

THE ROAD AHEAD

**EXPLORING THE POTENTIAL OF PUBLIC-PRIVATE
PARTNERSHIPS IN CLOSING THE EUROPEAN
INFRASTRUCTURE INVESTMENT GAP**

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The Road Ahead: Exploring the Potential of Public-Private Partnerships in Closing the European Infrastructure Investment Gap

Abstract:

Modern infrastructure assets are fundamental for the long-term economic growth and development of countries and regions. Yet, the European infrastructure investment gap is projected to reach USD 2 trillion by 2040. One approach to closing this infrastructure investment gap is strengthening the collaboration between the private and public sector. In public-private partnerships (PPPs), substantial risks and responsibilities for delivering projects are transferred to the private sector. Through the examination of three case studies on PPP road projects and interviews with 23 stakeholders knowledgeable about PPPs, this thesis explores how PPPs can be used in delivering European infrastructure assets, with a specific focus on how Sweden should approach them. We find that attitudes toward PPPs differ among countries in Europe, but that the perceptions are oftentimes sprung from misconceptions. PPPs must not be categorically dismissed, which has generally been the case in Sweden. Rather, they must always be evaluated as a method among others for delivering infrastructure, albeit chosen only for projects with certain characteristics that generate competitiveness. We further conclude that for well-suited projects, PPPs provide advantages over traditional procurement methods through better risk allocation and aligned incentives as well as by necessitating a long-term perspective for the public sector. Thus, we strongly suggest that Sweden, and other European countries, embrace the PPP model as an option in delivering infrastructure assets to more efficiently narrow, and ultimately close, the European infrastructure investment gap.

Keywords:

Public-Private Partnership, Public Procurement, Project Finance, European Infrastructure, Governance, Risk Management, Infrastructure Investments

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Contents

1. INTRODUCTION.....	5
2. LITERATURE REVIEW	8
2.1. INTRODUCTION TO PROJECT FINANCE AND THE CHARACTERISTICS OF PPPS	8
2.2. RESEARCH ABOUT THE USAGE AND PERCEPTION OF PPPS	10
2.3. EVALUATING PPP PROJECTS	11
2.4. PPPS IN A SWEDISH SETTING.....	14
3. METHODOLOGY.....	16
3.1. CHOICE OF METHODOLOGY	16
3.2. DATA COLLECTION.....	16
3.3. DISCUSSION OF THE METHOD	18
4. THE CASE STUDIES.....	19
4.1. THE MERSEY GATEWAY PROJECT	19
4.1.1. HISTORY OF PPPS IN THE UK	19
4.1.2. BACKGROUND OF THE MERSEY GATEWAY PROJECT	20
4.1.3. BIDDING FOR THE MERSEY GATEWAY PROJECT	22
4.1.4. FINANCING THE MERSEY GATEWAY PROJECT.....	24
4.1.5. OUTCOME	25
4.2. THE WESTERN STRASBOURG BYPASS PROJECT	26
4.2.1. HISTORY OF PPPS IN FRANCE	26
4.2.2. BACKGROUND OF THE WESTERN STRASBOURG BYPASS PROJECT	27
4.2.3. BIDDING FOR THE WESTERN STRASBOURG BYPASS	28
4.2.4. FINANCING THE WESTERN STRASBOURG BYPASS	29
4.2.5. OUTCOME	31
4.3. THE SOTRA CONNECTION PROJECT	33
4.3.1. HISTORY OF PPPS IN NORWAY	34
4.3.2. BACKGROUND OF THE SOTRA CONNECTION PROJECT.....	34
4.3.3. BIDDING FOR THE SOTRA CONNECTION	35
4.3.4. FINANCING THE SOTRA CONNECTION PROJECT	36
4.3.5. OUTCOME: RECENT DEVELOPMENTS	38
4.4. USING PPPS FOR INFRASTRUCTURE DEVELOPMENT.....	40
4.4.1. THE ROLE OF PPPS	40
4.4.2. REASONS FOR INITIATING A PPP	41
4.4.3. SITUATIONS WHERE PPP PROJECTS ARE APPROPRIATE	42
4.4.4. POLITICAL WILLINGNESS.....	44
4.5. PROCURING AND DELIVERING PPP PROJECTS	45
4.5.1. FINANCING	46

