that are important to be looked out when the private sector is encouraged to participate in the provision of infrastructures. The commission pointes out the following ones in the green paper (European commission 2004):

- The relatively long duration of the relationship, involving cooperation between the public partner and the private partner on different aspects of a planned project.

- The method of funding the project, in part from the private sector, sometimes by means of complex arrangements between the various players. Nonetheless, public funds - in some cases rather substantial - may be added to the private funds.

- The important role of the economic operator, who participates at different stages in the project (design, completion, implementation, funding). The public partner concentrates primarily on defining the objectives to be attained in terms of public interest, quality of services provided and pricing policy, and it takes responsibility for monitoring compliance with these objectives.

- The distribution of risks between the public partner and the private partner, to whom the risks generally borne by the public sector are transferred. However, a PPP does not necessarily mean that the private partner assumes all the risks, or even the major share of the risks linked to the project. The precise distribution of risk is determined case by case, according to the respective ability of the parties concerned to assess, control and cope with this risk

Nonetheless, paper stresses further that PPP cannot be understood as a miraculous solution and entrust to the states members to duly drawn up a specific regulation .As it is underlined in the green paper, the community law on public contracts and concessions is neutral as regards the choice exercised by Member States to provide a public service themselves or to entrust it to a third party(European commission 2004).

More recently, the commission has passed a new directive 2013/23/ue that aims to solve the absence of clear rules at Union level in the field of the award of concession contracts creates problems of legal uncertainty, hampering the freedom to provide services and distorts the functioning of the internal market(European commission 2014). The directive has to be seen as an attempt of the communitarian authorities to harmonize and merge into a common framework the disparate national legislations.

3.3.1.1 European PPP expertise center

Along with the commission, the **European investment bank** (EIB) has been collaborating with the state members on the financial side, which has been undoubtedly crucial to ensure the financial feasibility of PPP around Europe (European PPP expertise Centre 2015b).Therefore, the experience accumulated has lead to the creation of **European PPP expertise centre** (EPEC) whose solely mission is to strengthen the ability of the public sector to engage in Public Private Partnership (PPP) transactions. It does this by helping Members to share experience and expertise, analysis and good practice.(European PPP expertise Centre 2009)

EPEC core activities encompassed collaborative working with state members, helpdesk and institutional strengthen, all draw on the broad PPP portfolio supervised by the EIB. Among these publications, there are relevant guides to conduct PPP procurement procedures, as well as how to assess the potential impact on the government balance sheets, namely:

- *The guide to guidance: How to prepare, procure and deliver PPP projects.* The Guide is intended for public sector officials, from EU Member States, who are in charge of PPP projects and have knowledge of and experience in conventional public procurement but are not familiar with PPP arrangements. (European PPP Expertise Centre 2012).Although, they also stress that in a rapidly changing environment, new strategies could make this guide obsolete.

- *Risk distribution and balance sheet treatment: Practical guide.* This guide is intended to give advice on the impact that the risk distribution between governments and the PPP or private concession partners in a specific project has on government deficit and debt. It contains a checklist of issues designed to help procuring authorities determine the possible statistical treatment of a PPP or concession project (European PPP expertise Centre 2014)

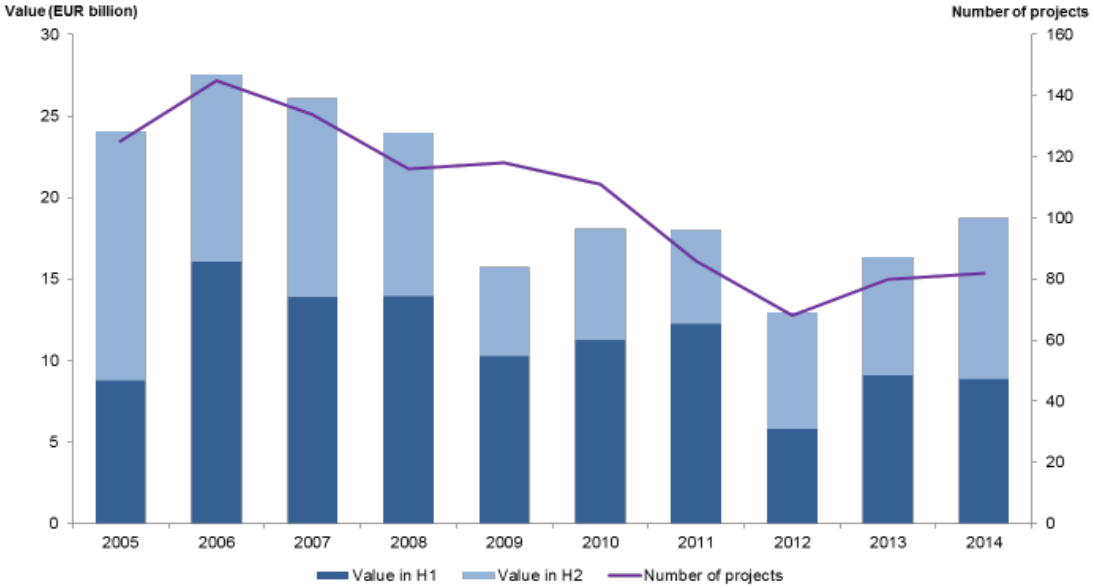


Figure 4: The European PPP market by value and number of projects since 2005 (European PPP expertise Centre 2015a)

Concurrently, the institution publishes papers and reports to contribute for a better comprehension of the PPP evolution, and reflecting also the market scenario on a biannual report. The last report available presents the situation at the end of the year 2014(European PPP expertise Centre 2015a) ,see figure above, whereby is summarized the overall market among the state members and the total value represented.

In connection with the foregoing, since PPP projects depend not only on the political willingness but also on the economy. Hence, the last economic downturn has hit PPP program hard, specially from year 2008 in advance, diminishing systematically the resources available for funding of PPP until 2013, year from which the program seems to recover its momentum. Nonetheless, among the current 82 transactions that reached financial close, 11 represent around the 60% of the market in Europe (11 billion), meanwhile the average transaction size is situated around 229 million Euros for the year 2014(European PPP expertise Centre 2015a)

Looking deeply into the PPP sector composition; transport projects represent the larger proportion of endeavors, and thus capturing most of the funds of the market share, almost11.8 billion Euros at the end of 2014.Further, a deeply analysis of the modes of transport, it is proved the alignment with the strategies of boosting the freight and passenger transport across Europe, Trans-European Transport Networks (TEN-T).

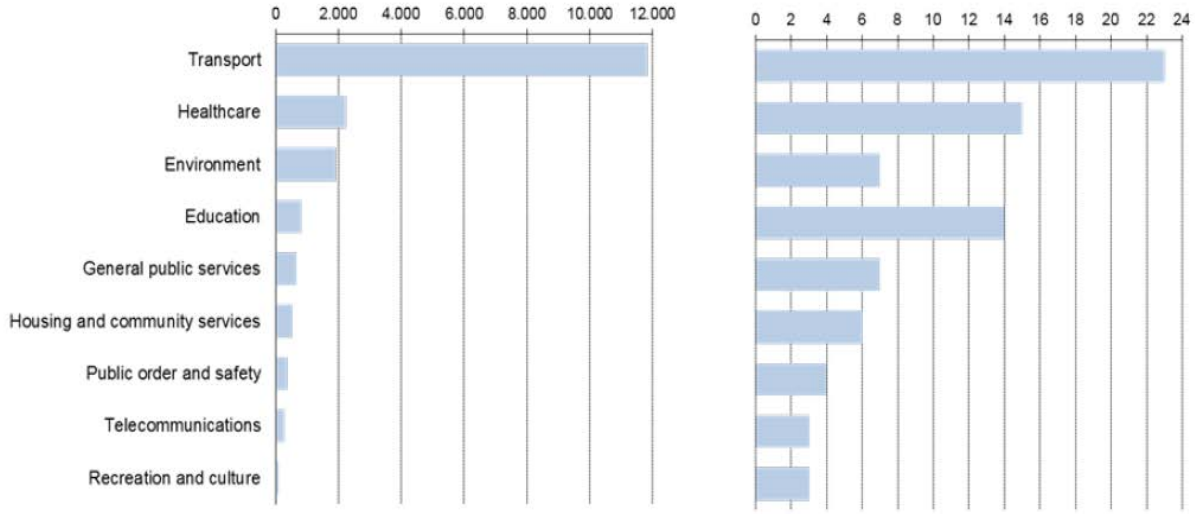


Figure 5- Sector breakdown: Market value (On the right) and number of projects (On the left) (European PPP expertise Centre 2015a)

Despite the fact that is the picture of the year 2014, this trend has been noted in previous reports. As a matter of principle, transport projects are considered more complex than other infrastructures, and therefore the ones that require stronger financial support to be launched. In addition, it is out of question that the weight of the transport sector will continue to be relevant in the future(OECD 2011).

3.3.1.2 Controversy between PPP and concession

There is recent discussion about the scope of the terms Public-Private Partnership and concession; especially after the green paper was published. This is even noticed by the Eurostat which clearly distinguish them in terms of accounting in the balance sheet as the EPEC reports in its papers (European PPP expertise Centre 2014). See in the **appendix K.**

Among the authors that criticize this fuzziness stand out Vassallo and Izquierdo work (Vassallo Magro & Izquierdo Bartolome 2007).They emphasise that the terms of concession and PPP are by no means opposing concepts, but they are concepts situated on two different horizontal levels which overlap in practice. To put it briefly, while concession stresses the public ownership of the asset, PPP stresses the need for a fair and balance relationship for the society. In the end, what the authors emphasize the most it is the fact that both PPP and concessions are about the contractual relationship established as well as the risk allocation made.

3.3.2 Spain

With more than 4000 km built and operated by private companies in 2014, the Spanish experience in the field of highway concessions , **concesiones de autopistas** in Spanish, is well established(Baeza Muñoz & Vassallo Magro 2010).First toll highway concession started up in 1969 until the last connection Malaga-Alto de Las Pedrizas was completed in 2012. It is noteworthy to bear in mind that term used in Spain to define highways designed, constructed and operated under private arrangements, is concession rather than Public-Private Partnerships (so-called Colaboraciones publico-privadas in Spanish) This is merely a matter of language; the idea is to stress the public ownership over the asset (Vassallo Magro & Izquierdo Bartolome 2007).

The two figures used to conduct these concessions could be distinguished through the origin of the cash flow, namely through making users to bear a direct payment, toll highways, or making the government responsible to made the payments, shadow toll. The former mechanism has been implemented since the first concession, and therefore it is the most extended, 3307 km of the total. The latter has been introduced lately, in 2007 were awarded the first highways, and it is intended for old highways which need to be upgraded, 1042 km in total(Subdelegación de sociedades concesionarias de autopistas de peaje 2013; Vassallo Magro & Perez de Villar Cruz 2010).

This thesis aims to focus on the toll highway concessions in its approach to the Norwegian projects, and hence the following sections are thought to outline the main features of the country, the sector and its surroundings.

3.3.2.1 Spanish Legislation

Even though there was no specific legislation for the first concessions, Spanish authorities were early aware from the early outset of how meaningful it was a trustful legislation as means to promote toll concessions; otherwise private sector would not have invested due to the high risks as a consequence of the lack of legal guarantees.

This legislation in concessions for toll highways started up in 1972, with the *law 8/1972*, which was completed with the *royal decree 215/1973*. The idea was to boost the national economy and at the same time enhancing the cohesion of the regions designing new land communications, essentially modern highways of double carriageway contrasting with the existing net of *national roads*, carreteras nacionales in Spanish, with only one carriageway and ,at that time, were nearly collapsed due to the traffic growth(Villalba-Romero 2014).

In 1978 the constitution was passed, and the conservative government elected did not made any changes into the existing scheme. In 1982 the labour government took office which did not neither modified the law nor promote much new projects under this strategy(Villalba-Romero 2014). It does not mean that PPP infrastructures were stopped completely, but rather testimonial in comparison to the traditional tendering formulas. As a matter of principle, toll highways have not been popular among the population due to the cost it implies for the users, taxpayers usually think that they are paying twice, once with their taxes and another using it(Vassallo Magro & Izquierdo Bartolome 2010). .

In 1996, a new conservative government was elected which has an enthusiastic aptitude towards the introduction of the private sector in the provision of infrastructures, as a means of keeping under control the public debt according to the commitments agreed with the European Union in order to enter in the Euro. The government was the first to define a policy for PPP in transport infrastructures through the Master plan for transport infrastructures ,*Plan Director de Infraestructuras de Transporte,* that considered PPP as a key factor in the launching of new direct toll road programs(Villalba-Romero 2014). Despite of this interest, it was not until 2003 when it was widely modified by the government during its second term. The outcome was the new *Law 13/2003* which basically updates the existing law to the new requirements approved in the European Union, The need to review the existing law, all the infrastructures subject of PPP arrangements, reinforcing the private financing in public infrastructures and improving the legal framework to capture this investment (Vassallo Magro & Gallego 2005).

Although this were the main reasons, it should be underlined the strong and steady economical growth, around 3% yearly, that the country was experienced. The concessionary sector was very well disposed towards the upcoming Law. For example a well known CEO, Dr. Juan Miguel Villar Mir who was head of the civil engineer Institution in Spain (Colegio de ingenieros de caminos, canales y puertos) at that time and CEO of the Villar-Mir group pointed out that the new structures of financing and private management would push forward the economy as consequence of the vast resources that would be mobilized more efficiently and productively(Villar Mir 2002).

Vassallo and Gallego (Vassallo Magro & Gallego 2005) described some key ideas on the new legislation:

- The private sector should be allocated with most of the market risks.
- The public sector should be allocated the risks that cannot be adequately managed by any other stakeholders.
- The public sector may assume or mitigate some risks, but this assumption should generally avoid increasing Spain's public deficit.

In 2004, the socialist party developed a long term strategic Plan for transport infrastructures 2005-2020 ,*Plan Estrategico de Infrastructuras de Transporte (PEIT)* included private participation under PPP forms, focusing on shadow tolls (Villalba-Romero 2014). However in 2008 the financial crisis hit the economy around the world, and Spain was one of the most affected countries in the European economy Union, as all other countries in the Mediterranean region. Toll highway concessions were also affected by the crisis, especially the ones built in recent years. Indeed, it has been not only a matter of overestimation of traffic forecast, there are cases in which the traffic is less than a 50% of the initial estimation, but also a matter of expropriations(Vassallo Magro et al. 2012). There are cases in which the price of the square meter raised up to 100 times the expected value at the outset of the project.(Jiménez-blanco et al. 2014)

Thus, it all has summed up a colossal burden for the SVP established pushing them towards the bankruptcy. Hence, the successive government have sought to avoid this situation by given loan at a 0% interest rate or even subsides. In 2011, *the new Royal decree 3/2011* encompasses the tendering

system of toll concessions within the overall frame of bidding for all the public administration at a national level.

Table 3: Evolution of the length of toll highway concessions in Spain

Year	operation	design /construction	Total granted	Year	operation	design /construction	Total granted
1967	0	167	167	**1991**	1.948	202	2.150
1968	0	414	414	**1992**	1.995	164	2.159
1969	34	474	508	**1993**	2.000	164	2.164
1970	82	426	508	**1994**	2.033	51	2.084
1971	175	559	734	**1995**	2.033	141	2.174
1972	281	629	910	**1996**	2.033	221	2.254
1973	370	1.399	1.769	**1997**	2.109	147	2.256
1974	583	1.372	1.955	**1998**	2.118	216	2.334
1975	616	1.426	2.042	**1999**	2.242	324	2.566
1976	881	1.161	2.042	**2000**	2.251	526	2.777
1977	1.109	933	2.042	**2001**	2.327	456	2.783
1978	1.349	693	2.042	**2002**	2.447	350	2.797
1979	1.496	546	2.042	**2003**	2.624	208	2.832
1980	1.622	420	2.042	**2004**	2.788	470	3.257
1981	1.670	372	2.042	**2005**	2.811	447	3.257
1982	1.670	372	2.042	**2006**	3.069	213	3.282
1983	1.756	286	2.042	**2007**	3.244	38	3.282
1984	1.769	273	2.042	**2008**	3.244	38	3.282
1985	1.835	207	2.042	**2009**	3.261	25	3.286
1986	1.835	207	2.042	**2010**	3.283	25	3.307
1987	1.835	254	2.089	**2011**	3.307	0	3.307
1988	1.843	246	2.089	**2012**	3.307	0	3.307
1989	1.877	236	2.113	**2013**	3.307	0	3.307
1990	1.895	255	2.150				

Source :(Subdelegación de sociedades concesionarias de autopistas de peaje 2013)

Lately in 2012, a new long term Plan of infrastructures, transport and housing ,*Plan de Infraestructuras, Transporte y Vivienda (PITVI)*,defined three basic principles aiming to liberalize the management of transport infrastructure and services, to promote private participation and to adapt the provision of the existing infrastructures and services to the actual demand(Villalba-Romero 2014).Simultaneously, the ongoing economic downturn has forced the government to make some proposals and other actions to enhance the concessionary market of transport, which are recorded by Villalba-Romero (Villalba-Romero 2014):

- Rescue new toll road concessions in financial distress, allocating them in a new holding company as financial vehicle controlled by the Government and issuing project bonds to improve its financing. Further concession restructuring will be required. These measures however are under negotiation and still are not in place.

- Create specific PPP unit, to promote, regulate, control and monitor project from inception to follow-up and result assessment.
- Constitute PPP excellence centres.
- Increase bearing of commercial risks by government
- Increase government funding and/or guarantees for PPP project funding/ financing. To some extent, these measures have been already implemented in some of the toll road concession in troubles.
- Increase emphasis on small scale PPP contracts.
- Extend PPP form to other sector than transport and alternative solutions to municipalities are being considered

3.3.2.2 Organization of the public administration related to concessions

The Ministerio de fomento, *Ministry of public works*, is the granting authority responsible of developing the any initiative related within the toll concessions system according to the strategic plan active at that time. Likewise, the *Ministry of public works* is accountable of monitoring and controlling the performance of the concessions, stressing the economic balance of the toll highway (Gobierno de España 2012). Although it is not the only Ministry involved in the process and the awarding contract has to be approved by the council of Ministers.

The *General secretary of infrastructures* ,Secretaría General de Infraestructuras, has been assigned within the general secretaries of the ministry (Gobierno de españa 2012) with the responsibility, among others, to enforce the existing laws in terms of toll highway projects. This general secretary is formed by the G*eneral directorate of roads* ,Dirección General de Carreteras, among others general directorates , which is also divided in sub-directorates that are subsequently specialized entities along the different stages in the construction of a highway infrastructure, such as Planning, construction, conservation and the operation phase , of any road project including toll highways (Gobierno de España 2012). Therefore, the sub-directorates are the agencies through which any highway project are analyzed and controlled along their lifespan. These sub-directorates are the key agencies in the process.

Nonetheless, the concessions poses a different strategy, as it is defined by are circular orders that set up the process to be followed by the sub-directorates along each phase. The orders in force were drawn up in 2001 and only apply for the *General directorate of roads*. Nonetheless, the number and specialization of these sub-directorates within may vary depending on the government, although these changes usually affect more to the sub-directorates related with the administration. Those departments, agencies and directorates belonging to the *General Secretary of infrastructures* and directly involved are sketched below.

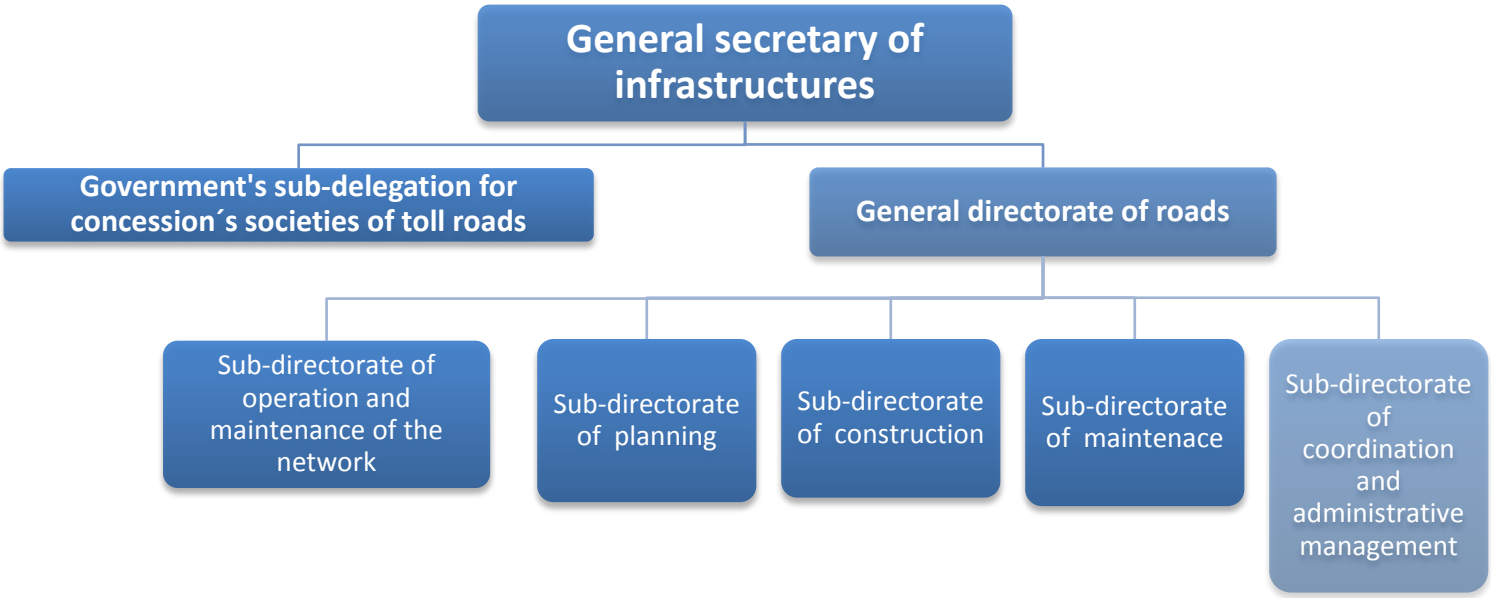


Figure 6- A sketch of a part of the organizational chart of the ministry of public works (Ministerio de fomento 2013). Showing departments related with toll highway projects.

To sum up, the specific responsibilities G*eneral directorate of roads* in respect of toll highways are described below (Gobierno de españa 2012):

- Reporting and coordinating the inspection and control of the highway operated under a toll scheme based on the payment by the user.

- Making feasibility reports for new sections highways under the concession scheme in coordination with the government's sub-delegation for concession´s societies of toll highways

Within the *General Secretary of infrastructures*, there is a post-award unit called *Government's sub-delegation for concession´s societies of toll highways*, Subdelegación de sociedades concesionarias de autopistas de peaje, with a remarkable role in the evaluation of the performance of the contracts in Toll highways. Indeed, most of the information presented and used in this paperwork has been obtained through reports yearly written by this agency and published on the *Ministry of public works* web site. The access to the information is free of charge, though reports are only written in Spanish.

The report offers a wide range of information and figures that reviews, inter alia, the composition of the shareholders of the companies, financial rates, volume of traffic along the year and in comparison to the historical trend among other data available. The latest reports include in addition data in terms of how shadow tolls haven been lately implemented in Spain. Despite the fact that the details available are thought to be complete and well structured, data released refers to the year 2012 though it is being published in 2104.

Apart from the report, this unit has been assigned with responsibilities designated in the Royal decree 657/1986. The following ones are spotlighted (Gobierno de España 1986):

- To coordinate the actions agreed by the central administration in relation to the concessions contracts.

- To monitor and control the fulfilment of the existing concessions obligations during the operation phase, as well as watch for the fulfilment of the economical-financial balance plan.

- To propose the approval of the toll rates and their reviews, as well as to authorize the bonus scheme.

- To make proposals in order to hijack the concession and the reversion of the concession or the contract resolution.

- To arrange, after hearing the concessionaire, the imposition of the coercive penalties and fines according to the existing law, as well as in the bidding administrative specifications.

- To define the temporary using conditions of the highways according to the existing law.

- To approve the contracts signed by the concessionaire with third parties in order to operate the service areas, this includes also any other contract related with the provision of services need to operate the infrastructure.

- To gather data considered essential from the concessions societies, to verify their account books and to arrange inspections of the facilities and services. It may attend to the board meetings of the management board.

It is obvious that the agency contribution as a surveillance authority to ensure the good practices by the concessionaries due to role taken whilst offering a service considered essential by the society(Villalba-Romero 2014). The database and experience accumulated enhance the future performance of the public authorities, thereby enabling governments from past failures.

Concurrently, it should be mentioned that concessions are not only granted by the national government owing to the territorial organization. As a consequence of the decentralization conducted in Spain, infrastructures are either owned by the central state, the autonomous community /or the province in which are divided the autonomous communities of Spain. Thereby, this scenario also applies to the concessions in highways, meaning that, each autonomous community with toll highways operating within their territories may have its own structure to manage and control their performance (Villalba-Romero 2014). In fact, some of the autonomous governments have carried out their own policy of infrastructures under shadow toll arrangements.

Nonetheless, the general directorate of roads have delegations along the country which have are also involved in the development of the toll highway projects. However this is not going to be further studied in the thesis.

Table 4: Length of the toll highways granted by the different administrations in Spain

Administration	Total length (km)	Percentage (%)
Central administration	2759	83,43
Basque provincial council	162.3	4,91
Navarre provincial council	112.6	3,40
Government of Catalonia	212.3	6,42
Government of Galicia	57.8	1,75
Balearic government	3	0,09
TOTAL	3307	100

Source: **(**Subdelegación de sociedades concesionarias de autopistas de peaje 2013)

33.2.3 The concessionary sector: Agents, evolution and crisis

3.3.2.3.1 Evolution

It is noteworthy that there are clearly three periods regarding the development of highway concessions in Spain which are defined by Vassallo, Ortega and Baeza in their research(Vassallo et al. 2012)

1. **First phase** place between 1967 and 1975, a total of 2,042 km (61.17%) of toll highways were built by the central government of Spain under the toll highway program which aims to expand and improve the Spanish highway.

2. The **second phase** last from1976 to 1995. During this period any government undertook a new toll highway program. Specially, along the Socialist governments who were politically opposed to promoting private concessions as a means to finance highways.

3. Finally a **third phase**, 1996 up to 2011, in which 969 km (25.24%) of new toll highway concessions were awarded by the central government. In 1996 the new conservative government faced with the obligation to cut down public deficit to accomplish with the European treaties to join the future Euro. This led the government to implement once again the concessions program so as to encourage the participation of the private sector in the financing of new transportation infrastructure. Afterwards, the Socialist government that took office in 2004 continue with this concession system, though it promoted fewer toll highways.

To date, the toll highway market is composed of 32 SVP and 22 out of the total are granted by the central government, whereas the remaining concessions are granted by various autonomous communities; inter alia, Catalonia, Galicia and Navarre, as well as the Basque provinces of Biscay and Guipuzcoa.The longest concession granted has a length of 478 km that includes four toll highways in the east part of the country, and the shorter is a tunnel of 3km whose shareholder is a public entity. Besides, on the table on the previous page, it is noticeable that the first forth concessions noted represent around the 44% of the total length operated. This is entirely explained by the fact that they belong to the first stage of concessions implemented in Spain under an ambitious plan.

Table 5: Total length of highways granted by central government. Length refers to all the sections granted, even those which have no tolls.

First phase	Length (km)	Percentage of total market	Third phase	Length (km)	Percentage of total market
ACESA	478,3	14,50%	HENARSA	85,5	2,60%
AUMAR	467,6	14,10%	MADRID-LEVANTE	177	5,40%
AVASA	294,4	8,90%	MADRID-TOLEDO	81	2,40%
AUDASA	218,9	6,60%	AUSUR	76,6	2,30%
EUROPISTAS	84,3	2,50%	CASTELLANA	50,8	1,50%
IBERPISTAS	69,6	2,10%	EJE AEROPUERTO	8,8	0,30%
AUCALSA	86,8	2,60%	AUSOL	102,2	3,10%
			MADRID SUR	99,1	3,00%
			AM	91,5	2,80%
			ACEGA	56,6	1,70%
			AULESA	38	1,10%
			AUCOSTA	114	3,40%
			CIRALSA	53,5	1,60%
			GUADALCESA	24,5	0,70%
Total	**1699.9**	**51.3%**	**Total**	**1059.1**	**31.9%**

Source:(Subdelegación de sociedades concesionarias de autopistas de peaje 2013)

3.3.2.3.2 Agents

One of the immediate consequences of this experience, it is the fact that up to seven Spanish concessionary companies have been situated on the top of the world list of the publication "Public works financing" related to companies specialized in concessions around the world (Europa press 2010; Europa press 2014). The aforementioned companies are part of major construction conglomerates, some of the most import are ACS group, FCC, Abertis, Ferrovial, Sacyr,Acciona and OHL (Public Work Finance 2013). The experience gained in Spain has been crucial for these groups to expand their business model and portfolio towards not only South America, the natural market for Spanish companies, but also the USA, UK and even Australia. Their current portfolios encompass hospitals, education, Highways, railways and many other services

Although, it does not mean that the aforementioned groups have also the same weight at a national level as they do abroad. In 2013, 71,6% of the shareholders were construction groups, where as the remaining 28,4% was divided between concessionary firms (15.7%), banks (7.4%), public entities (2,5%) and others (2.8%) (Subdelegación de sociedades concesionarias de autopistas de peaje 2013).

3.3.2.3.3 Crisis

More recently, the financial crisis has hit especially hard the concessions granted during the third stage, but also the total market in general and it has reveal some relevant weaknesses in the toll market (Baeza Muñoz et al. 2011)

- Traffic volume has shown to be much more susceptible to the economic cycles when the toll highway rivals with alternative highways free of charge
- This susceptibility is even more deeply felt in toll highways in which traffic depends on the season and urban toll highway that rivals with collapsed free of charge highways.
- Traffic risk allocated to concessions which have seen to be susceptible to economic cycle, it may poses a threat to the endeavor.
- The state is always willing to renegotiate the terms of the contract rather than cease it.
- Renegotiations result most of the times in negative outcomes for the taxpayers and users whom usually end up paying a higher fare or even a longer lifespan of the concession.

These weaknesses together with others more specific to each project has lead to a period of severe turbulences in the concession market as described on previous sections which could influence greatly on future programs of toll highways in Spain.

3.3.2.4 Toll highways and the society

Besides the technical and legal side of concessions, there is also a political and sociological perspective of this strategy that influences enormously the performance and the potential of the market. The matter is the fact that due to the financial crisis, the downturn of the national economy has lead to a severe cut in the budgets. The Spanish government has less and less manoeuvrability to face any spontaneous situation which could jeopardize the stability of the national budget which is now supervised by European commission.

Figure 7: toll highway in Spain .Source: vozpopuli.com

The main political motivations for PPP as solution, originally official motivations were technical, looking for competition and efficiency and there were also positive motivations and strategic motivations, namely electoral interests. On the other side, unofficial motivations clearly respond to ideological approaches as it has been seen recently(Villalba-Romero 2014).

In general, it could be said that the conservative parties have pursued with more enthusiasm the engagement of private funds in the provision of infrastructures,

especially in a context of the Maastricht treaty to become a member to the Euro. Although, the last socialist government shared also this vision and granted PPP projects under the shadow toll mechanism (Vassallo et al. 2012). However, the crisis has also affected the political parties as it has done with the society. New parties have come up; some of them are extremely reluctant, or even opposed, towards PPP. Further, they are clearly opposed to bailout the concessionaries that have signed for bankruptcy which may entail severe turbulences in the market. This political panorama is not yet to be defined, especially since the local and regional elections held in May 2015 which has led to unstable governments

Accordingly, the Spanish society has also become more aware about the toll highways which could be seen in several national newspapers and magazines. The media have published more news, opinion columns and even editorials, particularly about the problems faced in the concessions established in corridors around Madrid, so called las radiales. For instance , it could be read that *"The government calls for a bail-out of the toll highways with an haircut of the 50%"* (Romero 2014a) in which it is explains the measures that the governments pretends to implement to avoid the bankruptcy, another article states *"Toll highways in Spain.: The conflict is opened"* (Villalon 2012) in which a former member of the ministry of public works analyses the situation, or *"Toll roads towards the bankruptcy"*(Romero 2014b) that analyzes the drawbacks of the expansion abroad of the concessionaries. Finally, the editorial of El Pais, one of the both top-selling newspapers and most read on the internet, published an editorial *"A bankruptcy avoidable"* (El país 2014) which underlines the political responsibilities of past governments with the current turbulences in the market. Further, a trendy TV-program in the Spanish television called "Salvados", that covers issues of highly topical issues, devoted also a program to analysis this problem.

All of this information has revealed ultimately the potential impact of the concessions on the government budget as a result of the clauses signed. It is said that toll highways are an amplifier of the overall economy situation, because when everything goes wrong, they go extremely bad and the other way around.(Baeza Muñoz et al. 2011) In brief, in the event of bankruptcy the central administration is accountable as it is going to be explained in following sections and therefore it must pay for the entire project, including the financial arrangements made by either sponsor or the concessionaire.

3.3.3 Norway

Norwegian society is not an exception demanding transport communications in their daily life Although, the particularities the geography, steep mountains, rugged coastline or long fjords; the climate conditions, severe winters; or even the human settlement, scattered population along the country.; has entailed a major challenge in the transportation of humans and goods, especially in terms of road transport(Ministry of transport and communications 2014). Consequently, a more complex road project means more need for resources (money) per kilometre of road built in a context of public funds constraints.

Norwegian authorities have also been interested in new funding scenarios for transport infrastructures; inter alia, public private partnerships. The Norwegian experience in PPP, **Offentlig-Private Samarbeid** in Norwegian, started in 1998 when this scheme was introduced to conduct projects in the transport sector(Solheim-kile et al. 2014). The purpose was to first develop a set of pilot projects to analyze their performance in the market and, if satisfactory, spread the strategy to other sectors.

Finally, in 2001, the Storting approved to conduct three pilot projects in the road transport sector, namely:

- E39 Klett- Bårdshaug
- E39 Lyngdal-Flekkefjord
- E18 Grimstad-Kristiansand.

Transport sector has not the only area affected by the introduction of the PPP in Norway. Education, court police or even recreation are among the sectors in which the scheme has been implemented in the country showing has been progressively increased the interest of the public authorities on it (Solheim-kile et al. 2014). Henceforward, the following theory aims to present the main actors and their influence on the PPP within the road transport scenario.

3.3.3.1 Norwegian Legislation

Apart from the national transport plan, Norway has not specific legislation for PPP projects. These are managed on the basis of the public procurement law, *Lov 16. juli 1999 nr. 69 om offentlige anskaffelser*, that affects to all the public departments, included the transport department of Norway. More recently, this legislation was strengthen when was approved the regulation of public procurement, *Forskrift 7. april 2006 nr. 402 om offentlige anskaffelser*.

Apart from this legislation, the Norwegian policy of transports, in general, has been conducted in the last decades through a nine years plan called national transport; though the plan is reviewed each four years, whereby purposes and goals sought by the government are detailed. The program is elaborated with the cooperation of all the sectors involved in alignment with the strategic vision of the government and finally is sent to the parliament to be approved. So far four plans have been implemented in Norway:

- **2002-2011** submitted by the centre coalition of Kjell Magne Bondevik which boosted the first three PPP pilot projects in the road transport. Therefore, the program showed the willingness of the government to try out PPP as a new way of organizing the development of transport infrastructure. The main purpose sought was to test whether such scheme could provide efficiency gains while the government retained the control(Ministry of transport and communications 2000).

- **2006-2015**, elaborated during the government of the centre-right coalition led by Kjell Magne Bondevik, but in fact supported by the labour party, the socialist left, progress party and center party. This program devoted especially to the PPP which are currently tested in the road sector. Besides, the Ministry declares that PPP will only be used when this type of contract contributes to an adequate risk transfer and that the total costs of the project are lower than in traditional development. Finally, the Ministry of Transport will present an overall evaluation of experiences with PPP once the procurement process is completed for all pilot projects(Ministry of transport and communications 2004).

- **2010-2019**, submitted by the red-green coalition of Jens Stoltenberg which lack of any reference to the PPP scheme, neither in the figure of funding nor new strategies. The plan put the focus especially on policies of efficiency in public transport, maintenance operations to improve the standards in the infrastructure and concurrently increasing safety to reduce road accidents along the period(Ministry of transport and communications 2009).

- **2014-2023**, the ongoing plan was also elaborated by the red-green coalition of Jens Stoltenberg, although the new government elected is formed by a centre-right coalition which did not support the plan in the Storting. The plan devotes a section to underline the need to implement a new scheme for funding and organizing special priority projects as part of a streamlining of the administration (Ministry of transport and communications 2009).This statement t is related to the fact that three new PPP projects are to be implemented in Norway in the midterm: E10/rv 85Tjelsund-Gullesfjordbotn-Langvassbukt (300 mill €), Rv3/rv 25 Ommangsvollen-Grundset/Basthjørnet (450 mill€) and Rv 555 Sotrasambandet (850 mill €)(Bordal 2014).

3.3.3.2 Organization of the public administration related to PPP

The national parliament of Norway, **Storting**, is the appropriate authority and makes decisions regarding development of the state road network. In addition, it also its responsibility to approve the funds required to implement PPP projects. While, on the government side, the *Ministry of Transport and communications*, Samferdselsdepartementet, is defined as the authority that has the necessary powers to plan and implement the resolutions passed regarding any road infrastructures. In this regard, the Minister is responsible vis-à-vis the Storting for the development, operation and maintenance of the state road network (Statens Vegvesen 2014b; Statens Vegvesen 2014a; Statens Vegvesen 2005)

One of the subordinate agencies to this Ministry is the *Norwegian Public Roads Administration*, Statens vegvesen, consisting of the Directorate of Public Roads and five regional offices. The agency has been designated as the central authority for the state roads, and therefore is responsible for ,inter alia, the planning, construction and operation of the national and county road networks, vehicle inspection and requirements, driver training and licensing and are also authorized to grant subsidies for ferry operations(Samferdselsdepartementet 2011). The *Norwegian Public Roads Administration* (NPRA) is pointed as the representative of the State in the procurement process, as well as the contractual party in the PPP Contract (Statens Vegvesen 2014a; Statens Vegvesen 2014b; Statens Vegvesen 2005).Meanwhile, the seven regional roads administrations designed as the local state road authority in charge of planning the process and the development of plans according to the Planning and Building Acts. In short, its aim is to facilitate the execution of any project planned.

3.3.3.3 Toll financing

Despite the fact that toll roads are usually associated to PPP, Norway has been using since the early 1930s toll financing as supplement to government funding. In fact, since 1980s data have indicated

how progressively has been spread this scenario as a financial instrument for the high road construction costs due to the Norwegian topography. Today there are 48 toll projects scattered throughout the country. Additionally, the seven toll cordons of main cities make up the bulk of the annual revenues while fjord crossings through tunnels and bridges still represent the majority of the projects (Amdal et al. 2006).

The national transport plan 2014-2023 expected that tolls would be able to collect around 12, 3 billion € along this period to support the government's budget. In this regard, it is remarkable to underline that the expected investments are calculated to be around 63,5 billion € (Ministry of transport and communications 2014). Toll funds are used to finance both urban and inter-urban road projects. In the case of the three largest cities of Norway (Oslo, Bergen and Trondheim) tolls have made the main contribution for road investments, and to a certain extent, public transport investment programs. In the non-urban areas, toll financing is used for road investments only(Odeck & Bråthen 2002)

Figure 8- A sketch of a part of the organizational chart of the Norwegian Public Roads Administration It only shows the departments involved directly in a PPP project.

To date, about 100 toll projects have been realized successfully and only one has been declared as bankrupt in 1944 .The success of the Norwegian road toll systems may be accredited to its organizational framework. Although projects are approved by the Storting, toll project are started under the initiative of local municipalities or communities regarding to a certain needs in the area in terms of road infrastructures. This may lead to implement a toll to ensure a certain level of financing for the road.

Therefore a toll project pretends to merge both the local and private interests into establishing a dedicated toll company ,limited liability society, whose solely purpose is to operate the road toll system and to administer the toll revenues during 15 years normally. It is noteworthy to bear in mind that the toll company is set as a non-profit enterprise, and therefore investors, mostly public

authorities, receive no share dividends. Indeed, it is the Ministry of Transport and Communications who establishes the perceptive operating regulations for the toll company (Odeck & Bråthen 2002; Amdal et al. 2006).This toll program has contributed significantly to boost road projects that otherwise would have been postponed until funds available could be ensured for the purpose of the project. To sum up, the key decision-making procedure for toll projects in Norway is described by Odeck and Bråthen (Odeck & Bråthen 2002):

- Toll projects are based on local initiatives and local political agreement at municipality and county level.
- A two step political process is followed when proposing toll projects: A principal acceptance of toll financing and also an approval of financing scheme including possible public guarantees.
- All projects must be approved by the Norwegian Parliament.
- A non-profit company is responsible for the toll collections.
- The Ministry of Transport and Communication approves the tolls and the discount systems.

Payment of toll roads is currently realize through **Autopass** system (www.autopass.no) which consists of electronic toll tags, registration equipment at toll stations and a central payment system. There are around 50 toll stations and most of them are operated automatically. Although there are still some stations which are also manually operated until the end of 2015 when is expected to automate the process.

Figure 9: Toll station operated both automatically and manually. Source: www.vg.no

3.3.3.4 The PPP road Sector

Norway is now about to undertake a second phase of three new roads under PPP arrangements as it is planned by the government. So far, there is only a first phase of PPP program which was launched to test the suitability of the model in the country consisting of three pilot projects .The main agents involved in this stage are Veidekke, Bilfinger,Skanska, Sundt, Laing Roads and Pihl&Sønn, which are the core shareholders of the SPV of the projects. It could be seen that the international profile of some of these participants reveals the interest arose abroad by first PPP program. Besides the new national plan also seeks to boost international competition for road projects (Bordal 2014).

Authorities are earning an experience, as the companies do, for a better assessment of PPP projects, and thereafter the approach to conduct the procurement procedure. As a matter of fact, it is the experience gained by all the involved players what will ensure the potential of the market in the coming years as Maté stated (Maté Sanz 2004). Additionally, the *transportøkonomisk institutt* (Eriksen et al. 2007) , tøi, has undertaken some analysis to evaluate the impact whether it is positive or not in terms of value-for-money.

3.3.3.4 Norwegian society and PPP in infrastructure

It is clear that there is a political division on the issue of PPP in road projects. As an example, the previous government formed by a coalition of red-green parties was clear in its position on the matter, as it was announced by the Minister of finance Sigbjørn Johnsen, whose statements were widely published by the media in 2010. Headlines such as *"Johnsen will not use private loans for roads"* (NRK 2010) in which it could be read that the parliamentary debate was arose by the right part. The minister argued that Norway has no need for private investment in the provision of infrastructures and that private engagement increased the costs of the projects. Whereas on the other side, the principal conservative party has shown its willingness to spread PPP scheme, as it is written *" Right will allow private "take Norway on at the government's expense*"(Ruud 2013) in which it goes clear that many of the party's ideas in several sectors, including transport, are thought to be carried out using private funds.

As it is seen, this issue has been also part of political campaigns as it happens during the elections in 2013 in which left-green parties showed more reluctant positions on PPP than the right and center parties which were more open to draw on this scheme to implement new projects. After elections a center-right coalition formed government lead by the conservative party has retaken the PPP strategy under the leadership of Ketil Solvik-Olsen as minister of transport.

The new program has indeed captured the attention of the newspapers and the industry in the country.*"NPRA ready with three new PPP projects"* announced the portal of byggeindustrien (bygg.no) or *"Considering PPP in 10 mr (1, 25 billion€"* could be seen on the magazine veg og vei of the NPRA. In the meantime, some voices have been heard against the PPP scheme, describing them as overpriced since they are more expensive, risky and inflexible (Manifest Senter for samfunnsanalyse 2013). Focus is especially on the costs, as it could be read on *" OPS are undoubtedly much more expensive"*(Engen 2014) which interviews professor Øystein Husefest Meland . Mr. Husefest Meland stresses that PPP as become indeed more a political ideology than a financial instrument. The professor also pointed out that undoubtedly it is much more expensive to obtain private financing than funding through public channels .In addition; he underlines the lack of experience of the authorities in PPP policies.

4. Cases of study

Henceforward, a profile of the projects and the countries is outlined to introduce the relevant data for the subsequent analysis. The information presented has been obtained through a research of databases of international and national agencies; web pages of the firms involved and researches published by other entities.

4.1 Countries profiles: Spain and Norway

PPP projects are not exogenous entities; their performance is indeed bound to their surroundings. Although the economic globalization has made more fuzz the existence of state boundaries, especially in the European scenario, there are still some factors and circumstances inherent to a country that made a significant different on the final outcome. The idea is to provide background information upon which further analysis and assessment could be conducted satisfactorily. Then, the first question that arises is which factor should be prioritized.

Road infrastructures are intended in essence to contribute towards a better communication though channelizing a certain level traffic in a corridor. Hence, this should be the first factor to consider as comparing scenarios. At this point, it is important to remark once more that while providing a certain traffic level could be the main reason to undertake a road project, payment mechanism in PPP may depend on other criteria not directly related to this. Traffic volume is roughly defined as a function of the economic situation (GDP), the total population and the motorization index(Ortega Hortelano & Baeza Muñoz 2012) .

$$Traffic\ volume = f(Population;\ economy; motorization)$$

Table 6: Main indicators of economy, population and infrastructures of Spain and Norway in 2014.

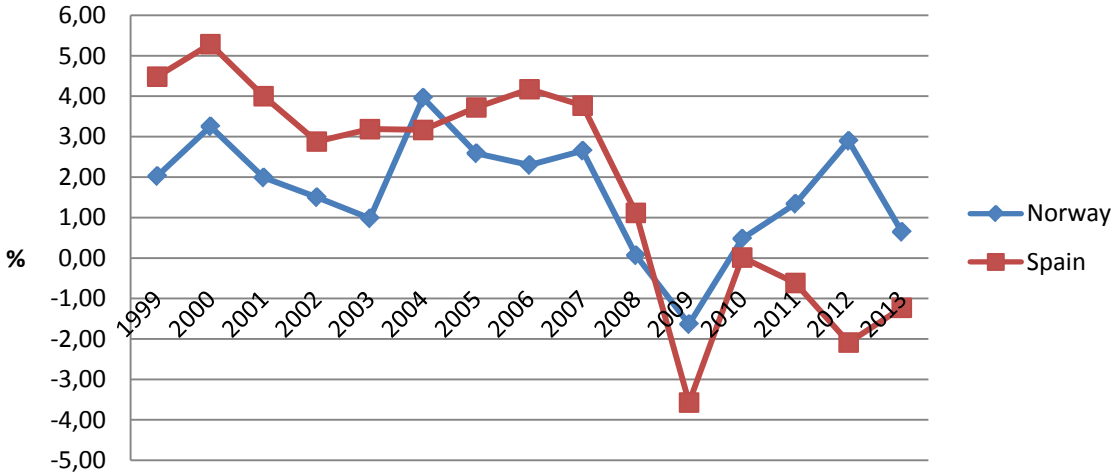
	Spain	**Norway**
Area (sq km)	505.990	385,178
Total population	46.617.825	5.080.166
Population density ((people per sq. km of land area	93,46	13,91
GDP (current €) estimate	1.425 billion €	319,96 billion €
GDP rank	13th	22th
GDP per capita €	30.677	73.481,6
Public debt , % of GDP in	97,7	30.3
Human development index (HDI)	0.869	0.944
HDI rank	27th	1st
Road network owned by central government km	26.123	10.540
Total length of Highways km	14.981	392

Source: World Bank and Eurostat.