4.5.2.	OVERALL COST AND VALUE FOR MONEY	47
4.5.3.	PROJECT DELIVERY, MAINTENANCE AND ASSET TRANSFER	49
4.5.4.	PROCUREMENT PROCESS AND PUBLIC-PRIVATE RELATION.....	50
4.5.5.	PROJECT RISKS	51
4.5.6.	EVALUATING PPPS	52
4.6.	PUBLIC OPINION AND PUBLIC SECTOR VIEW	53
5.	DISCUSSION.....	56
5.1.	USING PPPS TO FINANCE INFRASTRUCTURE	56
5.2.	IMPLICATIONS FOR SWEDEN	60
5.3.	LIMITATIONS	61
6.	CONCLUSIONS.....	62
6.1.	CONCLUDING REMARKS	62
6.2.	SUGGESTIONS FOR FUTURE RESEARCH.....	63
7.	REFERENCES	64
APPENDIX A	73
APPENDIX B		76
APPENDIX C		82
APPENDIX D		86
APPENDIX E		90

1. Introduction

A well-developed infrastructure is central to all countries' long-term economic growth and social development. As infrastructural needs are met, economies can increase their focus on reaching increased productivity through innovation. Hence, regions with modern and reliable infrastructure can better achieve economic growth and attract foreign investments, causing a positive feedback loop. Keeping infrastructure at a satisfactory level is therefore highly important and yet there is a growing infrastructure investment gap in Europe, which is set to reach USD 2 trillion by 2040 (Global Infrastructure Hub, 2018). The infrastructure investment gap is defined by Global Infrastructure Hub, a not-for-profit organization formed by the G20, as the difference between current investment trends and investment needs. The current trend is on a yearly average basis 14% below the investment needs. For some sectors, such as the road transportation sector, the estimated investment gap is even more severe with the corresponding number being as high as 20% (Global Infrastructure Hub, 2018).

Countries have looked toward alternative ways of delivering infrastructure projects, of which one is the public-private partnership (PPP). As explained by the European PPP Expertise Centre (EPEC), PPPs are long-term contractual arrangements between a public and private party. They are designed for delivering public infrastructure projects, with the major risk and responsibilities for maintenance and operations being borne by the private party (EPEC, n.d.-b). PPPs are however a diverse term, and this thesis focuses predominantly on concession contracts and availability-based PPPs following the design-build-finance-operate-maintain (DBFOM) structure.

PPPs have been subject to intense debate, for example regarding whether or not they provide value for money (e.g., in Grimsey and Lewis, 2005; Blanc-Brude et al., 2006). It has also been discussed to what extent the private sector should be involved in public infrastructure assets (Boardman et al., 2010). Thus, the variety of experiences and opinions of PPPs have prompted different approaches to using them in European infrastructure procurement (Medda et al., 2013; Verhoest et al., 2015). Modern PPPs were first introduced in the UK and were for a long time used under the Private Finance Initiative (PFI) and PF2 schemes, but following a series of highly criticized cases, these programs were discontinued in 2018 (HM Treasury, 2018). In countries such as France and Norway, however, PPPs have not been abandoned by the government and are being used. In the case of Sweden, PPPs have only been used for the Arlandabanan and Nya Karolinska Solna (NKS) projects prior to 2023, both which have been heavily scrutinized (Agerström et al., 2021). The Swedish Parliament commissioned an inquiry

in 2016 to investigate the prerequisites for using private capital to finance public infrastructure (SOU 2017:13). The report found no legal obstacles for using PPPs in Sweden and suggested launching a trial program of three PPP projects in transport infrastructure. The trial program would be evaluated after completion and a decision was to follow on whether PPPs should be used more regularly by the state (SOU 2017:13). However, as no projects have been performed on the national level, no decision has been made on the matter since. In 2020, the Swedish National Audit Office (2020) commented that neither the parliament nor the government seemed willing to prioritize using PPP to finance public infrastructure. Later, the Swedish National Debt Office (2021) published a Debt Office Commentary¹ that recommended the central government to refrain from using PPPs.