Figure 10: Norway and Spain

Even though the indicators, it is reasonable to think that such variables cannot be solely as nap of a given year but rather a dynamic overview of a period. Otherwise these figures would be senseless because of the project life-cycle that simultaneously has an effect on the outcome. Therefore, the following tables are thought to introduce the reader into the case, together with a brief interpretation of the data.

Table 7: GDP growth (annual %)

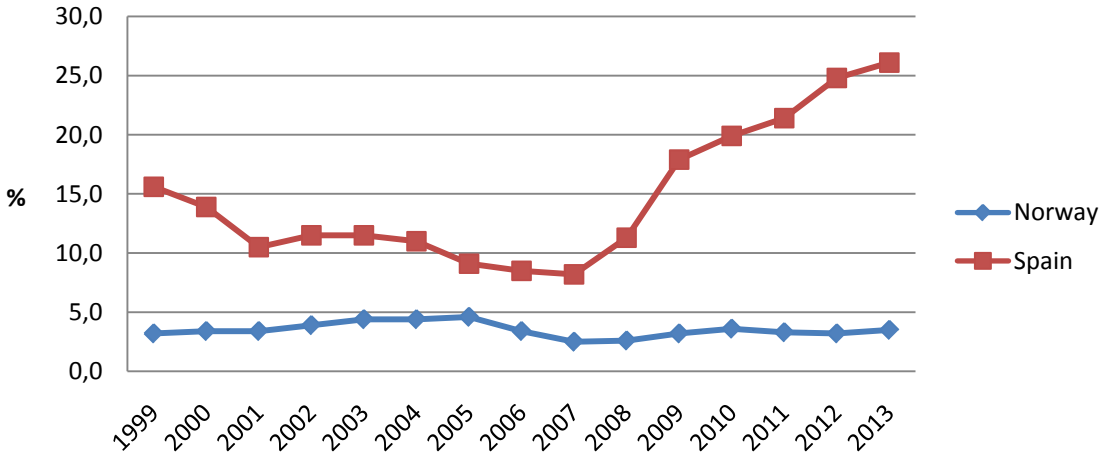


Source: (World Bank 2014)

On the economy side, Spanish economy was more dynamical during the years previous to global financial crisis which both countries suffered from. A significant divergence is seen after the year 2009 which is also the most critical in term so economic growth for both. Norwegian economy started a phase of continuous economic growth whereas Spain was still facing some ups and downs in its economy. Simultaneously, despite this macroeconomic indicator, the level of unemployment has responded differently. In Spain, the unemployment rate has experienced a steady increase reaching up to 26% of the active population. On the other side, Norway has remained more or less unchanged its rate under the 5%.

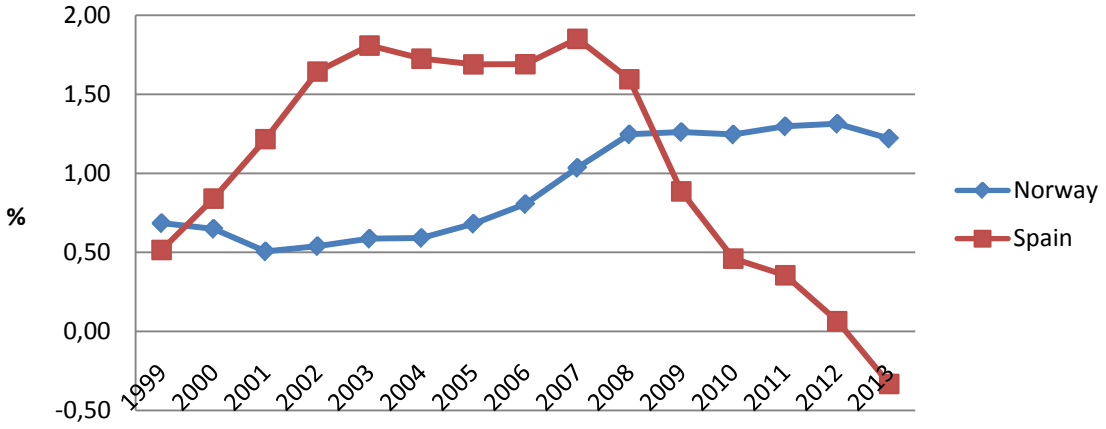
This data has to be assessed together with the evolution of the population, especially in the case of Spain. Both economy and population have led to close the existing gap in motorization between these countries, though the trend has shown a steady growth of motor vehicles year after year.

Table 8: Unemployment, total (% of total labor force)



Source: (World Bank 2014)

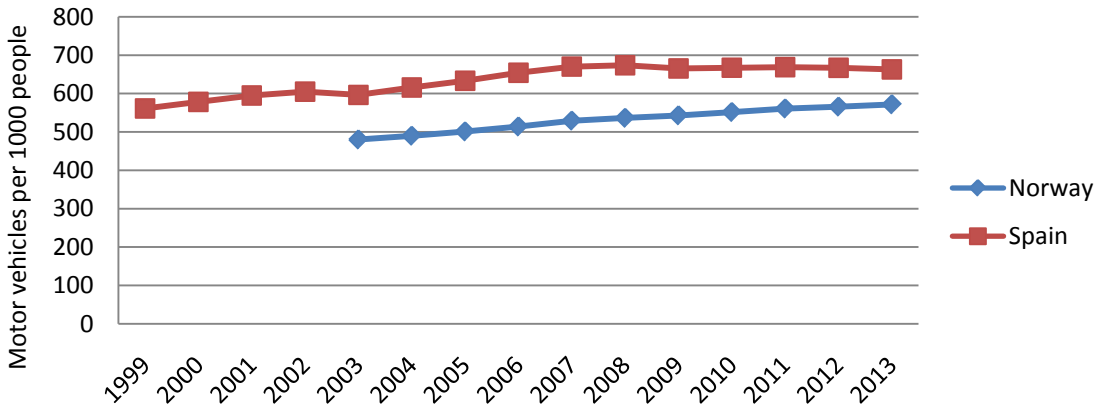
Table 9: Population growth (annual %)



Source: (World Bank 2014)

Although traffic is known to play a crucial role to decide whether or not is suitable to plan a new road within a corridor. PPP arrangements have to be seen from an upper perspective. They are also intended to contribute to a better use of public resources, the continuously concept of value-for-money.

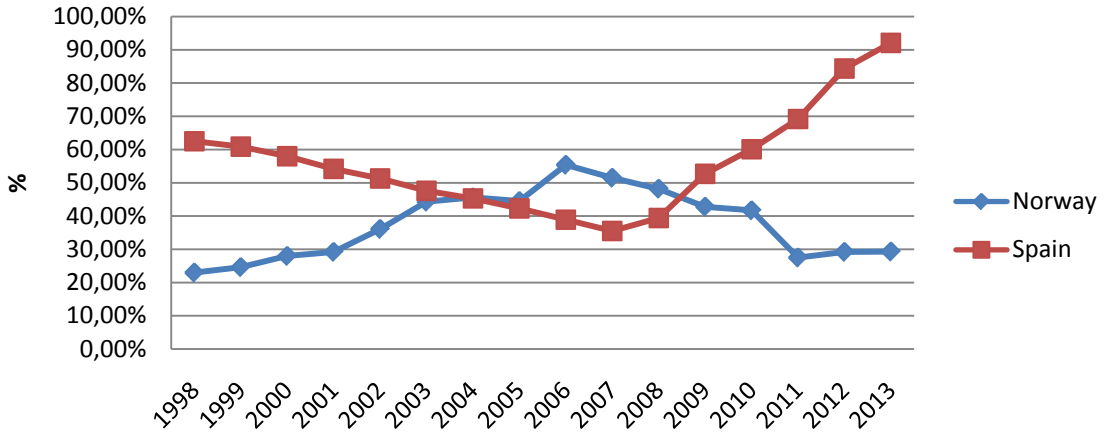
Table 10: Motorization index



Source: (Eurostat 2013)

Despite the fact that this should be the key driver while considering a PPP project, governments also look on the economical impact of projects on the balance sheets. In fact, they could be seen as a part of a more comprehensive strategy to reduce debt but at the same time maintain a certain level of investment in the country .It is noteworthy to highlight that during this period of study, Spain was reducing debt until the year 2008 in which the economical crisis made it to escalate sharply. On the other hand, Norway increased its debt until its maximum in 2006, year from which the debt started to decrease, even during the worst years of the crisis.

Table 11: Debt (%GDP)



source:(World Bank 2014)

Finally, it is thought to mention as brief reference the fact that procurement processes are based on a certain legal system such as the civil law or common law system. In the case of the countries of study, they both do belong to the same root, the civil law, but to different sub-categories, namely napoleonic law in Spain and the Nordic law in Norway. For the level of approach of this research and also for the features of the issue itself, differences are not noticeable.

4.2 Projects profiles

Henceforward, Norwegian and Spanish projects selected for this research are introduced separately. Information gathered is intended to provide an overview of the differences and similarities between the schemes and even among the projects of each country.

Spain: 15 projects from the **third phase** have been selected of toll highway concessions, all of them granted by the central government.

Table 12: List of Spanish concessions selected

Section	SPV	Published
AP-7 Alicante -Cartagena	Autopista del sureste, concesionaria española de autopistas SA (Ausur)	January 1998
AP-53 Santiago de Compostela-Alto de Sto. domingo	Autopista central gallega, concesionaria española SA (Acega)	November 1998
R-3 Madrid- Arganda	Accesos de Madrid, concesionaria española SA (Accesos Madrid,AM)	May 1999
R-5 Madrid-Navalcarnero		May 1999
AP-71 León-Astorga	Autopista de Leon SA, concesionaria del estado (Aulesa)	September 1999
AP-61 Segovia-El Espinar	Castellana de autopistas SA (Castellana de autopistas)	June 1999
AP-51 Avila-Villacastín		June 1999
R-2 Madrid-Guadalajara	Autopista del Henares SA, concesionaria del estado (Henarsa)	February 2000
R-4 Madrid-Ocaña	Autopista Madrid-Sur, concesionaria española SA (Madrid sur)	April 2000
M-12 Eje aeropuerto	Autopista eje aeropuerto, concesionaria española SA (Eje aeropuerto)	March 2002
AP-7 Cartagena-Vera	Autopista de la costa cálida, concesionaria española de autopistas SA (Aucosta)	February 2003
AP-36 Ocaña-La roda	Autopista Madrid Levante, concesionaria española SA (Madrid-Levante)	August 2003
AP-41 Madrid-Toledo	Autopista Madrid-Toledo, concesionaria española de autopistas SA (Madrid-Toledo)	August 2003
AP-7 Circunvalación de alicante	Ciralsa SA, concesionaria del estado (Ciralsa)	August 2003
AP-46 Málaga-Alto las pedrizas	Autopista del guadalmenina SA, Concesionaria española, SA (Guadalcesa)	August 2005

Norway: The **3 projects** conducted to date by the Norwegian authorities have been chosen for this research.

Table 13: List of Norwegian PPP road projects selected

Section	SPV	Published
E39 Klett-Bårdshaug	Orkdalsvegen AS	October 2001
E3 Lyngdal-Flekkefjord	Allfarveg AS	October 2002
E18 Grismtad-Kristiansand	Agder Ops Vegselskap AS	February 2005

It is noteworthy to bear in mind that the main reason to select projects from the third phase in Spain is because of they share a common time frame with the Norwegian projects. Hence the benchmarking analysis could be based on a same scale which includes other external factors such as technology or global economy. Otherwise, findings would have been even more limited for future PPP schemes.

Besides the time frame, projects size is additionally another issue to look out. Basic features as length, planned construction budget, the planned construction costs per km built and even the Average Annual Density of Traffic (AADT) could demonstrate how likely they are while providing better overview. But first, there are some remarks need to be made.

Concession contracts in Spain include also other stretches to be built or upgrade but toll exempted, and therefore figures attached included also these additional projects. Secondly the data presented as planned construction cost in Spain is based on the figure given on the awarding royal decree. This figure represents the of the construction definitive guarantee which is defined as the result of the application of 4% planned construction investment, including VAT, of the works granted on the concession contract. Further, since these projects have been launched in different years, all economic figures have been updated to year 2015 using the inflation rates of each country according to the figures given by the World Bank in its database. Simultaneously a currency exchange of 1€=8 Nok has been set. The intention is to make as feasible as possible the comparison among figures.

In addition in Spain, construction budgets include so-called "Cultural 1%" according to the law 16/1985 on the Spanish historical heritage. As it c is described by the Ministry of public works web page,*" The Heritage Act defines the obligation to use at least a 1% of the total budget in any public works granted for conservation and enrichment purposes of the Spanish Historical Heritage or the promotion of any artistic creativity preferably in the immediate surroundings."*. Currently, this figure has been increases to the 1, 5%.

The last indicator selected, AADT, represents the mean value calculated according to the values given in the annual report on Spanish toll. Norwegian AADT has been gathered though the vegkart.no in which data are sorted out along road sections of variable length. The Statistikk trafikkmeldinger command provides the value of the mean AADT.

Table 14: Projects ranked based on length

		Length Km
1	AP-36 Ocaña-La roda	177
2	AP-7 Cartagena-Vera	114
3	R-4 Madrid-Ocaña	99,1
4	R-2 Madrid-Guadalajara	85,5
5	AP-41 Madrid-Toledo	81
6	AP-7 Alicante -Cartagena	76,6
7	AP-53 Santiago de Compostela-Alto de Sto. domingo	56,6
8	AP-7 Circunvalación de alicante	53,5
9	E18 Grismtad-Kristiansand	38,8
10	E3 Lyngdal-Flekkefjord	38
11	AP-71 León-Astorga	38
12	R-3 Madrid- Arganda	37
13	R-5 Madrid-Navalcarnero	29
14	AP-61 Segovia-El Espinar	27,7
15	E39 Klett-Bårdshaug	27
16	AP-46 Málaga-Alto las pedrizas	24,5
17	AP-51 Avila-Villacastín	23,1
18	M-12 Eje aeropuerto	8,8

Table 15: Projects ranked based on Construction budget.

		Planned Construction budget € (2015)
1	R-3 Madrid- Arganda	1.248.133.703,60
2	R-5 Madrid-Navalcarnero	
3	R-4 Madrid-Ocaña	995.409.048,52
4	AP-7 Cartagena-Vera	961.636.177,48
5	AP-36 Ocaña-La roda	798.806.372,71
6	R-2 Madrid-Guadalajara	685.986.727,82
7	AP-7 Circunvalación de alicante	658.558.918,82
8	AP-41 Madrid-Toledo	605.023.709,39
9	E18 Grismtad-Kristiansand	513.250.000
10	M-12 Eje aeropuerto	510.845.625,18
11	AP-61 Segovia-El Espinar	488.516.918,94
12	AP-51 Avila-Villacastín	
13	AP-53 Santiago de Compostela-Alto de Sto. domingo	456.681.242,57
14	AP-46 Malaga-Alto las pedrizas	455.837.361,57
15	AP-7 Alicante -Cartagena	346.155.239,17
16	E3 Lyngdal-Flekkefjord	208.874.489
17	E39 Klett-Bårdshaug	204.638.859
18	AP-71 León-Astorga	172.492.642,30

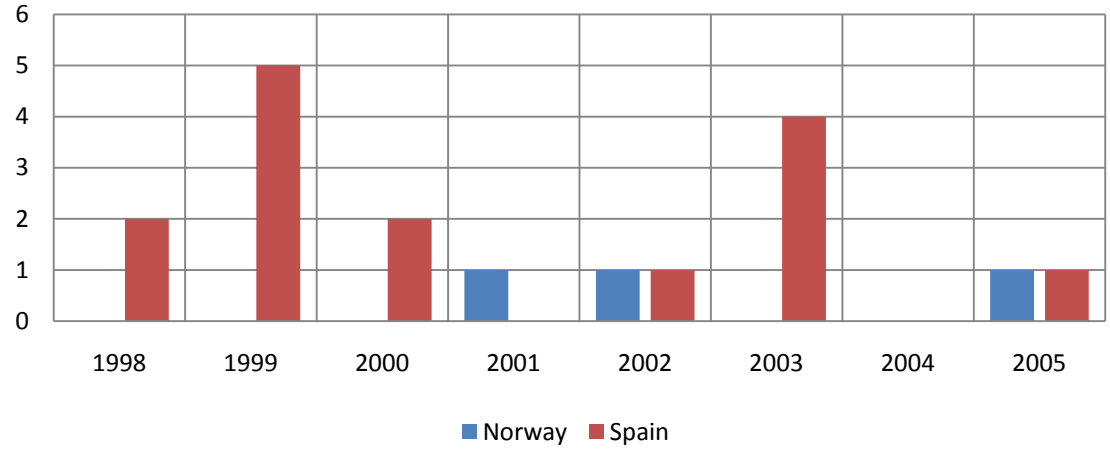
Table 16: Projects ranked based on construction cost per km built.

		Km/€
1	**M-12 Eje aeropuerto**	58.050.639,22
2	**R-3 Madrid- Arganda**	33.733.343,34
3	**R-5 Madrid-Navalcarnero**	
4	**AP-46 Malaga-Alto las pedrizas**	18.605.606,59
5	**AP-61 Segovia-El Espinar**	17.635.989,85
6	**AP-51 Avila-Villacastín**	
7	**E18 Grismtad-Kristiansand**	13.228.093
8	**AP-7 Circunvalación de alicante**	12.309.512,50
9	**R-4 Madrid-Ocaña**	10.044.490,90
10	**AP-7 Cartagena-Vera**	8.435.405,07
11	**AP-53 Santiago de Compostela-Alto de Sto. domingo**	8.068.573,19
12	**R-2 Madrid-Guadalajara**	8.023.236,58
13	**E39 Klett-Bårdshaug**	7.579.217
14	**AP-41 Madrid-Toledo**	7.469.428,51
15	**E3 Lyngdal-Flekkefjord**	5.496.697
16	**AP-71 León-Astorga**	4.539.280,06
17	**AP-7 Alicante -Cartagena**	4.518.997,90
18	**AP-36 Ocaña-La roda**	4.513.030,35

Table 17: Projects ranked based on AADT

		AADT
1	**M-12 Eje aeropuerto**	18081
2	**AP-7 Alicante -Cartagena**	16786
3	**R-3 Madrid- Arganda**	13710
4	**E18 Grismtad-Kristiansand**	13284
5	**R-5 Madrid-Navalcarnero**	9426
6	**AP-46 Málaga-Alto las pedrizas**	8171
7	**E39 Klett-Bårdshaug**	8008
8	**R-4 Madrid-Ocaña**	7923
9	**R-2 Madrid-Guadalajara**	7906
10	**AP-7 Circunvalación de alicante**	7123
11	**AP-51 Avila-Villacastín**	6770
12	**AP-61 Segovía-El Espinar**	5816
13	**E3 Lyngdal-Flekkefjord**	5403
14	**AP-53 Santiago de Compostela-Alto de Sto. domingo**	5089
15	**AP-71 León-Astorga**	4345
16	**AP-36 Ocaña-La roda**	3952
17	**AP-7 Cartagena-Vera**	3089
18	**AP-41 Madrid-Toledo**	2103

Table 18 : Number projects Initiated per year



The result from the tables displayed above points out that these projects, despite their inherent features, could be intended as reliable samples for further analysis. Apart from the time frame, it is noticeable that the Norwegian PPP roads have a size suitable for comparison with the toll highways in Spain. None of these roads are neither on the first nor the last positions in the ranks.

On the economic side and as a matter of fact, E18 Grimstad-kristiansand could be ranked as a medium size project while E39 projects could be sorted within the small size projects owing to their planned budgets. Although, they shift upwards in relation to their cost per km built, the difference is not remarkable enough for a final assessment. Simultaneously AADT and the length display widely disparate values. The former shows values ranging from more than 18000 average vehicles per day to around 2400.Hence a considerable set of scenarios arise for the analysis, even though it is advisable to be cautious since this has to be contrasted with other exogenous variables that influence the driver's behaviour. The latter may not be consider as important as the previous, but data is relevant to underline that between the range of 20 to 30 km 9 projects are located, including the three Norwegian. In addition, one single project has less than 10 km and only two more than 100 km.

The table below sketches the mean and the standard deviation for each of the indicators to support the

Table 19: Main values obtained

	Length	Planned budget	€/km	AADT
Average	57,51	581.927.939,76	13.890.721,31	8166
SD	41,82	303.102.600,87	13.929.945,44	4549

And last but not least, there is another significant issue that cannot be overlooked :the surroundings of the roads .For this purpose, the model proposed to study the nature of their surroundings is given by Vassallo, Baeza and Ortega(Baeza Muñoz et al. 2011) owing to their experience in the field. Thus, the model can be considered as the most suitable to conduct a classification. The core idea of this approach is to distinguish among projects depending on the nature of the existing competitors in their corridors. From this perspective three main categories arise(Baeza Muñoz et al. 2011):

- **Category 1**; referred to those toll highways whose competitors are convectional roads along low-density interurban corridors.

- **Category 2;** includes those located in high-density routes where there are free highways usually congested.

- **Category 3;** highways located in populated tourist areas competing also against free highways and conventional roads.

The following categories have already been proposed by the authors of the classification.

Table 20: Classification of the Spanish concessions

	Concession	Published	Length (Km)	Type of road	Competitors in the corridor	Other competitors
Category 1	**AP-51 Avila-Villacastín**	January 1998	23,1	Interurban	conventional road	
	AP-53 Santiago de Compostela-Alto de Sto. domingo	November 1998	56,6	Interurban	conventional road	
	AP-61 Segovía-El Espinar	May 1999	27,7	Interurban	conventional road	
	AP-71 Leon-Astorga	May 1999	38	Interurban	conventional road	
	AP-36 Ocaña-La roda	September 1999	177	Interurban	conventional road	Free highway
Category 2	**R-3 Madrid- Arganda**	June 1999	37	Suburban road	Free highway	Public transport
	R-5 Madrid-Navalcarnero	June 1999	29	Suburban road	Free highway	Public transport
	R-2 Madrid-Guadalajara	February 2000	85,5	Suburban road	Free highway	Public transport
	R-4 Madrid-Ocaña	April 2000	99,1	Suburban road	Free highway	Public transport
	M-12 Eje aeropuerto	March 2002	8,8	Urban road	Free highway	Public transport
	AP-41 Madrid-Toledo	February 2003	81	Suburban road	Free highway	Public transport
	AP-7 Circunvalación de Alicante	August 2003	53,5	Urban road	Free highway	
Category 3	**AP-7 Alicante -Cartagena**	August 2003	114	Interurban	conventional road	Free highway
	AP-7 Cartagena-Vera	August 2003	76,6	Interurban	conventional road	Free highway
	AP-46 Málaga-Alto las pedrizas	August 2005	24,5	Interurban	conventional road	Free highway

Source:(Baeza Muñoz et al. 2011)

In Norway, an analysis of the surroundings of the projects has led to place the PPP roads in two of the three main categories proposed. Category one includes both E39 projects while the category two retains the E18 road.