Consequently, the need for infrastructure investments addressing the infrastructure investment gap, coupled with the Swedish government's skepticism and limited use of PPPs, presents a compelling area for research. This thesis therefore sets out to explore how PPPs can help European countries in general, and Sweden in particular, in efficiently delivering public infrastructure assets. This is done by illustrating the frameworks and adoption of PPPs in the UK, France, and Norway, as well as conducting interviews with professionals in the field. The thesis aims to answer the following research question:

How can public-private partnerships help European countries, and Sweden in particular, bridge their infrastructure investment gaps?

Given the nature of the research question, we opted for answering it using a qualitative, case-study approach. Building on the general PPP framework and existing research of public-private partnerships, we examined three cases from the road sector to gain empirical insights and illustrate the considerations and characteristics of PPP projects. To comprehensively explore the potential and current state of PPPs and to be able to foster further discussion, we conducted interviews with a diverse group of PPP stakeholders. This included representatives from the public sector, project companies, financiers, sponsors, academia, and intergovernmental organizations. The case studies illustrate how PPPs are used in the UK, France, and Norway, and highlight the background, bidding process, financial composition, and outcome of each project. A selection of our interviewees were involved in or knowledgeable about the projects, providing us with in-depth insights into the cases. By connecting and comparing the cases to practitioners' views on and experiences from PPPs, we find that PPPs are not a superior alternative for delivering public infrastructure assets, but that they for the right project can yield

¹ A Debt Office Commentary is an essay by employees aiming to further the understanding of a relevant subject.

numerous benefits. Every project should therefore be carefully evaluated to determine the best delivery method, and while the PPP structure is an option, it should only be considered alongside other alternatives. PPPs should only be chosen for projects with sound underlying economics and where certain characteristics that generate interest from the private sector can be identified. Sweden has generally dismissed PPPs, which has led to missed learning opportunities, limited knowledge, and misconceptions about the model. Using PPPs for well-suited projects provides benefits that can support Sweden in closing the infrastructure investment gap. Such benefits include innovative project execution, efficiency and quality gains, lowered fiscal burden (especially for local governments), good risk allocation as well as all parties taking on a long-term project perspective. Consequently, we suggest that Sweden consider PPPs as a possible way of delivering infrastructure assets as this can help in closing the infrastructure investment gap.

The main purpose of our thesis is thus to answer how the usage of public-private partnerships can help bridging the infrastructure investment gap in Europe as well as to inform and ignite the Swedish debate about whether, and when, to use PPPs. The thesis contributes with empirical evidence from cases where PPPs have been used to undertake infrastructure delivery in European countries as well as through insights from professionals in the field. While Europe is a broad term as the market is somewhat fragmented (e.g., Medda et al., 2013), we believe the experiences to be largely transferable, especially in a Western European context. To the best of our knowledge, no prior research has used a multiple case-study approach to investigate the usage, perception, advantages, and disadvantages of PPPs in connection to Sweden. Thus, this thesis bridges the existing research gap and extends literature for public-private partnership usage in Europe in general and Sweden in particular.

The thesis proceeds as follows. Section 2 reviews relevant literature while section 3 outlines and discusses the methodology of the thesis. Section 4 presents the three case studies of European PPP road projects and proceeds to present results from the 20 interviews, divided into themes central to answer the research question. In section 5, we discuss our findings from the case studies and interviews and connect them to existing literature. Further, we address implications for Sweden and limitations of our study. Finally, section 6 presents our conclusions and provides suggestions for future research.