Table 21: Proposed classification for the Norwegian PPP projects

	PPP project	Published	Length (Km)	Type of road	Competitors in the corridor	Other competitors
Category 1	**E39 Klett-Bårdshaug**	October 2001	27	Interurban	conventional road	
	E39 Lyngdal-Flekkefjord	October 2002	38	Interurban	conventional road	
Category 2	**E18 Grismtad-Kristiansand**	February 2005	38,8	Suburban road	conventional road	Public transport

E39 Klett- Bårdshaug goes through the municipalities of Orkdal, Børsa and Melhus and its part of the coast corridor in Norway. The road has been identified as interurban and the population density and as well as the fact that there are only rural roads as competitors. It has been concluded that this road belongs to Category 1.

E39 Lyngdal-Flekkefjord is located in Vest-Agder and passes through the municipalities of Lyngdal, Kvinesdal and Flekkefjord. It is the last stretch of the E39 route which ends in Kristiansand. The road is defined as interurban and it has similar characteristics as the other stretch above. Therefore it has been considered within category 1.

E-18 Grismtad-Kristiansand has been considered to be a part of a suburban corridor along the municipalities of Kristiansand (5th urban region in Norway), Lillesand and Grimstad. The density of population in the area of influence entails that apart for being the main route with Oslo, it is meant to serve especially for commuters in the region. That reasons has led to include this stretch in the category 2.

5. Findings

5.1 Research questions 1 and 2

The procurement process is a crucial plan which has developed its own strategy addressed called Project Procurement Management. This states that procurement includes any processes necessary to purchase or acquire products, services, or results needed from outside the project team. This process also includes the contract management and change control processes required to develop and administer contracts or purchase orders issued by authorized project team members (Project management Institute 2008).These institution also distinguishes the following steps:

1. Plan Procurements.
2. Conduct Procurements.
3. Administer Procurements.
4. Close Procurements.

In the case of public procurement, the approach is defined by the existing Laws on public procurement which cover from the purchase of services to the construction of infrastructures. These Laws set down how a public authority is enable to carry out the purchase of certain goods according to the principles of fair treatment for all the bidders. This legislation could be specific for a certain type of purchase as in Spain or covered more broadly as in Norway.

In any case, it is important to remember that the European commission has been putting lot efforts on drawing up a common legal frame to set basis for a future European market on PPP in infrastructures. The institutions are based on the experience gained by the EIB, as described on the theory. Therefore the following research is intended to describe ,as precisely as possible, how procurement procedures are undertaken and which are the recommendations and hints given on reports by the specialized EIB branch on the theme, the EPEC.

The guide to guidance is considered the main contribution to issue of conducting procurement process. In fact, the EPEC recommends using this publication as a broad guide to procurement and implementation issues in PPPs. In addition, this sourcebook could contribute to introduce which information should be requested from PPP advisers or even as starting point to learn more about specific aspects of PPP design (European PPP Expertise Centre 2012).

Additionally, EPEC states that The Guide is intended for public sector officials from EU Member States who are in charge of PPP projects and have knowledge of and experience in conventional public procurement but are not familiar with PPP arrangements(European PPP Expertise Centre 2012). These officials could find themselves in any stage of a PPP arrangement for which they need support to conduct it successfully. Maybe an early stage in which a project proposal has been indentified and they are considering the potential of a PPP project, or owing that a PPP scheme has been selected how to engage it correctly and eventually future impacts once the project is under implementation.

Table 22: PPP project cycle and structure of the Guide: phases, stages and steps

Phases	Stages	Steps
1. Project Identification	**1.1 Project selection and definition**	Identification Output specifications
	1.2 Assessment of the PPP option	Affordability Risk allocation Eurostat treatment Bankability Value for money
2. Detailed Preparation	**2.1 Getting organised**	Project team Advisory team Plan and timetable
	2.2 Before launching the tender	Further studies Detailed PPP design Procurement method Bid evaluation criteria Draft PPP contract
3. Procurement	**3.1 Bidding process**	Notice and prequalification Invitation to tender Interaction with bidders Contract award
	3.2 PPP contract and financial close	Final PPP contract Financing agreements Financial close
4. Project Implementation	**4.1 Contract management**	Management responsibilities Monitoring service outputs Changes to the PPP contract Dispute resolution PPP contract termination
	4.2 *Ex post* evaluation	Institutional framework Analytical framework

source:(European PPP Expertise Centre 2012)

The EPEC elaborated its own structure to conduct the analysis of a PPP cycle. For this reason, and as a mean to facilitate and ensure the reliability of the results, the research done on the procurement procedures of each country has been based on the proposed structure above. Although not all of these phases and stages are going to be displayed.

As a matter of principle, the focus is on partially on detailed preparation since it covers some relevant aspects that define the procurement process. On the other hand, the core research is put on the procurement. Thus, stages selected are intended to be studied to compare what it is recommended by the EPEC and in meantime the real mechanism and processes displayed by the public authorities of Spain and Norway.

2.2 Before launching the tender,

3.1 Bidding process,

3.2 PPP contra and financial close

Table 23: Comparison of detailed preparation phase between EPEC, Spain and Norway

Detailed Preparation			
Pre-tender steps	**This stage has two main goals:** **• to further develop all aspects of the PPP design (e .g . responsibilities, risk allocation, payment mechanism) in a progressive and iterative manner, concluding with a full draft PPP contract;** **• to select the tendering method, decide on bid evaluation criteria and prepare the complete tender documents**		
Stages	**EPEC**	**Spain**	**Norway**
Further studies	The Authority and its team of advisers should take great care to ensure a clear delineation of the extent to which the private sector can rely on the results of information given by the Authority. As a general principle, the private sector should be required to do its own due diligence investigations rather than rely on information provided to it.	Studies carried out by the granting authorities are indicated as available for all the bidders. These further studies contain specifications to be fulfilled in the tenders submitted.	Further information regarding technical, economical or any other aspect will be provided within the tender documents. The information provided in the memorandum cannot be invoked afterwards by the bidders.
Detailed design PPP arrangement	All aspects of the PPP arrangement (e.g. responsibilities, risk allocation, payment mechanism) need to be developed in greater detail, with the ultimate goal of producing the draft PPP contract. It is advisable to deal with this in sub-steps rather than try to draft a full PPP contract right away. This simplifies the internal review process.	The final design of the contract to be signed is based on the basis of the administrative specifications given, including the parameters of the preferred bid.	Risk allocation is fully described in the E39 klett-Bårdshaug project whereas the others projects outline the principles. All of them state that traffic risk will not be allocated to the private sector. Payment mechanism is well described and the remaining criteria will be given in tender documents
Procurement method	EU legislation allows four procurement procedures: open, restricted (these two are also sometimes referred to as “standard procedures”), negotiated (an exceptional procedure) and competitive dialogue (the use of which is subject to conditions)	**Open procedure**	**Negotiated procedure**

Table 24: Comparison of detailed preparation phase between EPEC, Spain and Norway

Detailed Preparation			
Pre-tender steps	**This stage has two main goals:** **• to further develop all aspects of the PPP design (e .g . responsibilities, risk allocation, payment mechanism) in a progressive and iterative manner, concluding with a full draft PPP contract;** **• to select the tendering method, decide on bid evaluation criteria and prepare the complete tender documents**		
Stages	**EPEC**	**Spain**	**Norway**
Bid evaluation criteria	The composition of the committee will often be prescribed by national law. The role of the evaluation committee is to oversee the procurement process and take (or recommend) key decisions, such as decisions about the shortlist and the preferred bidder. The EU procurement regime allows some flexibility regarding the criteria that can be used to evaluate bids and select the preferred bidder. As a rule, award criteria (and the weighting to be applied to each criterion) should be specified in advance	Composition of the committee and the award criteria are clearly defined on the basis of the tendering procedure set in the tender documents. Award Criteria most used: Technical quality, technical and financial feasibility, Efficiency of the concessional business plan	If the award of the contract is given based on the economically most advantageous tender, shall criteria relating to the subject of such contracts be used. This may include quality, price, technical value, aesthetic and functional characteristics, environmental characteristics, running costs, profitability, customer service and technical assistance, and time of delivery or completion
Draft PPP contract	It is considered better practice to prepare and issue a full draft PPP contract with the invitation to tender. This is unavoidable in both the restricted and competitive dialogue procedures as there is no room for negotiations post final bids	The full draft of the PPP contract is issued on the basis of the tendering procedure.	A full draft of the PPP contract has been prepared by the legal advisors. This draft is included among the documentation once the candidate is invited to tender

Table 25: Comparison of procurement phase between EPEC, Spain and Norway

Procurement			
Bidding process	**The goal of the bidding process is to maximise value for money by creating appropriate incentives through a competitive process for the award of the long-term PPP contract. Sufficient attention should be placed on the key good procurement principles of "*transparency*" and "*equal treatment*", which will help bolster the legitimacy of the PPP and its acceptance by stakeholders. The equal treatment principle dictates that information provided to one potential bidder should be made available to the other potential bidders in a timely manner.(EPEC)**		
Stages	**EPEC**	**Spain**	**Norway**
Procurement notice	The Authority must comply with all requirements related to the publication of notices in the Official Journal of the European Union (OJEU). It is good practice to also publish the procurement notice in one or more international newspapers.	All projects are to be published in the OJEU and the Boletín oficial del estado (BOE). Article 141 CTLPP	All projects were published in OJEU and Norsk lysingsblad. *
Prequalification	Interested parties that respond to an initial notice are sent a short statement of information about the project and instructions or a questionnaire.	Open procedure do not require prequalification. General requirements for bidders are set according to the law 8/1972	Prequalification questionnaire is sent to the potential candidates.*
Shortlisting	The first step of the process is often to determine which consortia have passed the thresholds in all the relevant respects). Most of the criteria are expressed in terms of clear and objective thresholds	Open procedures do not require shortlisting	A maximum of four participants will be invited to submit a tender.*
Invitation to tender	The invitation to tender documentation should contain all the information that bidders will need to bid. It is important that advisers devote sufficient time and effort to develop the documentation in enough detail to ensure comparability of the bids and reduce the need for debate and clarification before the PPP contract is signed.	Open procedures provide all relevant information to the bidders from the start of the procedure	Tender documents will be issued to the candidates selected to participate

Table 26: Comparison of detailed preparation phase between EPEC, Spain and Norway

Procurement			
Bidding process	**The goal of the bidding process is to maximise value for money by creating appropriate incentives through a competitive process for the award of the long-term PPP contract. Sufficient attention should be placed on the key good procurement principles of "*transparency*" and "*equal treatment*", which will help bolster the legitimacy of the PPP and its acceptance by stakeholders. The equal treatment principle dictates that information provided to one potential bidder should be made available to the other potential bidders in a timely manner.(EPEC)**		
Stages	**EPEC**	**Spain**	**Norway**
Interaction with the bidders	The terms and conditions for an interactive process, including the procedures, protocols and rules, should be included in the broader set of conditions, rights and obligations to which bidders consent. The aim is to improve the quality of the proposals.	Not mentioned , but Article 139 CTLPP, Principle of equity and transparency, states that the contracting authority has to ensure an equal treatment to all bidders and candidates	The tenders from the individual candidates will be subject to individual negotiation
Evaluation of tenders	Bids will generally be assessed first on a number of pass/ fail criteria before the single preferred bidder is decided on. A key issue is the choice of the criteria for the evaluation and scoring of alternative bids. A determination must be made that the technical solution proposed by a bidder is feasible, deliverable and robust and also in terms of PPP organization.	Composition of the committee and the award criteria are clearly defined on the basis of the tendering procedure. Award Criteria: Technical quality, technical and financial feasibility, Efficiency of the concessional business plan	The ccriteria relating to the subject of such contracts may include quality, price, technical value, aesthetic and functional characteristics, environmental characteristics, running costs, profitability, customer service and technical assistance, and time of delivery or completion
Selection of preferred bidder	An important issue relating to the PPP contract award concerns the EU Remedies Directive (2007/66/EC) which was required to be transposed into national law by 20 December 2009.	**Most advantageous tender**	**Most economically advantageous tender**

Table 27: Comparison of detailed preparation phase between EPEC, Spain and Norway

Procurement			
PPP contract and financial close	**The activities involved in these steps often deal with detailed fine-tuning matters. Close interaction between the Authority, the PPP Company, its sponsors and its financiers is essential. This stage requires thorough organisation and management for it to proceed efficiently. It should be planned carefully, generally making use of experienced advisers. Many PPP projects have experienced lasting difficulties as a result of a lack of adequate planning or expert advice during this critical stage.**		
Stages	**EPEC**	**Spain**	**Norway**
Final PPP contract	A basic principle of good procurement is that any change to the PPP contract agreed with the preferred bidder during final negotiations must not be material to the procurement. The Authority's negotiating team and the preferred bidder will need to agree on a framework for final discussions.	Not specific data found. The final contract is published in the national journal of the government (BOE) as a royal decree law. Any changes afterwards have to publish also in the same journal.	Not data available
Financing agreements	PPPs are normally financed in whole or part through project finance arrangements. Insofar as possible, the Authority should require bidders to secure fully committed financing packages along with their bids. Authority should at least require that bidders provide evidence of a reasonably deliverable financing that the debt, the equity and, where applicable, the grant providers have reviewed and accepted the broad design of the PPP and the major contractual provisions (e.g. the proposed risk allocation)	A comprehensive economical-financial plan has to be presented among other bid documents prior to the selection of the preferred bidder	The financial documents have to submitted together with other documents requested for the final tender
Financial close	Any remaining "conditions precedent" contained in the financing agreements need to be fulfilled before funds can be disbursed. The Authority will need to confirm that the requirements of all internal approvals have been met.	The contract terms sets clearly that the financial close ,as previously agreed, has to be achieved 6 months before the toll road is opened to traffic but not once the contract is signed	Before the contracts signed

5.2 Research questions 3

At this point, there is no doubt about the importance of the risk allocation since one way to define PPP arrangements is as mechanisms for the premeditated sharing of risk between public and private partners (OECD 2008). Therefore, this issue is subject of further analysis according to the implications and consequences on the final outcome.

For this purpose, it is conducted an evaluation and assessment of the risk allocation undertook for the projects in each of the countries selected. Consequently the process followed relies on the risk matrixes provided for the projects. In the case of Spain , these are provided by Baeza and Ortega (Ortega Hortelano & Baeza Muñoz 2012) whose research was focused on the risk allocation on the third phase of toll highways granted. On the other hand, Norwegian risk matrixes are provided on the project memorandums and by experts of the NPRA in PPP projects. The process steps are summarized below:

1) Analysis of the Spanish risk matrix that covers all the projects of the 15 projects as they were designed on the original contracts.

2) Analysis of the Norwegian matrix given on the E39 Klett-Bårdsgaug memorandum as the initial approach of the NPRA.

3) The need for a common framework to compare both matrixes leads to set the same relevant risk classification for both. Since Spanish risk matrix is based on general risks categories rather than specific is considered to be the base of the risk classification.

4) Norwegian risks are reassigned within the categories defined.

5) This redistribution may affect the allocation of the risk between the stakeholders, and hence it has to be evaluated.

6) Finally, a comparison between both models.

Although risk allocation is not only important but also dynamic process that evolve as the project does. Accordingly, they analysis continuous as

7) Analysis of the Spanish risk matrix resulting from renegotiations of contracts.

8) Analysis of the Norwegian matrix after negotiations as indicated by the NPRA.

9) Analysis of the risk allocation resulting of the redistribution already defined.

10) Finally, a comparison between both models.

5.2.1 Standard risk matrixes

Spanish concessionary system is based on the Article 215, Royal Decree 3/2011 on public procurement. Article states that projects are undertaken upon the principle of exclusive risk of the contractor. However, despite this statement, the article itself adds that this is without prejudice of the Article 231(Force majeure), and the agreement on risk sharing clauses included in the contracts.

Risk allocation in Spain is based on standard contracts given by the authorities for the bidding procedure since this is thought to be an open procedure .Although risks are not expressly written in detail into the contracts neither as a matrix nor as a section (Villalba-Romero 2014). Baeza and Ortega(Ortega Hortelano & Baeza Muñoz 2012) have gone through these standard contracts to assign risks ,based on the typology of risks defined on the OECD,: into a common matrix . These risks are listed above while the full matrix could be seen on the **appendix B**:

- **Design or technical risk**
- **Construction risk**
- **Availability risk***;*
- **Demand risk**
- **Operating risk***;*
- **Encashment (Enforcement) risk***;*
- **Financial risk***;*
- **Political risk***;*
- **Environmental risk***;*
- **Force majeure***;*

Authors have also added three categories, namely (Ortega Hortelano & Baeza Muñoz 2012):

- **Land acquisition**, it Refers to the purchase of the land required.
- **Permission** ,such as the approval of the environmental impact assessment
- **Legislative**; it stems from the political risks in relation to potential legislative modifications of the contract.
- **Technological;** In the Spanish case, it concerns to available technology along the years that affects the performance of the asset. This is set down in the Article 247.4 on

> Operation and maintenance of the asset, so-called progress clause, whereby the concessionary is said to maintain the assets in accordance with the technical, environmental, accessibility and removal of barriers and users safety standards applicable owing to the progress of science (Gobierno de España 2011)

Table 28: Analysis of the Spanish risk matrix

Type of risk	Public	Private	Shared	Risk allocation
Design/Technical risk		15		Totally private
Land acquisition risk		15		Totally private
Construction risk		15		Totally private
Operation risk		15		Totally private
Permissions risk		15		Totally private
Availability risk		15		Totally private
Demand risk		7	8	Almost equally allocated between private sector and shared
Financial risk		11	4	Mostly private
Environmental risk	9	6		More on public sector than on the private
Political risk			15	Totally shared
Legislative risk	9	6		More on public sector than on the private
Technological risk	9	6		More on public sector than on the private
Force majeure risk	15			Totally public

To sum up, the risk matrix provided is formed by 13 general categories of risks in total and covers the 15 projects. The results summarized on the table above point out that ,despite of the fact underlined that projects are one-off endeavour, it could be seen a similar pattern on the risk allocation of 8 risk categories: Design/Technical risk, land acquisition risk, construction risk, operation risk, permissions risk, availability risk, political risk and force majeure risk.

The remaining risk presents variations depending on when the project was granted as well as how risks were allocated eventually. As a matter fact, it could be distinguished between demand risk, which is said to be notorious for the sheet treatment, a group formed by the environmental, legislative and technological risks and finally the financial risk.

Firstly, demand risk has been shifted from private sector towards a shared allocation. This changed could be seen on a few projects before 2001; afterwards all concessions granted shared the burden of the traffic variation with the administration. The intention was to mitigate the harmful effects of this variable through extension of the concession period according to the performance of traffic. Secondly, legislative, technological and environmental risk also changed the control over these risks from public towards private sector. The new assignation could be noticed after 2002, year in which the progress clause was introduced (Baeza Muñoz et al. 2011). And last, financial risk is mostly bear by the private sector, though there are few projects in which the government granted participative loans to enhance the viability of the project (Baeza Muñoz et al. 2012).

Table 29: Demand risk distribution

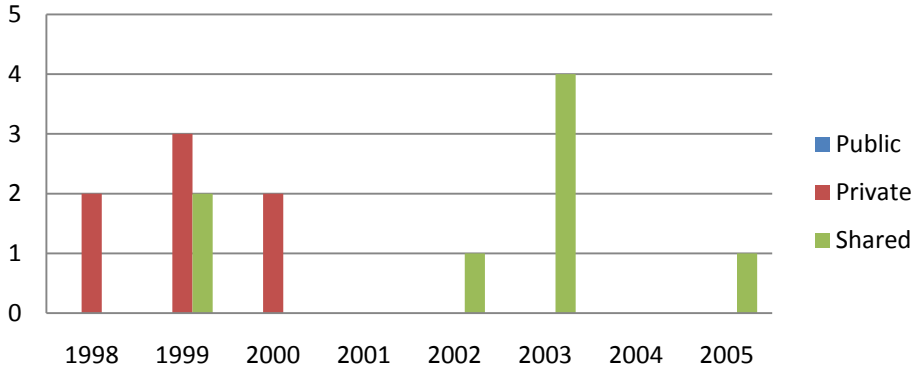


Table 30: Environmental, Legislative and Technological risk distribution

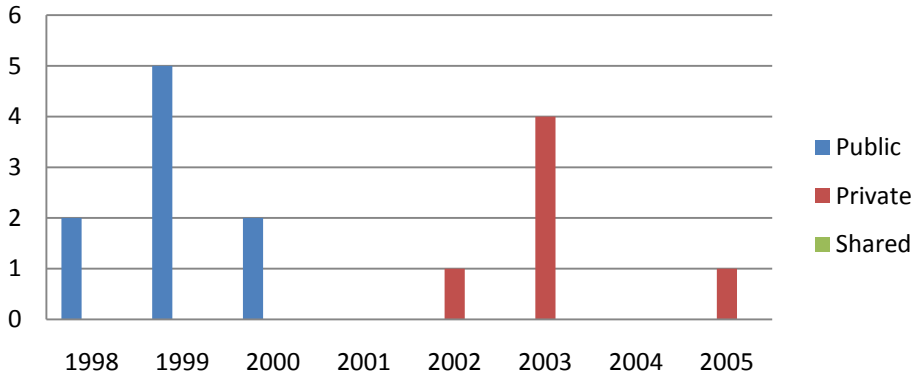
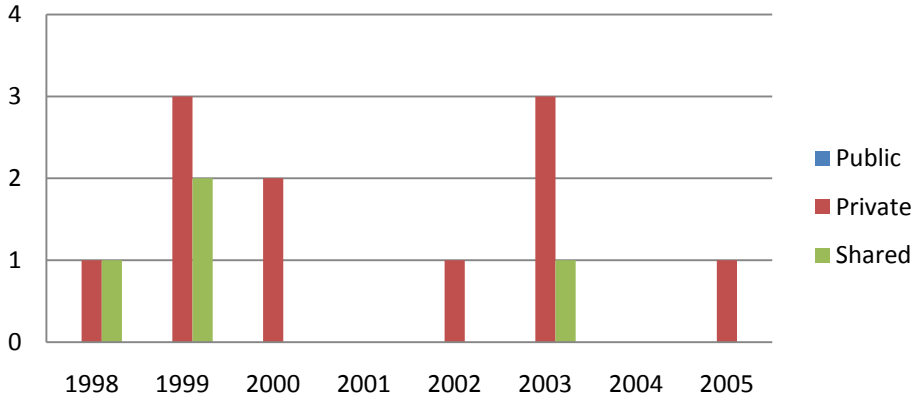


Table 31: Finacial risk distribution



In Norway on the other hand, there is only one risk matrix available on the three memorandums provided by the NPRA. This matrix was initially intended for the E39 Klett- Bårdshaug road project, the first of the three implemented in Norway and therefore it is impression of what was sought by the authorities in a PPP road project by the time the program was about to be launched. Eventually NPRA

used this same matrix for the later two bidding process and their subsequent negotiations. The full matrix drafted initially could be seen on **appendix C.**

In this matrix, there are 101 risks indentified. All of them are intended to be highly detailed items, defining precisely a certain threat to the project, and they are sorted within 7 main categories:

- **Pre-contract award**
- **Post-contract award preparations**
- **Land acquisition**
- **Engineering/design**
- **Construction**
- **Operation and maintenance**
- **Financial.**

At first sight, the risk assignation has put 14 of them are under the public control, 74 on the private and 12 are said to be shared between them. However, a deep analysis of the impact and extent of these risks have to be done. Matrix table is provided on next pages.