2. Literature Review

This chapter establishes a foundation for the topics and aspects discussed in our thesis by addressing existing literature on public-private partnerships (PPPs) and private financing of infrastructure. We conclude by outlining how we aim to extend the existing body of knowledge.

2.1. Introduction to Project Finance and the Characteristics of PPPs

Lacking a universal definition of public-private partnerships, the term can encompass a variety of contracts between the public and private sectors, transferring risks and responsibilities to different degrees to the private sector. This section will outline some common characteristics of PPPs as described in previous literature (e.g., Yescombe, 2014; Yescombe and Farquharson, 2018). For instance, PPPs commonly follow a project finance structure, which involves long-term financing where lenders rely on cash flows from the project alone to service debt. Consequently, assets to be financed must be ring-fenced, and financiers must perform extensive due diligence to ensure that risks are well-allocated or mitigated, and that the project can perform well on a standalone basis (Yescombe, 2014). Dentons (2018) describes how strict non-recourse financing is rare in project finance, and how transactions usually involve limited recourse. Limited recourse means that lenders do in fact have some recourse on the borrower or project sponsors, usually in the form of guarantees, thus not solely relying on the assets in the project (Dentons, 2018). Yescombe (2014) notes that limited recourse decreases the risk for lenders and increases the project's bankability.

Yescombe (2014) further explains how project finance usually involves high leverage, resulting in a relatively low weighted cost of capital (WACC). Despite the high leverage, studies have shown that the default risk of project finance loans is relatively low, especially in infrastructure. Moody's (2022) found that the 10-year cumulative default rate (CDR) for infrastructure projects is 3.8%. The study also finds that PPP projects have the lowest default risk, with the 10-year CDR being 3.7% (Moody's, 2022)

In PPPs, the private party is often constituted by a Project Company, henceforth referred to as Special Purpose Vehicle (SPV), that is established for the project in question. The SPV signs contracts with various stakeholders and acts as the executing party. In a PPP, the public party, who can range from the state, regional or local governments, to a public agency or public sector entity, is the ordering party that signs a PPP contract with the SPV (Yescombe and Farquharson, 2018). The SPV is usually backed with equity provided by the project's sponsors (key investors) and other investors through shareholder agreements as well as by debt provided by lenders primarily consisting of banks but also other financial institutions or investors (Yescombe, 2014).

The SPV may in turn contract with firms of various expertise in different stages of the project. Common subcontractors in a PPP are Engineering, Procurement, and Construction (EPC) contractors and Operations and Maintenance (O&M) contractors. Figure A.1 provides a schematic overview of a common structure for a PPP.

The modern PPP either follows the user-paid or government-paid mechanism. User-paid PPPs are usually concession agreements where the public party allows the private party to collect fees, usually via tolls or tariffs, from users (Yescombe and Farquharson, 2018). With user-paid PPPs, the private party generally faces demand risk from users of the asset. Government-paid PPPs, on the other hand, are funded by the government in line with a contract where payments, called availability-payments or unitary charges, are made to the private party based on the asset's availability, service quality and other KPIs stipulated in the contract. While demand risk normally remains on the public side, the payments to the private party could be reduced if they fail to fulfill certain requirements (Yescombe and Farquharson, 2018).

There are many different PPP contract types that are referred to using different acronyms depending on what risks and responsibilities are transferred to the private sector. See Figure A.2 for an overview of different contract types. Yescombe and Farquharson (2018) divide PPP contract types into the design-build-finance-operate (DBFO), where the public party remains as owner during the contract lifespan; build-transfer-operate (BTO), where the private party owns the asset during construction whereafter it is transferred to the public; build-operate-transfer (BOT), where the private sector owns the asset over the contract lifespan; build-own-operate (BOO), where the private sector owns the asset without a transfer date. Yescombe and Farquharson (2018) further note that the ownership of a facility and the payment model applied have little to do with each other. They also note that the terminology for the various contract types is not used consistently. In a similar manner, we want to acknowledge that PPPs are a very broad term, and the focus of our thesis will predominantly refer to greenfield (new development) projects where the government remains as owner. The cases in our thesis cover both concessions and availability-based PPPs.