5.2.1.1 Method

A first analysis highlights that the level of detail given for each matrix cannot make feasible a direct comparison between both models. Additionally,, among the general groups indentified by the Norwegian authorities, there few which do not match which the ones indentified by the OECD and consequently with those used for the Spanish matrix of risk.

Hence, this entails that first both cases have to be look from the same scale. Concurrently, it seems to be reasonable to "convert" or to group small-specific highly detailed risk into a more broadly and comprehensive risks categories. In addition, it is thought to be more reasonable and feasible to compare general categories rather than highly detailed risks which depend to great extent of the inherent characteristics of a certain project and its surroundings. These reasons have led to consider using the matrix provided for the Spanish projects as a benchmark.

However another matter arises regarding which of these two systems of general categories are more suitable, meaningful in terms of covering better the potential threats to a project. Subsequently another analysis was conducted of handbooks and guides provided by other international institutions and organizations regarding PPP projects aiming to assess risks categories, if any, identified. The institutions checked were:

- OECD (OECD 2008)

- World Bank (World Bank 2008)
- Federal Highways Administration (FHWA) of the united States and (Federal highway administration 2012)
- Indian government(Ministry of finance India 2015)
- State of Victoria in Australia(State government of Victoria 2001)
- European commission (European commission 2004)

They have been selected to represent heterogeneous sample of school of thoughts described on their reports regarding PPP and its risks. Their handbooks are mainly referred to infrastructures within the transport sector to narrow the scope of the risk identification.

The idea is to use the definitions given by Baeza and Ortega, since their research is thought to be used as a benchmark and compare with other definitions and general categories of risks identified by the aforementioned institutions. It is important to bear in mind that the importance of the definition goes far beyond of how is named a category, since it can mislead the interpretation of the risks covered. The resulting matrix could be seen on the next page and also a table indicating which risks are registered under other names though the definitions are similar to the ones considered as reference.

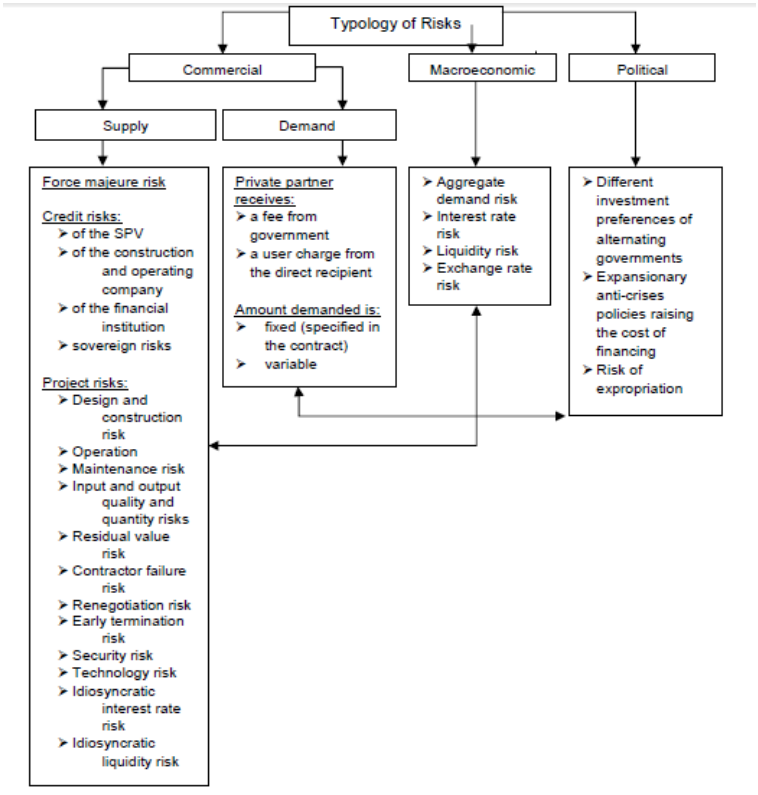


Figure 11: Proposed typology of risks (Burger et al. 2009)

Table 32: Analysis of types of risks most used by high-level institutions.

	OECD(2008)	**FHWA (2014)**	**World bank (2008)**	**Ministry of finance, India (2010)**	**State government of Victoria (2001)**	**European commission (2009)**	
	Transport Infrastructure	Transport Infrastructure	Transport Infrastructure	Transport infrastructure	Transport Infrastructure	All infrastructures	**Total matches**
Design/Technical risk	x	x	x	x(3)	x	x(5)	6
Land acquisition risk		x	x(2)	x	x(4)		4
Construction risk	x	x	x	x	x	x	6
Permissions risk		x	x(2)	x	x(4)		4
Availability risk	x		x(2)		x	x	4
Demand risk	x	x	x	x	x	x(5)	6
Operation risk	x	x	x	x	x	x	6
Enforcement risk	x						1
Financial risk	x	x(1)	x(2)	x	x	x(5)	6
Political risk	x	x	x	x	x(4)	x	6
Environmental risk	x	x	x(2)		x(4)	x	5
Legislative risk		x	x(2)	x	x(4)	x	5
Technological risk					x(4)		1
Force majeure risk	x	x(1)	x	x	x		5
Other risks indentified of importance/typical in PPP projects not sorted on the table	project default	Financial Default Risk to public agency, Hand back, Procurement, Appropriation risk	Project default, strategic	External linkages ,Handover ,Terminal value ,Sponsor ,project default, planning risk	Sponsor ,industrial relations, network and interface	Choice of private partner, Latent defect ,public acceptance, hidden protectionism, sustainability, residual value, planning	

(1)(2)(3)(4)(5) See on the table in the next page

Table 33: Comments regarding typologies of risks

(1) FHWA of risks	Financial risk **includes** Market conditions, competing facilities and refinancing risk
	Force majeure is not explicitly mentioned even though is analyzed afterwards
(2) World Bank definition of risks	**Financial risk** includes **Other market risks**
	Environmental risk, permission risks and **land acquisition** are referred as **site risks**
	Legislative risk includes **Change in standards risk**
	Availability risk is referred as **Performance risks**
(3) Indian government definition of risks	**Demand risk** includes **Volume and payment risks**
	Permission risk is referred as **approval risk**
(4) State government of Victoria definition of risks	**Environmental risk permission** and **land acquisition** are referred as **site risk**
	Demand risk is referred as **market risk**
	Political and legislative risks are referred as **Legislative and environmental risk**
	T**echnological risks** is referred as **asset ownership risk**
	Financial risk includes **Price risk**
(5) European commission definition of risks	**Design/Technical risk** is mentioned in pag 85
	Operation risk is mentioned in pag 85
	Financial risk is referred as **other financial risk**
	Financial risk includes **foreign exchange risk**

The analysis has clearly shown that most of the risks used are also considered by these institutions and only for two of them are mentioned once in the literature reviewed: technological and enforcement risk. About these last two, it can be argued that they are indeed more detailed than the others, referring to specific threats and in therefore handbooks that are intended to provide an overview of PPP do not cover them.

Concurrently, there are other risk categories defined along the literature that are not covered neither by the Spanish nor Norwegian risks matrixes, but that are thought to be relevant to undertake a comprehensive analysis of PPP in transport infrastructures according to these institutions. To sum up, risks displayed above are, in general, relevant for the reviewed authorities and hence using them as they are defined could provide a better and comprehensive vision of the consequences of a PPP in road transport

The following step is supposed to be a re-assignation of the 101 highly-detailed risks existing in the Norwegian risks matrix within the general categories proposed for Spain. The research has assumed that even if these items have already been assigned within a common category have to be double checked to ensure that they are allocated on the right area. The results of this process are presented on the following matrixes below. The matrix elaborated to re-assign the items in the Norwegian matrix into the Spanish categories is on the **appendix D;** results are summarized on the following tables.

Table 34: Overall results of the conversion to the Spanish matrix

Risks	Value
Total number	**101**
sorted	**99**
unsorted	**2**
Categories with >1 risk assigned	**13**
Categories with no risk assigned	**1**

Results present that 99 out of 101 (98%) items have been successfully allocated into one of the proposed categories by Baeza and Ortega. Consequently, there are two items (1, 98%) which have not been assigned into any category.

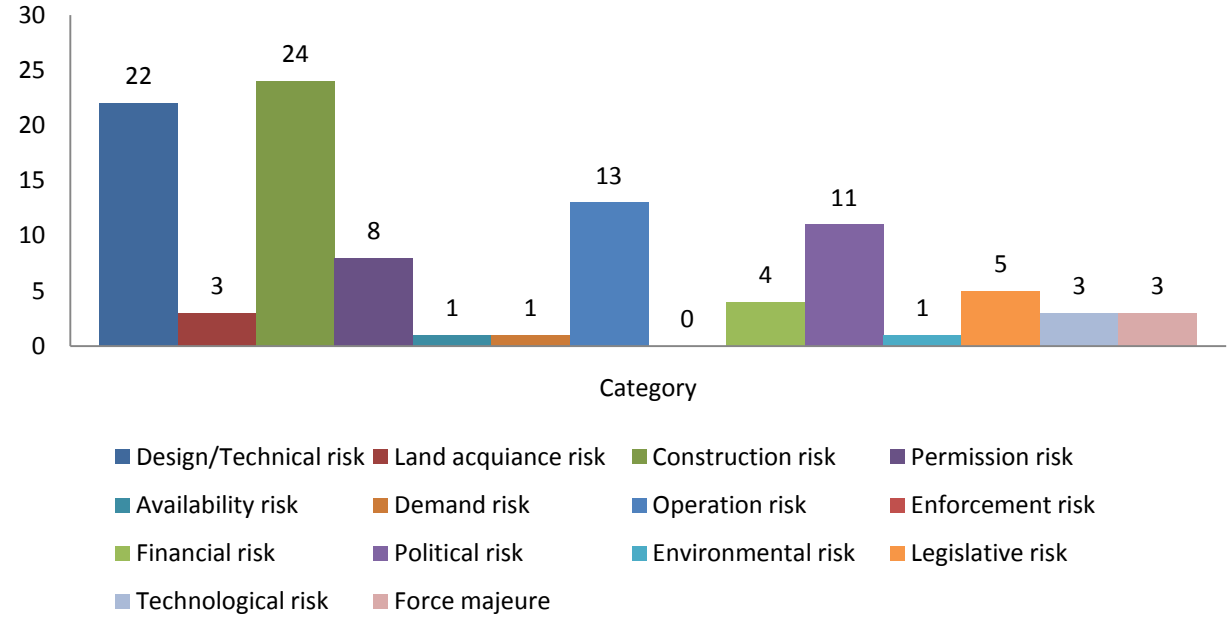
- Item 6.13 Latent defects beyond end of operational phase
- Item 6.17Road evaluation at the end of the operational phase

Additionally there is also one category which has not been allocated with any item since none of the items studied is closely related to what the group stands for.

- Enforcement risk

They are thought to be more suitable within other categories which have not been considered though it does not mean that they do not exist. It could be concluded that both enforcement risks and items unsorted are not going to be further analyzed.

Table35: Distribution of risks according to the new categories introduced



In connection with the foregoing, the first hint that currently draws from the conversion is that most of the proposed categories have been assigned with at least one risk except the aforementioned enforcement risk. As a matter of fact, construction and technical/design group cover most part of the items followed by Operation and permission risk groups. These categories could be seen as the most outstanding areas in a road project in terms of opportunities and threats. The remaining classes have less than 10 items. In the case of enforcement risk,

Subsequently, once the risks are grouped, the aim is to analyze how they are allocated between the stakeholders. It is noteworthy to underline that a logical distribution of risks within each of the categories will ensure that the re-assignation of items has been done satisfactorily for the final comparison. The following tables present how risks are controlled according to the items belonging to each of the 13 classes used now.

Design/Technical risk: All of the risks selected were already assigned to this group by the Norwegian authorities. As expected, all of them are taken by the private sector.

Table 36: Risk allocation within design/technical category

Design/Technical risk			
Risk factor	**Public**	**Private**	**Share**
Changes in planning permission		x	
Compatibility of design with existing Norwegian road requirements		x	
Traffic safety audits		x	
Bridges and structures		x	
Road construction		x	
Tunnel gates and water/frost protection		x	
Geotechnical planning		x	
Technical planning related to traffic		x	
Landscaping		x	
Compliance with permits and approvals		x	
Geotechnical evaluations		x	
Geological evaluations		x	
Compliance with third party environmental requirements		x	
Planning changes from the company		x	
Health / Environment / Safety		x	
Survey of pipelines and cables		x	
Compatibility between solutions and output specifications		x	
Design fault / Prolonged design process / Non – approval of design / Increased design costs		x	
Lifetime of elements		x	
Project administration and integration		x	
Design costs		x	
Utilities owners (water, power supply etc.)		x	
Total	0	22	0

Land acquisition risk: The class was also proposed by the Norwegian authorities, though some modifications have been made on the items assigned. The results show that this is a group evenly distributed.

Table 37: Risk allocation within land acquisition category

Land acquisition risk			
Risk factor	**Public**	**Private**	**Share**
Failure to acquire interests on time	x		
Failure to return "access / construction" land in agreed condition		x	
Land owners and other third parties			x
Total	1	1	1

.

Permission risk: Category formed by items taken from the post-contract, design/technical and construction classes. Most of the items are thought to be taken by the private sector.

Table 38: Risk allocation within the permission category

Permission risk			
Risk factor	**Public**	**Private**	**Share**
Emission & disposal permits/licenses		x	
Permits/licenses according to the legislation regulating health issues in the municipalities		x	
Other environmental permits/licenses		x	
Approval of alternative access roads, storage sites etc.		x	
Approval of areas for storage of excess materials			x
Time and costs to meet approval requirements		x	
Relevant operational and maintenance manuals, approvals and legal certificates		x	
Total	0	7	1

Availability risk: Another relevant category in terms of balance sheet treatment. The item assigned is put on the private sector.

Table 39: Risk allocation within the availability category

Availability risk			
Risk factor	**Public**	**Private**	**Share**
Non-availability of service (not due to force majeure)		x	
Total	0	1	0

Demand risk: As above, this class is also significant for the Eurostat in terms of national accounts. In this case; the public sector takes control over the item.

Table 40: Risk allocation within the demand category

Demand risk			
Risk factor	**Public**	**Private**	**Share**
Changes in traffic volume	x		
Total	1	0	0

Financial risk: Almost all risks already assigned are still within this class which is completely bear by private sector.

Table 41: Risk allocation within the financial category

Financial risk			
Risk factor	**Public**	**Private**	**Share**
Cost overruns due to inflation		x	
Interest rate changes / finance changes		x	
Changes in rate or method of taxation		x	
Insolvency / failure of sub-contractors / failure of Project Company		x	
Total	0	4	0

Environmental risk: Its only item is considered to be managed by the authorities before the contract is awarded.

Table 42: Risk allocation within the environmental category

Environmental risk			
Risk factor	**Public**	**Private**	**Share**
Archaeological explorations	x		
Total	1	0	0

Technological risk: As in the Spanish market, Norwegian authorities indentified risks related to the progress of science that have to bear by the private sector.

Table 43: Risk allocation within the technological category

Technological risk			
Risk factor	**Public**	**Private**	**Share**
Maintenance and functionality		x	
Technological change / possible upgrades		x	
Obsolete equipment		x	
Total	0	3	0

Operation risk: All of these items listed below are previously put in the operation category displayed by the Norwegian authorities and they are taken by the private sector.

Table 44: Risk allocation within the operation category

Operation risk			
Risk factor	**Public**	**Private**	**Share**
Operations and maintenance, execution and costs		x	
Managing sub-contractors		x	
Supervising the fulfilment of specifications		x	
Failure to achieve output specifications		x	
Changes in scope of services specifications by operations/maintenance/SPC		x	
Cost overruns of operations/maintenance/services specifications		x	
Damages to infrastructure		x	
Latent defects – new road – old road renewed		x	
Adverse weather conditions operation phase		x	
Responsibility for the quality of the road at handover after the operational phase		x	
Maintenance defects at the end of the operational phase		x	
Meeting specifications		x	
Equipment Price		x	
Total	0	13	0

Legislative risk: To some extent similar to political. Items selected are more related to regulations to be enforced by the authorities and that affect the performance of the project. Five items have been assigned.

Table 45: Risk allocation within the legislative category

Legislative risk			
Risk factor	**Public**	**Private**	**Share**
Environmental Impact approval	x		
Safety standard clarification	x		
Compatibility of design with future Norwegian road requirements			x
Delays/cost overruns due to general legislative changes		x	
Costs of compliance with all general changes in legislation and statutory requirements	x		
Total	3	1	1

Construction risk: Undoubtedly one of the core categories and clearly bear by the private sector

Table 46: Risk allocation within construction category

Construction risk			
Risk factor	**Public**	**Private**	**Share**
Access to site			x
Construction in compliance with plans, specifications, laws and regulations		x	
Safety inspections		x	
Compliance with permits and approvals		x	
Health / Environment / Safety		x	
Construction and construction costs		x	
Ground conditions		x	
Reconstruction of pipelines and cables		x	
Costs in accordance to delays and forced time		x	
Labour unions		x	
Labour shortage		x	
Difficult weather conditions construction phase		x	
Delays relating to changes in the SPC		x	
Misinterpretation of design/specifications		x	
Flow of traffic		x	
Project administration and integration		x	
Reinstatement of materials		x	
Material supply problems		x	
Failure of sub-contractor		x	
Relations to the surroundings		x	
Financial solidity of prime constructor		x	
Financial solidity of sub-contractors		x	
Disputes between contractor/designer		x	
Collapse / structural failure of existing structures including structures owned by third parties		x	
Total	0	23	1

Force majeure risk: these items are spread along the design, construction and operation phase.

Table 47: Risk allocation within force majeure category

Force majeure risk			
Risk factor	**Public**	**Private**	**Share**
Force majeure cost time delay			x
Force majeure cost implications			x
Force majeure operation phase			x
Total	0	0	3

Political risk: Not included as a category on the Norwegian matrix but items closely related to it are spread through the pre-award, post award, design, construction, operation and even finance. Items are either shared or public handled.

Table 48: Risk allocation within the political category

Political risk			
Risk factor	**Public**	**Private**	**Share**
Area development plan	x		
Budget approval	x		
Protestor action previous to design			x
Planning changes from the Norwegian Public Roads Administration	x		
Planning changes from the municipalities or other parties	x		
Planning authorities	x		
Protestor action operation phase			x
Adequacy and accuracy of information provided by the Norwegian Public Roads Administration			x
Changes in scope of services specifications by the Norwegian Public Roads Administration during operational phase	x		
Relation road users – road authority	x		
Failure of the Norwegian Public Roads Administration to meet payment obligations to the SPC in the operational phase	x		
Total	8	0	3

These results prove that the regarding design, construction, operation, permission availability, demand, financial, environmental, technological and force majeure , the assignation of risks is totally or mostly defined . Political risks present more variation than the formers between risks allocated on the public sector and those which are shared. In addition, Legislative risks, which some authors claim to be the same as the previous one, shows a distribution more favourable towards putting the burden on the public sector with two exceptions that go to both private sector and shared. Finally, land acquisition distributed evenly all the risks.

Table 49: Results obtained from the suggested distribution of Norwegian items within the new categories introduced

Type of risk	Type of Risk assigned	Public	Private	Shared	Risk allocation
Design/Technical risk	Private		22		Totally Private
Land acquisition risk	Public/Private/Shared	1	1	1	Equally distributed
Construction risk	Private/Shared		23	1	Mostly Private
Operation risk	Private		13		Totally Private
Permissions risk	Private		7	1	Mostly Private
Availability risk	Private		1		Totally Private
Demand risk	Public	1			Totally Public
Financial risk	Private		4		Totally Private
Environmental risk	Public	1			Totally Public
Political risk	Public/Shared	8		3	More on Public sector than shared
Legislative risk	Public/Private/Shared	3	1	1	More on Public sector than shared or on the private
Technological risk	Private		3		Totally Private
Force majeure risk	Shared			3	Totally Shared

5.2.2 Negotiations and renegotiations of risk matrixes

Negotiations may be part of the procurement procedure followed, like the negotiated procedure in Norway, or it may be a consequence of changes in the current performance or the surroundings, as it has happened in Spain, that affects seriously the feasibility of the project. In this last case, it is usually called renegotiation since the contract has already been signed based on standard conditions given by the public authorities.

These changes in the contract affect also to the risk allocation, since it is directly linked to the financial results and ratios associated to the project financial plan (Vassallo Magro 2002). These changes could be made in form of insurance coverage, loans or modifications of the initial conditions granted. See **appendix F.**

In the case of Spain, Baeza and Vassallo (Baeza Muñoz & Vassallo Magro 2008; Baeza Muñoz & Vassallo Magro 2011; Baeza Muñoz et al. 2011) have already studied renegotiations undertaken from the early beginning of the concessionary market. They demonstrated that the number of renegotiations in the concessionary market has been extraordinary high and that in most cases; causes of renegotiation are not duly justified. Further, there are renegotiations said to be positive for the outcome of the project while there are others negative. This latter has obviously detrimental effects on the users owing to the lax attitude of the government. As a matter of fact, it is the attitude of the authorities what has created per verses incentives to renegotiate and thus tenders submit overly aggressive offers.

These renegotiations in Spain focused on period of concession, rates, economical-financial benefits or the construction and operation of new stretches (Baeza Muñoz & Vassallo Magro 2011). Before 2010 only 4 of the concessions were renegotiated (see on table above). However, the economic downturn and court decision regarding land acquisition prices of the Madrid area, have impact hard on the performance , pushed the government to approved in the General State Budget 2010 (Law 26/2009) and later in the Law 43/2010 countermeasures to cope with this turbulences. Some of the concessions granted along the third phase were included to be subject of participative loans or new agreements in terms of concession period or rates. Also in the General State Budget 2011 included other mechanism to ensure the feasibility of these projects. Table containing information regarding concessions subjected to these loans is on the **appendix G.**

Table 50: Contracts renegotiated before 2010

Stretch	Year Published	Modifications	Cause
R-3 Madrid-Arganda	2009	New stretch granted	Awarding of a new link between R-5 and AP-41
R-5 Madrid-Navalcarnero			
R-4 Madrid-Ocaña	2004	Construction deadline December 2004 / Increase Toll rates	Archaeological site
AP-7Circunvalación de Alicante	2007	Toll rates	Delay in delivery

The matrix obtained by Baeza and Ortega (Ortega Hortelano & Baeza Muñoz 2012) with the results of these renegotiations could be seen in the **appendix** .The final risk allocation of all the projects is summarized in the table below:

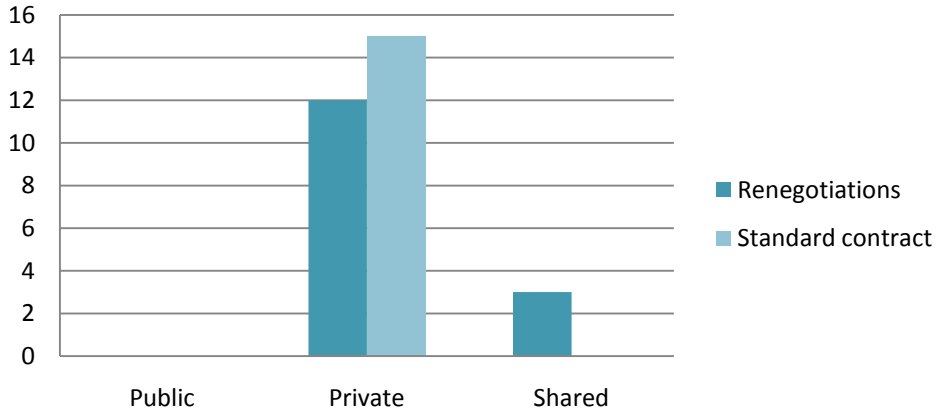
Table 51: Results given by Baeza and Ortega after all renegotiations undertaken

Type of risk	Public	Private	Shared	Risk allocation
Design/Technical risk		15		Totally private
Land acquisition risk		12	3	Mostly private
Construction risk		14	1	Mostly private
Operation risk		15		Totally private
Permissions risk		15		Totally private
Availability risk		15		Totally private
Demand risk		6	9	More shared than on private sector
Financial risk		9	6	More on private sector than shared
Environmental risk	9	6		More on public sector than on the private
Political risk			15	Totally shared
Legislative risk	9	6		More on public sector than on the private
Technological risk	9	6		More on public sector than on the private
Force majeure risk	15			Totally public

It is noteworthy to highlight changes occurred on construction, land acquisition, demand and financial risks. Clearly it could be seen the trend towards a shared assignation of risks, as a result of a strategy to alleviate the burden on the private sector due to the financial turbulences that they are undergoing.

Land acquisition has been shifted towards shared in those concessions affected by the decision court that declared that the land price used was not in conformity with the real value of those areas and thus the final price was increased up to 100 times per square meter. Concessionaries argued that the economical-financial equilibrium was not met under these circumstances and consequently the government was pushed to create a compensation account, in the form of participative loans. This is seen on the table below.

Table 52: Land acquisition risk



Afterwards, Law 43/2010 also ensured new participative loans spreading them to other concessionaries .Subsequently, these loans, together with the modification of demand risk to share in other projects, shifted the assignation of financial risks from private to share. Finally, construction risk is shared solely in one of the concessions owing to the delays caused by an archaeological site discovered during the construction. As in the land acquisition, graphs above prove how the exposures of private sector to risk have been softened after renegotiations.

Table 53: Construction risk

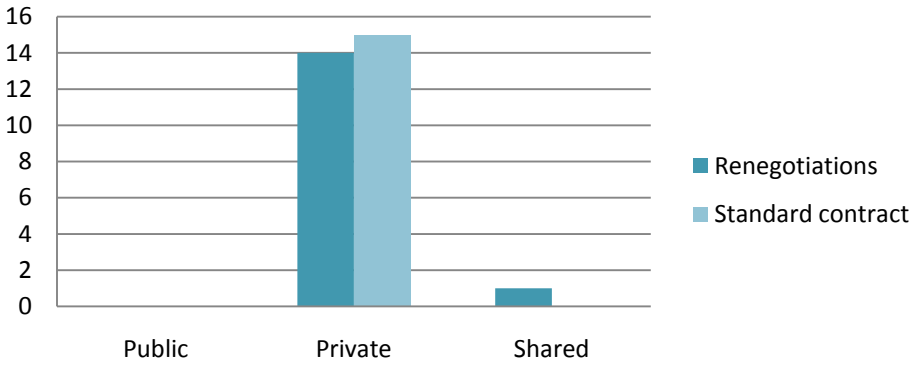


Table 54: Demand risk

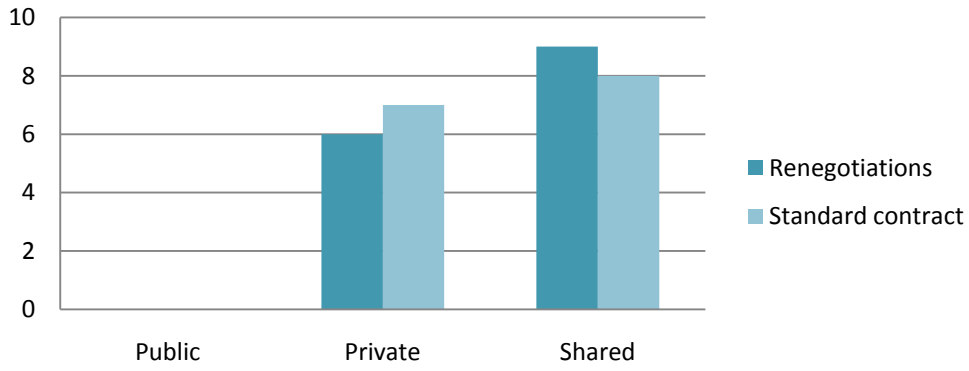
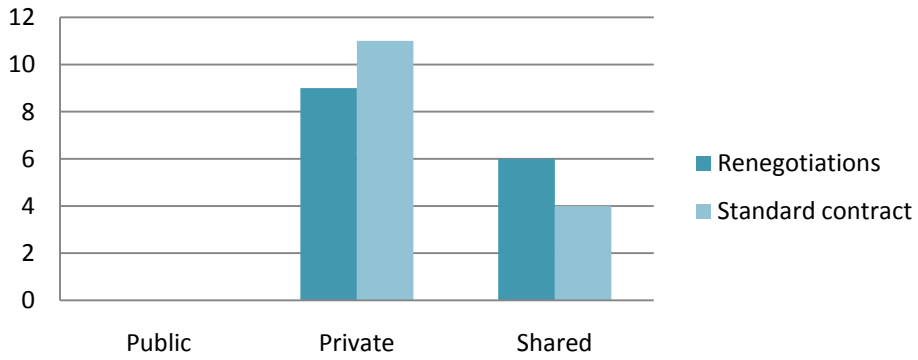


Table 55: Financial risk



On the other hand, in Norway the changes in the standard matrix were caused by the procurement process itself. Negotiated procedures entail a discussion and agreement of a certain contract provided by the grating authorities. After these meeting following changes were made applying to all PPP projects:

- Item 1.5, Safety standard clarification, is left out.
- Item 2.2 , Emission & disposal permits/licenses,is public owned
- Item 4.3, Compatibility of design with future Norwegian road requirements, is public owned
- Item 4.5, Approvals by the Norwegian Public Roads Administration and its sub-items are left out, as long as it is according to the technical specifications in the contract. The PPP-company got all the technical specifications that were worked on by the NPRA Thus they could use it, but it was their own risk and they had to check everything.

Negotiations have left 94 items to allocate. Since most of the items have not been modified within another category, the focus is on those which have been re-assigned to other stakeholder. The same two items continue unsorted as previously .As it was done for the standard or initial proposed

allocation, tables below represent categories affected by these new arrangements which are: Legislative, permission and design/technical.

Design/Technical risk: The item 4.5 and its sub-items were allocated here. Now there are 16 risks.

Table 56: Risk allocation within design/technical category after negotiations.

Design/Technical risk			
Risk factor	**Public**	**Private**	**Share**
Changes in planning permission		x	
Compatibility of design with existing Norwegian road requirements		x	
Traffic safety audits		x	
Compliance with permits and approvals		x	
Geotechnical evaluations		x	
Geological evaluations		x	
Compliance with third party environmental requirements		x	
Planning changes from the company		x	
Health / Environment / Safety		x	
Survey of pipelines and cables		x	
Compatibility between solutions and output specifications		x	
Design fault / Prolonged design process / Non – approval of design / Increased design costs		x	
Lifetime of elements		x	
Project administration and integration		x	
Design costs		x	
Utilities owners (water, power supply etc.)		x	
Total	0	16	0

Permission risk: Only item 2.2 has changed, no major difference has been made on this category.

Table 57: Risk allocation within permission category after negotiations.

Permission risk			
Risk factor	**Public**	**Private**	**Share**
Emission & disposal permits/licenses	x		
Permits/licenses according to the legislation regulating health issues in the municipalities		x	
Other environmental permits/licenses		x	
Approval of alternative access roads, storage sites etc.		x	
Approval of areas for storage of excess materials			x
Time and costs to meet approval requirements		x	
Relevant operational and maintenance manuals, approvals and legal certificates		x	
Total	1	6	1

Legislative risk: Item 1.5 was removed while the 4.3 changed to public. Now no risks are shared.

Table 58: Risk allocation within legislative category after negotiations.

Legislative risk			
Risk factor	**Public**	**Private**	**Share**
Environmental Impact approval	x		
Compatibility of design with future Norwegian road requirements	x		
Delays/cost overruns due to general legislative changes		x	
Costs of compliance with all general changes in legislation and statutory requirements	x		
Total	3	1	0

Table 59: Results obtained from the suggested distribution of Norwegian items within the new categories introduced after negotiations.

Type of risk	Type of Risk assigned	Public	Private	Shared	Risk allocation
Design/Technical risk	Private		16		Totally Private
Land acquisition risk	Public/Private/Shared	1	1	1	Equally distributed
Construction risk	Private/Shared		23	1	Mostly Private
Operation risk	Private		13		Totally Private
Permissions risk	Private	1	6	1	Mostly Private
Availability risk	Private		1		Totally Private
Demand risk	Public	1			Totally Public
Financial risk	Private		4		Totally Private
Environmental risk	Public	1			Totally Public
Political risk	Public/Shared	8		3	More on Public sector than shared
Legislative risk	Public/Private/Shared	3	1	0	More on Public sector than on private
Technological risk	Private		3		Totally Private
Force majeure risk	Shared			3	Totally Shared

6. Discussion

All findings presented together with the theory provided are going to help to answer and more importantly to understand the opportunities and threats behind each of the strategies displayed by the countries studied.

6.1 Which are the main differences, if there are some, observed between the procurement procedures in PPP projects of Spain and Norway?

One of the most noticeable differences between the procurement procedures selected is in fact the method itself. Norway has conducted PPP arrangement through a **negotiated procedure** while Spain opted for an **open procedure**. At first sight, it could not be said that any of them is better than the other since they pretend to achieve a purchase from a different approach, but some considerations have to make.

Open procedures are intended in Spain to gain more efficiency through competition by opening the contract to major number of bidders (Baeza Muñoz & Vassallo Magro 2008). All of them compete under the same conditions based on a standard contract designed by the granting authority. Contracts cannot be discussed and the **most advantageous** bid is awarded with the project. The concept of most advantageous bid is based on the evaluation criteria which are usually a mixture between technical and economical criteria intended to obtain the best from both sides.

Norway has opted for a negotiated procedure in which only a selected group of bidders will be invited to participate, no more than four in any case, to further negotiations. Indeed the NPRA reserves the right to choose two among the bidders invited in first stage into a final round (Statens Vegvesen 2005). This process is based on the law ***§ 14-3. Competition with negotiation, by prior publication*** ¸in particular with the section referring to construction contracts where the work to be performed exclusively for research, experiment or development purposes and not to make profits or earnings of research or development.

This strategy has been reported as expensive and more time-consuming that an open procedure and that some bidders attempt to bidding process since there were at least three projects, otherwise they would have resigned to take part (Pedersen & Helmersen 2014). These statements could be strengthened evaluating how much time takes to conduct a procurement procedure in Spain and Norway. Time is considered a reliable reference, since it could be used to outline the total expenses made by the firms to take part in a bidding process.

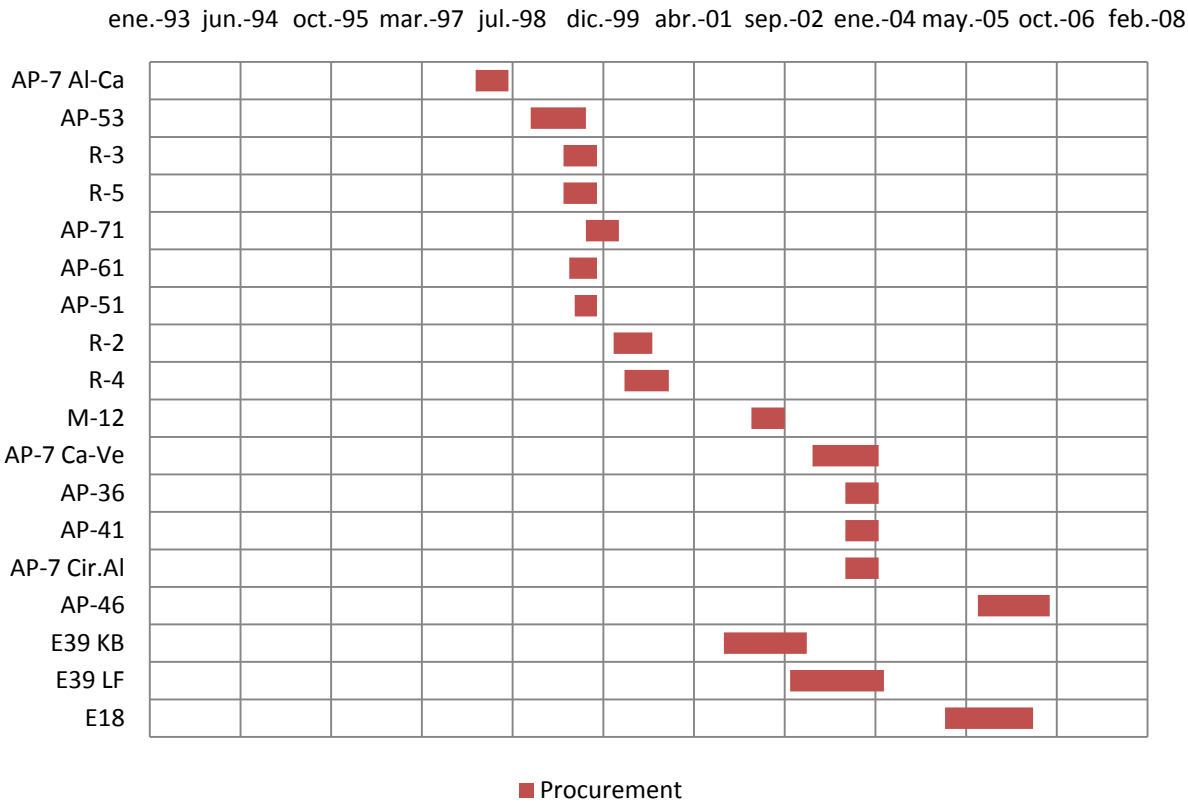
Table 60: Time spend on procurement procedures

	Spain	Norway
Average	7,60	16,33
SD	2,41	1,53

Norwegian procurement procedure takes more than twice the time that is required in Spain. Even in the worst scenario in Spain, it is shorter the time required than in Norway. This could entail that those

companies with a project portfolio broad enough could afford to be a bidder in this sort of procedures. This could be seen perfectly on the next figure. Data is in **appendix A.**

Table 61 : Procurement procedurs along time line



Norwegian negotiated procedure has also another difference according to the preferred bidder. NPRA stress that the criteria are based on the most economically advantageous bid, especially on the Life cycle cost analysis. Nonetheless may include other relevant criteria related to the type of construction as it is stated by the Article ***§ 22-2. Criteria for selection of tenders.***

Additionally, the financial close is approached differently from one country to another. Norway seeks to reached the financial close before the tender documents are signed while in Spain is until 6 months before the road is opened when the financial close has to be achieved. However, despite the fact of disposing relatively longer time, there are few projects which have faced serious problems to reach it successfully (Fuente 2009; Izquierdo Bartolome & Vassallo Magro 2002).

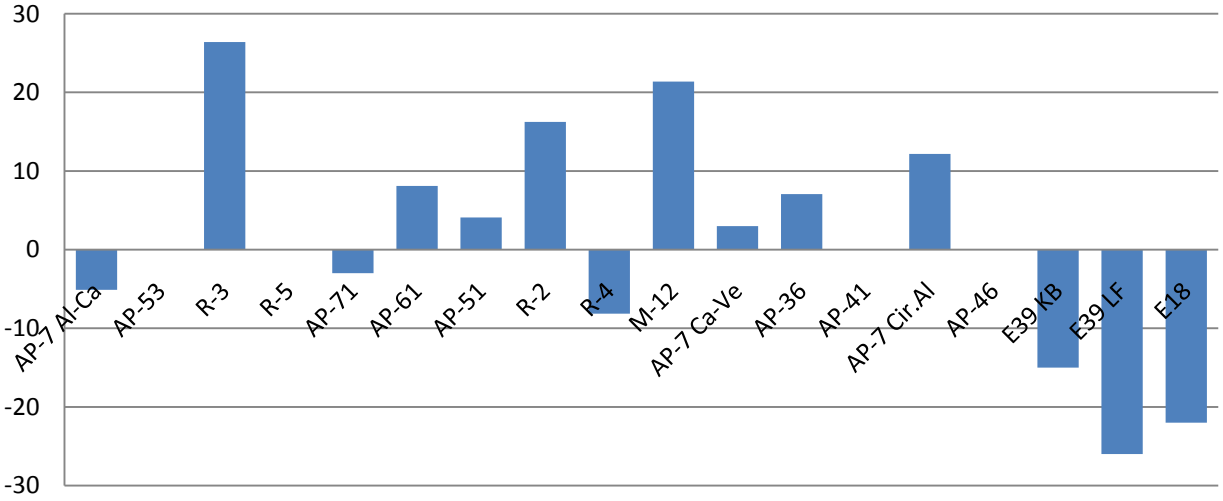
It has to be taken into consideration the fact Toll highways in Spain under PPP arrangements cannot decide by their own, maximum toll levels since they are fixed in the contract. and they are updated every year to bring them into line with inflation (Vassallo Magro et al. 2012). The contracts enable the concessionaire the flexibility of being able to modify, slightly toll levels depending on the time of day and of year, but the legislation does not allow enough flexibility to implement, for example, congestion pricing approaches (Vassallo Magro et al. 2012). Norway has decided to take over the demand based on its experience in toll financing and draft a payment mechanism according to criteria

related to the availability, operation and maintenance; and on a lower level the safety of the road and level of heavy vehicles.

Regarding the period granted, it is noteworthy to underline how it is approached. Spanish legislation states that period granted starts once the awarding decision is published in the BOE while Norwegian authorities define in the memorandums that operating period starts once the construction works are over. The Spanish intention is clearly to boost the efficiency during the construction period, rewarding the contractor in case it is able to start before the operation period. However, projects of study do not even reached the expected opening date in most of the cases owing to problems of different nature. Norwegian projects have been compared with expected duration according to traditional procurement methods resulting much more favourable for the PPP mechanism.

Finally, cost overrun during construction have been reported by different authors (Vassallo Magro et al. 2012; Villalba-Romero 2014) apart from those included in the land acquisition. Some causes of these cost overruns have been published in the BOE; however it could not be checked for all of them. This is also the case of Norway where no reliable data in papers reviewed could be used.

Table 62: Deviations from the expected openning



6.2 How do the Norwegian and Spanish PPP projects follow the procurement recommendations given by the European PPP expertise centre (EPEC)?

At first sight, it can be noticed that both procurement methods comply in general terms with the proposals made by the EPEC. It is indeed remarkable to check that both countries respect the basic principles of the EC Treaty, based on transparency, equal treatment, proportionality and mutual recognition of all bidders. This is also related with the fact that the opening of PPP process is widely published on the gazettes and official journals. However, there are some details that should be looked closer to align completely the principles numbered by the EPEC with those followed by the authorities.

First of all, based on the principle of selecting a competitive procurement procedure, EPEC do not recommend the use of negotiated procedures, the institution asserts that this should be used only exceptionally for a PPP. Concurrently, it is advisable to include a procurement specialist who should work closely with the legal advisers.

Moving into the procurement process, this is more intended for those which are based on a negotiation. This applies especially for those definitions and advises intended for the bidding process, more precisely prequalification, shortlisting, invitation to tender which are closely followed along the preparation used by the NPRA during this stage. For Spain, these recommendations do not apply since it is an open procedure.

Regarding the evaluation of tenders, the EPEC declares that even if the evaluation score is not based on a technical evaluation, a determination must be made that the technical solution proposed by a bidder is feasible, deliverable and robust, that it is based on reliable technologies, that it meets all minimum technical requirements set and that the costs and financial structure are consistent with the technical solution (European PPP Expertise Centre 2012).This statement is complied by Spanish procedures in every project launched while in Norway it has been only possible to check the principles enumerated by the procurement law and some intentions in the memorandums, but there is a lack of reliable information to ensure how technical aspects have been evaluated accordingly with the recommendations proposed.

Additionally, EPEC remarks how important it is to look at the proposed project management. To put in other words, the bidding consortium must come across as a cohesive entity rather than just a collection of companies put together for bidding purposes(European PPP Expertise Centre 2012). This issue is also duly addressed by the Spanish authorities since they include a criterion of efficiency of the concession organization. Norwegian procurement procedures planned also included an analysis of this issue, but as it happened before, no information has been gathered to define precisely how this was addressed.

Finally for the approach to the financial part of a PPP contract, EPEC admits that this is one of the most complex issues to be addressed in a PPP arrangement. Besides, the institution asserts that this may not be reached once the contract is signed as it happens in Spain which could be reached up to 6 months before starting the operation period. On the other hand, Norwegian cases, owing to the negotiated procedure, are said to be close prior to the signature of the contract.

In connection with the foregoing, EPEC recommends the Authority that it should at least require that bidders provide evidence of a reasonably deliverable financing that the debt, the equity and, where applicable, the grant providers have reviewed and accepted the broad design of the PPP and the major contractual provisions. This has to be seen connected with the criteria of financial stability and strength evaluated during the bidding process.

6.3 How the existing risks are allocated between the private and public sector in Norway and Spain and how is the risk allocation different between the countries?

At this point, there is no doubt about the importance of the risk allocation and its consequences. Along the findings, it has been presented how certain meaningful categories of risks, covering even a higher number of specific risks, were assigned between the stakeholders, basically grouped around public and private sector. Nonetheless, bearing a risks implies a financial burden that impacts upon financing the project (Vassallo Magro 2002).

Before beginning to compare both scenarios, the first characteristic that cannot be overlooked is the fact that in Spain, similar projects do not share the same allocation of risks. It is clear prior to the renegotiations that standard contracts submitted by the authorities have been modified in terms of the assignation of some risk categories owing to the experience gain over the years, researches undertaken or simply the dynamic environment that changes constantly As it was described in the previous section, it could be distinguished between those ones granted before and after 2001.

Secondly, there are two stages to analysis, the first is based on the standard or delivered risks matrix by the authorities. The second stage is meant for the current or final risk allocation agreed after negotiations due to the inherent features of the process or owing to exogenous causes that have lead to a renegotiation of the clauses signed.

Last but not least, regarding n the case of the Norwegian projects, it is remarkable that these projects could be treated as a whole. Indeed, the matrix provided, as a first approach, is the same for all of them. As a matter of fact, the issue here was to figure out a methodology to treat the items given accordingly to the general classes of risks proposed by the research conducted in Spain. Once these items have been re-assigned, it has been possible to conduct an analysis to suggest a final overall risk distribution.

Nonetheless, it is noteworthy to bear in mind that it is not possible to compare both scenarios since one of the is formed by a set of projects while the other one is the sum of items supposed to be inherent to these three projects. The idea is to determine how likely risk management is managed in each scenario.

6.3.1 Standard risk matrix

After carrying out the conversion of the matrix, it is possible to proceed to compare both cases based on the same scale, see the table 46. As a starting point, it is considered obvious to evaluate those risks which have remained invariable over the years and projects in Spain with the suggested distribution for the three projects in Norway. The conclusion is that there are three groups which do not match: Land acquisition, political and force majeure see table 47.

The case of land acquisition is private owned, included as an item within the budget by the bidders. while in Norway both private and public sector collaborate to cope with this issue (Eriksen et al. 2007).

Force majeure is considered to be shared in Norway between private and public sector since these are events upon which no one has control over them (Grimsey & Lewis 2002). On the contrary, Spanish authorities have included the guaranties and hedge funds in the contracts according to the Article 231

on force majeure (Gobierno de España 2011) which states that concessionary has the right to claim damages in case of fires, natural disasters or violent events such as wars.

Table 63: Suggested distribution of risks for the Norwegian projects

Type of risk	Risk allocation	Suggested allocation
Design/Technical risk	Totally Private	Private
Land acquisition risk	Equally distributed	Shared
Construction risk	Mostly Private	Private
Operation risk	Totally Private	Private
Permissions risk	Mostly Private	Private
Availability risk	Totally Private	Private
Demand risk	Totally Public	Public
Financial risk	Totally Private	Private
Environmental risk	Totally Public	Public
Political risk	More on Public sector than shared	Public
Legislative risk	More on Public sector than shared or on the private	Shared
Technological risk	Totally Private	Private
Force majeure risk	Totally Shared	Shared

Table 64: Benchmarking between Spanish and Norwegian of "invariable" risks

Type of risk	Risk allocation	Suggested allocation	Results
Design/Technical risk	Totally private	Private	**yes**
Land acquisition risk	Totally private	Shared	**no**
Construction risk	Totally private	Private	**yes**
Operation risk	Totally private	Private	**yes**
Permissions risk	Totally private	Private	**yes**
Availability risk	Totally private	Private	**yes**
Political risk	Totally shared	Public	**no**
Force majeure risk	Totally public	Shared	**no**

Finally, political risks is shared based on principle of the patrimonial liability of the granting authority which has been pointed as one of the major causes of troubles for the administration since the concessionaries use it as a mechanism to pressure the governments during the renegotiations (Baeza Muñoz et al. 2012; Izquierdo Bartolome & Vassallo Magro 2002) see **appendix I.** On the contrary, it is public owned in Norway and despite the fact the item allocated within this category is referred to any kind of hedge funds or insurance for the concessionary, so its impact cannot be put on the same dimension as in Spain.

The remaining risks are handled in the same manner by both administrations. This risks including two of the most important in terms of balance sheet treatment as the Construction risks and availability risks which are solely bear by the private sector. Currently, there are other areas that have been modified over the years or depending on the project in Spain, see table 48. Therefore, those classes are meant to be assessed separately from the previous to facilitate the comprehension.

Among these classes, demand risk is known to be relevant in terms of paying back the investment on the asset. In the case of a road, this depends on the traffic level which cannot be controlled, especially by the private sector due to the exogenous variables involved. Despite this fact, in Spain , before 2001, this risks was allocated into the private sector responsibilities but later on mechanism to reduce the harmful effects caused by this variables were introduce(Ortega Hortelano & Baeza Muñoz 2012; Vassallo Magro 2004; Baeza Muñoz 2008). In the case of Norway, public allocation has to be understood within the toll financing program, successfully developed over 70 years (Odeck & Bråthen 2002).

The progress clause have caused changes on the environmental, technological risks and technological risks (Baeza Muñoz 2008) which have been allocated after 2001 on the private sector. This change has made that over this period there was a merge regarding technological risks while environmental has followed a different path than the Norwegian assumption. Finally, legislative does not make a big difference whether it is solely public or private in Spain since in Norway is shared.

Table 65: Benchmarking between Spanish and Norwegian of "variable" risks

Type of risk	Risk allocation	Suggested allocation
Demand risk	Almost equally allocated between private sector and shared	Public
Environmental risk	More on public sector than on the private	Public
Legislative risk	More on public sector than on the private	Shared
Technological risk	More on public sector than on the private	Private
Financial risk	Mostly private	Private

Financial risk is shared in Spain few cases owing to the loans granted as part of the awarding process by the government, but this does not apply as a rule (Subdelegación de sociedades concesionarias de autopistas de peaje 2013).Although, the Law includes some clauses that ensure the economical-financial equilibrium of the concessionary in case the granting authority modify the contract owing to causes of public interest or any other reason caused by the authority apart from those previously included in the contract (Baeza Muñoz et al. 2011; Gobierno de España 2011).

6.3.2 Risk Matrix after negotiations and renegotiations

Modifications on the contracts have been more significant in Spain than in Norway. As a matter of principle, the changes on the final clauses signed pointed by the experts at the NPRA have not being meaningful in terms of the suggested risk allocation and no other major change has been reported

afterwards. On the contrary, these negotiations or renegotiations, since contracts were already signed, in Spain have led to a new scenario caused mainly by the economic downturn, see **appendix J**.

Those areas which have remained invariable after renegotiations do not require further analysis in this section. However, construction and land acquisition risks do not longer belong to this class after changes undergone in a few projects. As a matter of principle, a construction risk is meant to be borne by the private sector. Although, problems caused by an archaeological site, delaying the construction of the R-4 Madrid-Ocaña make that, solely in this project, this issue is shared between public and private sector.

Land acquisition shift from private to share also responds to few individual cases as it happens in the R-3Madrid-Arganda, R-4 Madrid-Navalcarnero and AP-7Alicante -Cartagena. These cases, final price did not correspond which the initial estimations after court decisions that set down that those lands acquired were land for development and not undeveloped rural land. Also the R-2, Madrid-Guadalajara took part on the loans due to cost overruns in land acquisition, **see in the appendix E** (Jiménez-blanco et al. 2014; Vassallo Magro et al. 2012). It is remarkable to point out that this situation has approached both cases since Norway this area was already shared and thus no problems have been reported (Eriksen et al. 2007).

Table 66: Benchmarking between Spanish and Norwegian of "invariable" risks after negotiations

Type of risk	Risk allocation	Suggested allocation	Results
Design/Technical risk	Totally private	Private	yes
Operation risk	Totally private	Private	yes
Permissions risk	Totally private	Private	yes
Availability risk	Totally private	Private	yes
Political risk	Totally shared	Public	no
Force majeure risk	Totally public	Shared	no

All threats aforementioned would have been better cushioned if there was no economic crisis. As a matter of principle, demand risk is highly depended on the economic situation as described previously. . Besides, most of the traffic forecasts presented by the granting authority provided and bidders for the projects are far below the real traffic volume registered during this period. Deviations from these forecasts could rise in some project up to 80%, especially in those roads belonging to the category 2, see **appendix H.** This situation has seriously jeopardized the performance of the projects and has forced the government to display a set of countermeasures, participative loans, to keep down the harmful effects (Baeza Muñoz et al. 2011; Baeza Muñoz et al. 2012; Vassallo Magro et al. 2012; Vassallo et al. 2012). This trend could be seen as an approach between both scenarios, but in fact, they are still fact to share a common perspective on this issue. Norwegian is based on the toll financing program, while the response carried out in Spain do not considered to bring the public sector into managing tolls of these roads.

In connection with the foregoing, enforcement a risk is out of discussion in a PPP arrangement if it is public owned. The private sector do not need to know how government is committed to ensure that the users are going pay the tolls since they are going to get pay whether the users pay toll fares or not. In fact, Autopass outlines on its website which measures are taken to prevent users from going through toll station without paying the fare. In Spain, this risk is borne by the concessionary and thus it assumes responsibility as its logical since its payment profile is directly linked to ensure that users pay the fares.

Financial risk has also experienced modifications that should be seen also as a consequence of the loans and financial support granted by the central government in Spain. And last, those risks associated with the progress clause, environmental, legislative and technological risk did not undergo any modifications and same analysis could be outlined from them.

Table 67: Benchmarking between Spanish and Norwegian of "variable" risks after negotiations

Type of risk	Risk allocation	Suggested allocation
Construction risk	Mostly private	Private
Land acquisition risk	Mostly private	Shared
Demand risk	More shared than on private sector	Public
Environmental risk	More on public sector than on the private	Public
Legislative risk	More on public sector than on the private	Shared
Technological risk	More on public sector than on the private	Private
Financial risk	More on private sector than shared	Private

7. Conclusion

The discussion conducted around the research questions proposed has highlighted some aspects that could contribute to enhance the feasibility of the Norwegian PPP model. The aim is to draft an overall conclusion covering all the issues addressed along the research. Afterwards, it is intended to propose suggestions in those areas which are considered to hinder the potential of the PPP in Norway.

Before it is presented any suggestions, it is advisable to take a look at the surroundings. First, Spanish projects should be seen a part of a strategy to cut the debt and keep the investment rate while Norwegian roads were intended to be tested for a larger future program. Additionally, Economic downturn has hit more hardly the Spanish economic than the Norwegian, affecting the performance of projects during the starting or ramp up period. This has indeed triggered renegotiations in Spain while in Norway they are part of the procedure selected.

Regarding the procurement procedures, the negotiated ,as used in Norway, has required much more time that could have discouraged potential bidders to take part in open process. On the contrary, open procedures have consumed less time and thus fewer resources, along this phase. Although the results, in terms of construction time that have been reported, are worse than in Negotiated procedures, and further there are authors pointing to cost overruns during the construction of certain projects in Spain. This extend have not been verify in this paperwork as there is also a lack of reliable information in Norway as well to set a comparison.

Open procedures also entail standard or fixed risks matrix by the authorities. Risk assignation has been carried out by the authorities based on their experience and the surroundings to offer the most appealing project for bidders. As a result, Spanish authorities have put more effort on boosting projects than assessing their feasibility as it has been reported. This circumstance along with the patrimonial liability of the granting authority, and hence the political risks, has put in troubles the manoeuvrability of the administration during the renegotiations. In the meantime, Norway has maintained a considerable control over the projects while conducting the program. It is relevant to underline that authorities have taken over the demand risks and defining a payment mechanism based on a separated criteria.

Concurrently, risk assignation in Spain has undergone substantial modifications, trying to soften the bulk of the financial private burden. Financial, demand and, to a less extent, land acquisition risks and construction risks have been changed. The latter is only shared in one out of 15 while land acquisition has been shared in few concessions as a result of the participative loans granted by the authorities, as the demand risk also has been affected by these participative loans which at last impact on the financial risk. As a matter of fact, demand is behind of much of the turbulences caused by both economic downturn and overoptimistic traffic forecast in the corridors. This does not apply in Norway where land acquisition, even though is defined as shared, states that the administration is responsible to acquire interest in time, not the private sector.

In connection with the foregoing, risk related to progress clause have not experienced any change after renegotiations. This is a relevant issue since they link the progress of science to the performance of the project, especially during the operation and maintenance period.

Up to this point, some suggestions come up:

- Norwegian authorities have gained experienced enough to conduct open procedures that will ensure more efficiency and better solutions.

- Most advantageous tender should be the key criterion unless the most economically advantageous deepens in the technical and organization areas.

- Increasing the responsibilities and share of the private sector by sharing the demand risk, since for most of the projects it could be asserted that there is no other strong competitor in the corridor.

- Include a progress clause which may have little effects on technological or legislative risks, but it will made private sector more aware to maintain a good environmental standard along the corridor.

- Define the start of the period granted once the contract is awarded as a mean to enhance the good results in construction time.

- Creating an expertise and unique agency for PPP to monitor and control the execution of contracts during post-award phase

- Developing a specific legislation for PPP.

- Considering introducing state guaranties, to certain extent, as a mean to reduce the cost of financing.

Suggestion made are intended to draw a more appealing market for the investors as well as to engage more efficiently the advantages of the flexibility and adaptability offered by the private sector. Government is also advised to create agencies to keep track of the performance of the market in general and to provide better information to the public.

Finally, it is remarkable to stress that a PPP program has to be developed pursuing a tool to achieve better value-for-money rather than a strategy for maintaining the investment without increasing the public debt. Hence, Norwegian authorities have faced and planned from a more conservative outlook but it is the correct plan to undertake such endeavour when there was a lack of e reliable experience. On the coming years, authorities will be able to assess whether a PPP projects is more advisable or not, and thus how it should be conducted to gain the maximum value-for-money.

8. Further research

PPP arrangements have demonstrated to be suitable for any sort of infrastructure project. This research has pretended to show how they are approached from a broad outlook based on the country. It cannot be overlooked that each road project is a unique asset whose exogenous variables are thought to be more determinant than other types of projects.

In the case of Norway, a relevant external factor is the existing toll financing program which could be seen as a similar tool as a PPP. The doubt points to the financing program and the situation in which it could be used PPP arrangements assuming that the private sector takes all the demand risk. Additionally, this scheme has only been tested in two country corridors (E 39) and in a medium density corridor (E 18). Thus, there is still room to test whether it is suitable for an urban road, connecting commuters from the outskirts to the city centre. or not .or perhaps it should be used in the new E39 "free ferry" to provide better solutions while budget is keep under control. Another issue could arise in case the Norwegian authorities insist to display a negotiated procedure again.

In conclusion, the following research questions are proposed for further research:

1. How will impact Introducing PPP road projects in high populated areas as Oslo, Bergen or Stavanger, within corridors of high density? In which stretches of the E39 a PPP arrangement is more suitable

2. How could be speeded -up a negotiated procedure?

3. How will perform the Norwegian road transport by using PPP scheme instead of the toll financing program?

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Appendix

Appendix A: Data of procurement process in Spain and Norway

Section	SPV	Published	Awarding	Time Months	Handover year	Period granted(1)
AP-7 Alicante -Cartagena	Ausur	January 1998	July 1998	6	2048	50 years
AP-53 Santiago de compostela-Alto de Sto domingo	Acega	November 1998	September 1999	10	2074	75 years
R-3 Madrid- Arganda	Accesos Madrid	May 1999	November 1999	6	2049	50 years
R-5 Madrid-Navalcarnero		May 1999	November 1999			
AP-71 Leon-Astorga	Aulesa	September 1999	March 2000	6	2055	55 years
AP-61 Segovía-El Espinar	Castellana de autopistas	June 1999	November 1999	5	2031/2036	32/37 years(4)
AP-51 Avila-Villacastín		June 1999	November 1999		2031/2036	
R-2 Madrid-Guadalajara	Henarsa	February 2000	September 2000	7	2024	24 years
R-4 Madrid-Ocaña	Madrid sur	April 2000	December 2000	8	2065	65 years
M-12 Eje aeropuerto	Eje aeropuerto	March 2002	September 2002	6	2027/2028	25+1 years (2)(3)
AP-7 Cartagena-Vera	Aucosta	February 2003	February 2004	12	2040/2044	36+4 years (2)
AP-36 Ocaña-La roda	Madrid-Levante	August 2003	February 2004	8	2040/2044	36+4 years (2)
AP-41 Madrid-Toledo	Madrid-Toledo	August 2003	February 2004	8	2040/2044	36+4 years (2)
AP-7 Circunvalación de Alicante	Ciralsa	August 2003	February 2004	8	2040/2044	36+4 years (2)
AP-46 Málaga-Alto las pedrizas	Guadalcesa	August 2005	September 2006	13	2042/2046	36+4 years (2)

(1) Operational time starts once the awarding of the concession is published in the BOE (2) Operational period could be expanded if certain criteria is successfully accomplished (3) The concessionary could handover the asset in the year 2020 (4) The length of concession period depends on the evolution of the traffic.

Section	SPV	Published	Awarding	Time Months	Handover year	Period granted(1)
E39 Klett-Bårdshaug	Orkdalsvegen	October 2001	January 2003	15	2030	25 years
E3 Lyngdal-Flekkefjord	Allfarveg	October 2002	March 2004	18	2031	25 years
E18 Grismtad-Kristiansand	Agder OPS Vegselskap	February 2005	June 2006	16	2034/2039	20+5 years(2)

(1) Operational time starts once the construction stage is finished (2) Operational period could be expanded if certain criteria is successfully accomplished

Appendix B: Risk matrix provided by Baeza and Ortega

	Design Technical risk			Land acquisition risk			Construction risk			Permi-sion risk			Availabity risk			Traffic risk			Operation risk			Enforce-ment risk			Financial risk			Political risk			Enviro-mental risk			Legislati-ve risk			Techno-logical risk			Force Majeure risk		
	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S
Alicante-Cartagena		X			X			X			X		X				X			X			X				X			X			X			X			X		
Madrid Arganda		X			X			X			X		X				X			X			X			X			X			X			X			X		
Madrid Navalcarnero		X			X			X			X		X				X			X			X			X			X			X			X			X		
Santiago-Alto de Santo Domingo		X			X			X			X		X				X			X			X				X			X			X			X			X		
Ávila-Villacastín		X			X			X			X		X					X		X			X			X			X			X			X			X		
Segovia-El Espinar		X			X			X			X		X					X		X			X			X			X			X			X			X		
León-Astorga		X			X			X			X		X				X			X			X				X			X			X			X			X		
Madrid Guadalajara		X			X			X			X		X				X			X			X			X			X			X			X			X		
Madrid Ocaña		X			X			X			X		X				X			X			X			X			X			X			X			X		
Eje aeropuerto		X			X			X			X		X					X		X			X			X			X			X			X			X		
Ocaña-La Roda		X			X			X			X		X					X		X			X			X			X			X			X			X		
Madrid-Toledo		X			X			X			X		X					X		X			X			X			X			X			X			X		
Cartagena-Vera		X			X			X			X		X					X		X			X			X			X			X			X			X		
Circunvalación de Alicante		X			X			X			X		X					X		X			X				X			X			X			X			X		
Alto de las Pedrizas-Málaga		X			X			X			X		X					X		X			X			X			X			X			X			X		

Source:(Ortega Hortelano & Baeza Muñoz 2012)A: Administration P:Private sector S:Shared

Appendix C: Risk matrix provided by the NPRA

		E39 Klett-Bårdshaug		
1	**Pre contract award**	**Public**	**Private**	**Shared**
1.1	Environmental Impact approval	x		
1.2	Area development plan	x		
1.3	Budget approval	x		
1.4	Archaeological explorations	x		
1.5	Safety standard clarification	x		
2	**Post contract award preparations**	**Public**	**Private**	**Shared**
2.1	Changes in planning permission		x	
2.2	Emission & disposal permits/licenses		x	
2.3	Permits/licenses according to the legislation regulating health issues in the municipalities		x	
2.4	Other environmental permits/licenses		x	
2.5	Protestor action			x
3	**Land acquisitions**	**Public**	**Private**	**Shared**
3.1	Failure to acquire interests on time	x		
3.2	Approval of alternative access roads, storage sites etc.		x	
3.3	Approval of areas for storage of excess materials			x
3.4	Failure to return “access / construction” land in agreed condition		x	
4	**Engineering/Design**	**Public**	**Private**	**Shared**
4.1	Adequacy and accuracy of information provided by the Norwegian Public Roads Administration			x
4.2	Compatibility of design with existing Norwegian road requirements		x	
4.3	Compatibility of design with future Norwegian road requirements			x
4.4	Traffic safety audits		x	
4.5	Approvals by the Norwegian Public Roads Administration			
	Bridges and structures		x	
	Road construction		x	
	Tunnel gates and water/frost protection		x	
	Geotechnical planning		x	
	Technical planning related to traffic		x	
	Landscaping		x	
4.6	Compliance with permits and appro1als		x	
4.7	Geotechnical evaluations		x	
4.8	Geological evaluations		x	
4.9	Compliance with third party environmental requirements		x	
4.10	Planning changes from the Norwegian Public Roads Administration	x		
4.11	Planning changes from the municipalities or other parties	x		
4.12	Planning changes from the company		x	
4.13	Health / Environment / Safety		x	
4.14	Survey of pipelines and cables		x	
4.15	Compatibility between solutions and output specifications		x	
4.16	Design fault / Prolonged design process / Non – approval of design / Increased design costs		x	
4.17	Lifetime of elements		x	

4	Engineering/Design	Public	Private	Shared
4.18	Project administration and integration		x	
4.19	Design costs		x	
4.20	Fulfilment of third party demands			
	Planning authorities	x		
	Utilities owners (water, power supply etc.)		x	
	Land owners and other third parties			x
5	**Construction**	**Public**	**Private**	**Shared**
5.1	Access to site			x
5.2	Construction in compliance with plans, specifications, laws and regulations		x	
5.3	Compliance with permits and approvals		x	
5.4	Health / Environment / Safety		x	
5.5	Safety inspections		x	
5.6	Construction and construction costs		x	
5.7	Ground conditions		x	
5.8	Reconstruction of pipelines and cables		x	
5.9	Costs in accordance to delays and forced time		x	
5.10	Labour shortage		x	
5.11	Labour unions		x	
5.12	Difficult weather conditions		x	
5.13	Protestor action			x
5.14	Delays relating to changes in the SPC		x	
5.15	Misinterpretation of design/specifications		x	
5.16	Flow of traffic		x	
5.17	Financial solidity of prime constructor		x	
5.18	Financial solidity of sub-contractors		x	
5.19	Project administration and integration		x	
5.20	Disputes between designer/contractor/advisors		x	
5.21	Reinstatement of materials			x
5.22	Material supply problems		x	
5.23	Failure of sub-contractor		x	
5.24	Force majeure cost time delay			x
5.25	Force majeure cost implications			x
5.26	Delays/cost overruns due to general legislative changes		x	
5.27	Cost overruns due to inflation		x	
5.28	Relations to the surroundings		x	
5.29	Collapse / structural failure of existing structures (where used for access or part of existing road to be expanded) including structures owned by third parties		x	
5.30	Time and costs to meet approval requirements		x	
5.31	Relevant operational and maintenance manuals, approvals and legal certificates		x	

6	Operations and maintenance	Public	Private	Shared
6.1	Operations and maintenance, execution and costs		x	
6.2	Managing sub-contractors		x	
6.3	Supervising the fulfilment of specifications		x	
6.4	Failure to achieve output specifications		x	
6.5	Non-availability of service (not due to force majeure)		x	
6.6	Costs of compliance with all general changes in legislation and statutory requirements		x	
6.7	Changes in scope of services specifications by the Norwegian Public Roads Administration during operational phase	x		
6.8	Changes in scope of services specifications by operations/maintenance/SPC		x	
6.9	Cost overruns of operations/maintenance/services specifications		x	
6.10	Damages to infrastructure		x	
6.11	Latent defects – new road – old road renewed		x	
6.12	Adverse weather conditions		x	
6.13	Latent defects beyond end of operational phase			x
6.14	Force majeure			x
6.15	Relation road users – road authority	x		
6.16	Responsibility for the quality of the road at handover after the operational phase		x	
6.17	Road evaluation at the end of the operational phase	x		
6.18	Maintenance defects at the end of the operational phase		x	
6.19	Equipment			
	Price		x	
	Meeting specifications		x	
	Maintenance and functionality		x	
	Technological change / possible upgrades		x	
	Obsolete equipment		x	
7	**Financial risk**	**Public**	**Private**	**Shared**
7.1	Interest rate changes / finance changes		x	
7.2	Changes in rate or method of taxation		x	
7.3	Insolvency / failure of sub-contractors / failure of Project Company		x	

Appendix D: Conversion matrix for Norwegian items into the Spanish categories

		Design/ Techincal risk	Land acqusition risk	Construction risk	Permissions risk	Availability risk	Demand risk	Operation risk	Enforcement risk	Financial risk	Political risk	Environmental risk	Legislative risk	Technological risk	Force majeure risk
1	**Pre contract award**														
1.1	Environmental Impact approval												V		
1.2	Area development plan										V				
1.3	Budget approval										V				
1.4	Archaeological explorations											V			
1.5	Safety standard clarification												V		
2	**Post contract award preparations**														
2.1	Changes in planning permission	V													
2.2	Emission & disposal permits/licenses				V										
2.3	Permits/licenses according to the legislation regulating health issues in the municipalities				V										
2.4	Other environmental permits/licenses				V										
2.5	Protestor action										V				
3	**Land acquisitions**														
3.1	Failure to acquire interests on time		V												
3.2	Approval of alternative access roads, storage sites etc.				V										
3.3	Approval of areas for storage of excess materials				V										
3.4	Failure to return “access / construction” land in agreed condition		V												

		Design/ Techincal risk	Land acqusition risk	Construction risk	Permissions risk	Availability risk	Demand risk	Operation risk	Enforcement risk	Financial risk	Political risk	Environmental risk	Legislative risk	Technological risk	Force majeure risk
4	**Engineering/Design**														
4.1	Adequacy and accuracy of information provided by the Norwegian Public Roads Administration										v				
4.2	Compatibility of design with existing Norwegian road requirements	v													
4.3	Compatibility of design with future Norwegian road requirements												v		
4.4	Traffic safety audits	v													
4.5	Approvals by the Norwegian Public Roads Administration				v										
	Bridges and structures	v													
	Road construction	v													
	Tunnel gates and water/frost protection	v													
	Geotechnical planning	v													
	Technical planning related to traffic	v													
	Landscaping	v													
4.6	Compliance with permits and approvals	v													
4.7	Geotechnical evaluations	v													
4.8	Geological evaluations	v													
4.9	Compliance with third party environmental requirements	v													
4.10	Planning changes from the Norwegian Public Roads Administration										v				
4.11	Planning changes from the municipalities or other parties										v				

		Design/ Techincal risk	Land acqusition risk	Construction risk	Permissions risk	Availability risk	Demand risk	Operation risk	Enforcement risk	Financial risk	Political risk	Environmental risk	Legislative risk	Technological risk	Force majeure risk
4	**Engineering/Design**														
4.12	Planning changes from the company	v													
4.13	Health / Environment / Safety	v													
4.14	Survey of pipelines and cables	v													
4.15	Compatibility between solutions and output specifications	v													
4.16	Design fault / Prolonged design process / Non – approval of design / Increased design costs	v													
4.17	Lifetime of elements	v													
4.18	Project administration and integration	v													
4.19	Design costs	v													
4.20	Fulfilment of third party demands														
	Planning authorities										v				
	Utilities owners (water, power supply etc.)	v													
	Land owners and other third parties		v												
5	**Construction**														
5.1	Access to site			v											
5.2	Construction in compliance with plans, specifications, laws and regulations			v											
5.3	Compliance with permits and approvals			v											
5.4	Health / Environment / Safety			v											
5.5	Safety inspections			v											
5.6	Construction and construction costs			v											

		Design/ Techincal risk	Land acqusition risk	Construction risk	Permissions risk	Availability risk	Demand risk	Operation risk	Enforcement risk	Financial risk	Political risk	Environmental risk	Legislative risk	Technological risk	Force majeure risk
5	**Construction**														
5.7	Ground conditions			v											
5.8	Reconstruction of pipelines and cables			v											
5.9	Costs in accordance to delays and forced time			v											
5.10	Labour shortage			v											
5.11	Labour unions			v											
5.12	Difficult weather conditions			v											
5.13	Protestor action										v				
5.14	Delays relating to changes in the SPC			v											
5.15	Misinterpretation of design/specifications			v											
5.16	Flow of traffic			v											
5.17	Financial solidity of prime constructor			V											
5.18	Financial solidity of sub-contractors			V											
5.19	Project administration and integration			v											
5.20	Disputes between designer/contractor/advisors			v											
5.21	Reinstatement of materials			v											
5.22	Material supply problems			v											
5.23	Failure of sub-contractor			v											
5.24	Force majeure cost time delay														v
5.25	Force majeure cost implications														v
5.26	Delays/cost overruns due to general legislative changes												v		

	Design/ Techin- cal risk	Land acqusit- ion risk	Cons- truc- tion risk	Per- missi- ons risk	Availa- bility risk	De- mand risk	Oper- ation risk	Enfor- cement risk	Finan- cial risk	Poli- tical risk	Environ- mental risk	Legis- lative risk	Tech- nologi- cal risk	Force majeu- re risk
Construction														
Cost overruns due to inflation									v					
Relations to the surroundings			v											
Collapse / structural failure of existing structures (where used for access or part of existing road to be expanded) including structures owned by third parties			v											
Time and costs to meet approval requirements				v										
Relevant operational and maintenance manuals, approvals and legal certificates				v										
Operations and maintenance														
Operations and maintenance, execution and costs							v							
Managing sub-contractors							v							
Supervising the fulfilment of specifications							v							
Failure to achieve output specifications							v							
Non-availability of service (not due to force majeure)					v									
Costs of compliance with all general changes in legislation and statutory requirements												v		
Changes in scope of services specifications by the Norwegian Public Roads Administration during operational phase										v				
Changes in scope of services specifications by operations/maintenance/SPC							v							
Cost overruns of operations/maintenance/services specifications							v							

		Design/ Techincal risk	Land acqusition risk	Construction risk	Permissions risk	Availability risk	Demand risk	Operation risk	Enforcement risk	Financial risk	Political risk	Environmental risk	Legislative risk	Technological risk	Force majeure risk
6	**Operations and maintenance**														
6.10	Damages to infrastructure							V							
6.11	Latent defects – new road – old road renewed							V							
6.12	Adverse weather conditions							V							
6.13	Latent defects beyond end of operational phase														
6.14	Force majeure														V
6.15	Relation road users – road authority										V				
6.16	Responsibility for the quality of the road at handover after the operational phase							V							
6.17	Road evaluation at the end of the operational phase														
6.18	Maintenance defects at the end of the operational phase							V							
6.19	Equipment														
	Price							V							
	Meeting specifications							V							
	Maintenance and functionality													V	
	Technological change / possible upgrades													V	
	Obsolete equipment													V	

		Design/ Techin- cal risk	Land acqusit- ion risk	Cons- truc- tion risk	Per- missi- ons risk	Availa- bility risk	De- mand risk	Oper- ation risk	Enfor- cement risk	Finan- cial risk	Poli- tical risk	Environ- mental risk	Legis- lative risk	Tech- nologi- cal risk	Force majeu- re risk
7	**Financial risk**														
7.1	Interest rate changes / finance changes									V					
7.2	Changes in rate or method of taxation									V					
7.3	Insolvency / failure of sub-contractors / failure of Project Company									V					
7.4	Failure of the Norwegian Public Roads Administration to meet payment obligations to the SPC in the operational phase										V				
7.5	Changes in traffic volume						V								

Appendix E: Participative loans granted by the government of Spain

	State participative loans (Thou.€)						
	Loans granted in royal decree on awarding		Land acquisition cost overrun Law (26/2009)		Compensation account Law (43/2010)		
	Loan granted	loan plus interest	Loan granted	loan plus interest	Loan granted	loan plus interest	Total loan plus interest
AP-7 Alicante -Cartagena	76.929,55	76.929,55	25.199,44	26.442,57			**103372,12**
AP-53 Santiago de Compostela-Alto de Sto. domingo	60.101,21	60.101,21					**60101,21**
R-3 Madrid- Arganda			168.453,38	176.529,50	17.838,31	17.838,31	**194367,81**
R-5 Madrid-Navalcarnero							
AP-71 León-Astorga	26.444,53	32.999,80					**032999,8**
AP-61 Segovia-El Espinar							
AP-51 Avila-Villacastín							
R-2 Madrid-Guadalajara			275.318,90	288.489,62	16.183,81	16.183,81	**304673,43**
R-4 Madrid-Ocaña					14.000,67	14.000,67	**14000,67**
M-12 Eje aeropuerto					8.281,53	8.281,53	**8281,53**
AP-7 Cartagena-Vera					4.802,34	4.802,34	**4802,34**
AP-36 Ocaña-La roda					8.575,11	8.575,11	**8575,11**
AP-41 Madrid-Toledo					3.574,99	3.574,90	**3574,9**
AP-7 Circunvalación de alicante	101.000,00	101.000,00			6.843,25	6.843,25	**107843,25**
AP-46 Málaga-Alto las pedrizas							

Source:(Subdelegación de sociedades concesionarias de autopistas de peaje 2013)

Appendix F: Spanish matrix after renegotiations

	Design/ Technical risk			Land acquisition risk			Construction risk			Permission risk			Availability risk			Traffic risk			Operation risk			Emforcement risk			Finacial risk			Political risk			Environmental risk			Legislative risk			Technological risk			Force majeure risk		
	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S	A	P	S
Alicante-Cartagena		X				X		X			X		X				X			X			X				X			X			X			X			X		
Madrid Arganda		X				X		X			X		X				X			X			X				X			X			X			X			X		
Madrid Navalcarnero		X				X		X			X		X				X			X			X				X			X			X			X			X		
Santiago-Alto de Santo Domingo		X			X			X			X		X				X			X			X				X			X			X			X			X		
Ávila-Villacastín		X			X			X			X		X					X		X			X			X				X			X			X			X		
Segovia-El Espinar		X			X			X			X		X					X		X			X			X				X			X			X			X		
León-Astorga		X			X			X			X		X				X			X			X				X			X			X			X			X		
Madrid Guadalajara		X			X			X			X		X					X		X			X			X				X			X			X			X		
Madrid Ocaña		X			X				X		X		X				X			X			X			X				X			X			X			X		
Eje aeropuerto		X			X			X			X		X					X		X			X			X				X			X			X			X		
Ocaña-La Roda		X			X			X			X		X					X		X			X			X				X			X			X			X		
Madrid-Toledo		X			X			X			X		X					X		X			X			X				X			X			X			X		
Cartagena-Vera		X			X			X			X		X					X		X			X			X				X			X			X			X		
Circunvalación de Alicante		X			X			X			X		X					X		X			X				X			X			X			X			X		
Alto de las Pedrizas-Málaga		X			X			X			X		X					X		X			X			X				X			X			X			X		

Source:(Ortega Hortelano & Baeza Muñoz 2012) A: Administration P:Private sector S:Shared

Appendix G: Renegotiations undertaken as of 2010

Stretch	General State Budget 2010	Law 43/2010	Year Published	Handover year	Toll rate	Cause published
AP-7 Alicante -Cartagena	**Yes**	**Yes**	2010	Not modified	Increased	Increase of land acquisition cost
AP-53 Santiago de Compostela-Alto de Santo domingo	**Yes**	**Yes**	2011		Increased	Increase of construction cost due to a modification requested by the administration
R-3 Madrid- Arganda	**Yes**	**Yes**	2009 and 2010	Not modified	Increased	Increase of land acquisition cost
R-5 Madrid-Navalcarnero						
AP-71 Leon-Astorga		**Yes**				
AP- 61 Segovía-El Espinar	**Yes**		2012	7 years less after 2019 revision	Not modified	Court sentence of the European union court of justice
AP-51Avila-Villacastín						
R-2 Madrid-Guadalajara	**Yes**	**Yes**		2039	Increased	Increase of land acquisition cost
R-4 Madrid-Ocaña	**Yes**	**Yes**	2011	Not modified	Increased	Increase of construction cost due to a modification requested by the administration
M-12 Eje aeropuerto	**Yes**	**Yes**				
AP-7 Cartagena-Vera	**Yes**	**Yes**				
AP-36 Ocaña-La roda		**Yes**				
AP-41 Madrid-Toledo	**Yes**	**Yes**				
AP-7 Circunvalación de alicante	**Yes**	**Yes**				
AP-46 Malaga-Alto las pedrizas		**yes**	2010	Increases in 17 months	Increased	Increase of construction cost due to a modification requested by the administration

Appendix H: Evolution of traffic during the operating period in the Spanish toll highways

		2001		2002		2003		2004		2005		2006		2007	
	GDP growth	5,29		4,00		2,88		3,19		3,17		3,72		4,17	
	Concession	AADT	Var (%)	AADT	Var (%)	AADT	Var (%)	AADT	Var (%)	AADT	Var (%)	AADT	Var (%)	AADT	Var (%)
Category 1	AP-51 Avila-Villacastín			4.620	—	5.370	—	5.997	11,68	6.141	2,39	6.397	4,18	7.180	12,24
	AP-53 Santiago de compostela-Alto de Sto domingo					3.614	—	4.546	30,53	4.437	2,19	4.833	8,92	5.483	13,45
	AP-61 Segovía-El Espinar					4.763	—	4.768	—	5.014	5,15	5.544	10,58	6.177	11,42
	AP-71 Leon-Astorga					4.271	—	3.749	-12,22	3.944	5,19	4.270	8,27	5.123	19,98
	AP-36 Ocaña-La roda											4.194	—	4.646	—
Category 2	R-3 Madrid- Arganda							10.724	—	13.499	31,6	16.136	19,53	16.230	0,58
	R-5 Madrid-Navalcarnero							6.943	—	7.922	18,97	10.208	28,85	11.864	16,22
	R-2 Madrid-Guadalajara					5.003	—	6.180	—	7.675	24,18	9.502	23,81	11.034	16,12
	R-4 Madrid-Ocaña							6.348	—	6.665	18,97	9.150	37,29	11.347	24,02
	M-12 Eje aeropuerto									10.227	—	18.552	83,31	20.296	9,4
	AP-41 Madrid-Toledo													2.736	—
	AP-7 Circunvalación de alicante														
Category 3	AP-7 Alicante -Cartagena	11.544	—	12.402	—	14.607	17,78	16.560	13,37	18.559	12,07	19.656	5,91	20.407	3,82
	AP-7 Cartagena-Vera													3.179	—
	AP-46 Malaga-Alto las pedrizas														

		2008		2009		2010		2011		2012		2013		2014	
	GDP growth	1,12		-3,57		0,01		-0,62		-2,09		-1,23		1,40	
	Stretch	**AADT**	**Var (%)**	**AADT**	**Var (%)**	**AADT**	**Var (%)**	**AADT**	**Var (%)**	**AADT**	**Var (%)**	**AADT**	**Var (%)**	**AADT**	**Var (%)**
Category 1	**AP-51 Avila-Villacastín**	7.228	0,66	8.458	17,02	8.386	-0,85	7.782	-7,21	6.797	-12,65	6.887	1,32	7.101	3,11
	AP-53 Santiago de compostela-Alto de Sto domingo	5.683	3,65	5.865	3,21	6.159	5,01	5.785	-6,08	4.967	-14,15	4.611	-7,17	5.662	22,79
	AP-61 Segovía-El Espinar	5.966	-3,43	6.297	5,56	6.556	4,11	6.472	-1,29	6.288	-2,84	6.136	-2,42	6.480	5,61
	AP-71 Leon-Astorga	5.347	4,37	5.115	-4,33	4.911	-4	4.280	-12,84	3.570	-16,59	3.219	-9,83	3.625	12,6
	AP-36 Ocaña-La roda	4.770	2,66	4.471	-6,25	4.003	-10,48	3.715	-7,18	3.015	-18,86	2.802	-9,7	2.876	2,66
Category 2	**R-3 Madrid- Arganda**	15.193	-6,39	14.842	-2,31	14.073	-5,18	12.389	-11,97	10.308	-16,79	9.346	-9,33	9.340	-0,07
	R-5 Madrid-Navalcarnero	11.309	-4,67	10.836	-4,18	10.535	-2,78	9.475	-10,06	8.028	-15,27	7.136	-11,11	6.268	-3,74
	R-2 Madrid-Guadalajara	10.594	-3,99	9.378	-11,47	9.278	-1,06	7.801	-15,93	5.928	-24,01	4.588	-22,6	4.325	-5,73
	R-4 Madrid-Ocaña	10.402	-8,33	8.835	-15,06	8.096	-8,37	6.675	-17,73	5.489	-17,76	4.652	-15,25	4.516	-2,93
	M-12 Eje aeropuerto	20.134	-0,79	19.609	-2,61	19.395	-1,09	18.335	-5,46	18.299	-0,2	17.880	-2,29	18.435	3,1
	AP-41 Madrid-Toledo	2.991	9,29	2.691	-10,01	2.231	-17,1	2.390	7,13	931	-27,43	749	-19,55	752	-3,44
	AP-7 Circunvalación de alicante	9.981	—	7.978	-20,07	7.249	-9,13	6.528	-9,95	5.710	-12,53	5.293	-7,3	5.303	0,17
Category 3	**AP-7 Alicante -Cartagena**	18.625	-8,73	16.919	-9,16	17.173	1,5	17.507	1,94	16.931	-3,29	17.329	2,35	17.955	3,61
	AP-7 Cartagena-Vera	3.285	—	3.174	-3,38	3.288	3,58	3.142	-4,45	2.820	-10,24	2.737	-2,94	2.828	3,33
	AP-46 Malaga-Alto las pedrizas									8.192	—	8.150	-0,51	9.384	15,14

Appendix I: Patrimonial liability defined on the awarding contracts

	Patrimonial liability of the administration (€)
AP-7 Alicante -Cartagena	221.112.006*
AP-53 Santiago de compostela-Alto de Sto domingo	245.092.736,1*
R-3 Madrid- Arganda	677.010.00*
R-5 Madrid-Navalcarnero	
AP-71 Leon-Astorga	45075907,83*
AP-61 Segovía-El Espinar	266.403.423,4*
AP-51 Avila-Villacastín	
R-2 Madrid-Guadalajara	40.724.580,19
R-4 Madrid-Ocaña	559.656.461,48
M-12 Eje aeropuerto	305471256*
AP-7 Cartagena-Vera	526819000*
AP-36 Ocaña-La roda	487241249*
AP-41 Madrid-Toledo	348886000*
AP-7 Circunvalación de alicante	398665000*
AP-46 Malaga-Alto las pedrizas	No data

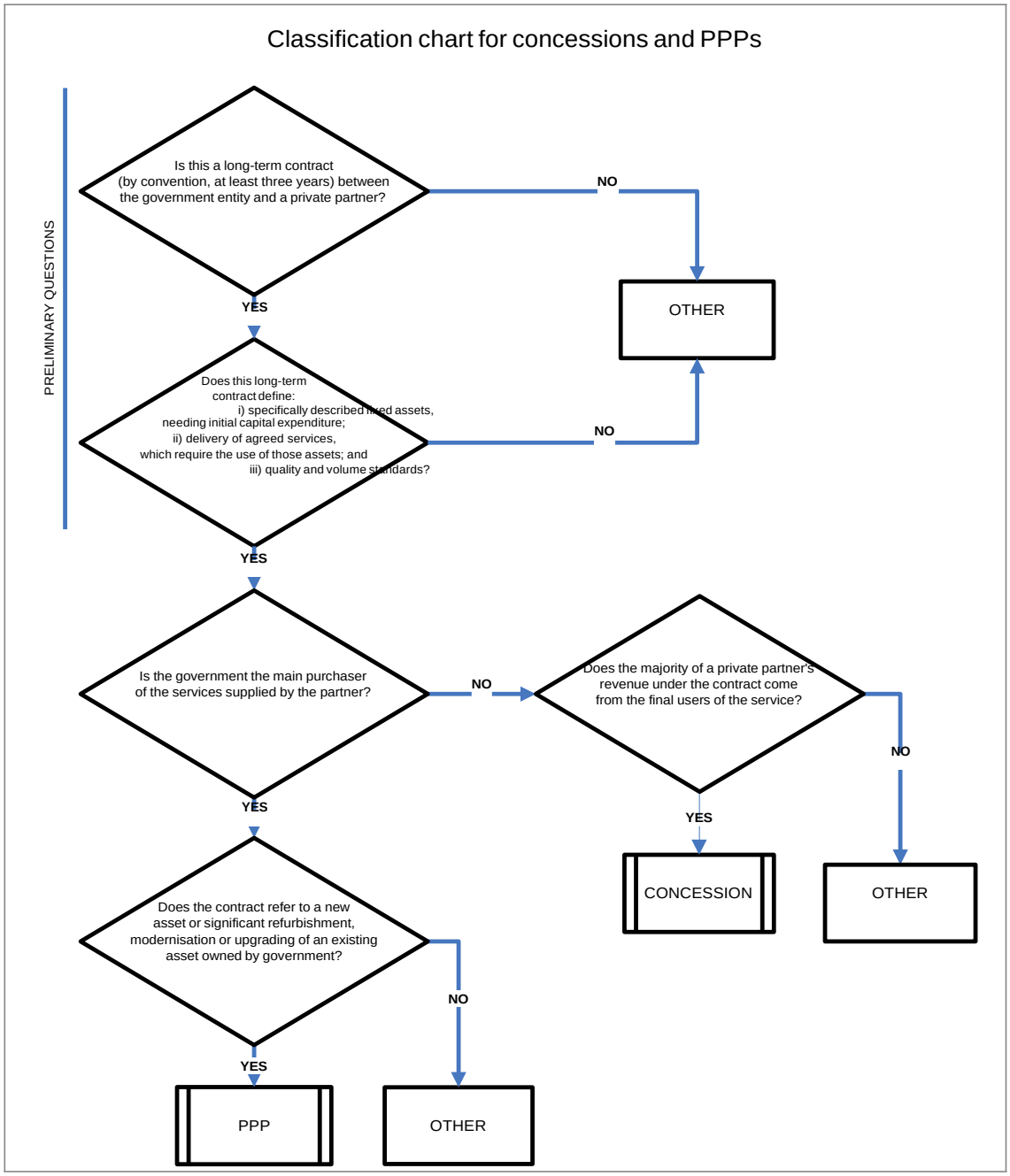
¨note (*) = data includes land and construction coverage as defined on the awarding publication.

Appendix J: Economical performance of the Spanish Projects (2011-2013)

	Accumulated amortization (2013-2012-2011)			
Stretch	**2013**	**2012**	**2011**	**Bankruptcy (year)**
AP-7 Alicante -Cartagena	26,4	24,1	22,10	Serious financial problems
AP-53 Santiago de compostela-Alto de Sto domingo	14,1	13,6	12,9	
R-3 Madrid- Arganda	10,6	9,40	8,30	October 2012
R-5 Madrid-Navalcarnero				
AP-71 Leon-Astorga	21,8	19,8	17,9	
AP-61 Segovía-El Espinar	28,6	25,30	21,30	
AP-51 Avila-Villacastín				
R-2 Madrid-Guadalajara	18,2	15,5	13,8	September 2013
R-4 Madrid-Ocaña	3,4	3,1	3	October 2012
M-12 Eje aeropuerto	6,3	5,7	5,4	January 2014
AP-7 Cartagena-Vera	14,2	12	10,00	February 2013
AP-36 Ocaña-La roda	9,30	8,2	7,30	December 2012
AP-41 Madrid-Toledo	9,80	7,7	6,40	May 2012
AP-7 Circunvalación de Alicante	9,5	7,6	5,9	August 2013
AP-46 Malaga-Alto las pedrizas	2,2	1,3	0,2	

Source:(Subdelegación de sociedades concesionarias de autopistas de peaje 2013)

Appendix K: Balance sheet treatment of PPP and concessions



Source:(European PPP expertise Centre, 2014)