Lastly, one central aspect of PPPs is the identification, assessment, allocation, and mitigation of risk. Risks are of various natures and arise in different phases of the contract period. For instance, some risks are tightly linked to the construction and operational phase while others are more general, such as political and economic risks that are often associated with projects being socially and politically sensitive (Yescombe and Farquharson, 2018). Grimsey and Lewis (2002) evaluate risks associated with PPP projects by conducting a case study on a wastewater

treatment facility in Scotland. They discuss the complexity of risk evaluation given the different perspectives of PPP stakeholders and highlight the importance of allocating risk to the party that is best able to manage it. For the public sector, the main goal is to achieve value for money and ensure that contract obligations are efficiently met. PPP projects are reasonable only if it is possible to establish a long-term revenue stream over the course of the project while also properly allocating risks among stakeholders. Successful PPP projects manage to transfer risk to the private sector while offering them a profit incentive in return (Grimsey and Lewis, 2002). Thus, to ensure proper risk allocation and preserve incentives, due diligence, and effective risk mitigation among PPP participants appears to be crucial.

2.2. Research About the Usage and Perception of PPPs

Prior studies have investigated the implementation of public-private partnerships. A few studies have specifically researched the differences in PPP usage across regions in Europe. Medda et al. (2013) comment on how the European PPP markets are nationally fragmented, but how harmonization has been introduced through various EU directives, guidelines, and cross-border projects. The authors study the benefits of PPPs in the transport sector and conclude that PPP contracts offer the ability to tailor incentives and risk-sharing to the unique characteristics of a project and the economic and institutional framework surrounding it. Furthermore, Medda et al. (2013) argue that choosing to use PPPs is a balancing act for the public sector, involving various trade-offs, which calls for a thorough value for money assessment for each project.

Another relevant field of research related to the usage of PPPs has analyzed the rationale for adopting PPPs in infrastructure procurement. There are several reasons for PPP adoption introduced in previous literature. Chan et al. (2009) mention that countries with immediate budget constraints may need access to private capital in order to conduct required investments in infrastructure. Almarri (2019) found that PPPs facilitate the transfer of private sector knowledge to the public sector, while also utilizing private sector capital, adding value for money, and transferring risk to the private sector. The concept of risk transfer and risk sharing is frequently found to be a cornerstone of PPP adoption (e.g., Hwang et al., 2013; Wang et al., 2018). Hwang et al. (2013) further found that a well-organized public agency, appropriate risk allocation and a strong private consortium are critical success factors for PPPs. Moreover, wider private sector involvement increases the level of innovation in PPP projects (Carbonara and Pellegrino, 2018). The authors also argue that instead of using traditional contracts such as fixed-price contracts, performance-based contracts should be used. Finally, it is evident from previous analyses of PPP adoption that the motivations vary across regions. In the Swedish context, the most important motivations among stakeholders for PPP adoption are risk transfers to the private

sector, cost reductions, and an opportunity for private investors to invest in core infrastructure (Sällberg and Numminen, 2022).

When it comes to the perception of public-private partnerships, it has also been researched in different contexts. Verhoest et al. (2015) have developed a governmental support index for public-private partnerships in 20 European countries. The index gives countries a score based on i) policy and political commitment, ii) legal and regulatory framework, and iii) PPP-supporting arrangements. Based on this ranking, Sweden receives the second-lowest overall score. The authors further comment that governmental support towards PPPs is rather limited in Sweden. The United Kingdom scored the highest overall *at the time*, whereas France scored the seventh highest. Norway was not included in the study. Verhoest et al. (2015) also find that countries differ substantially in terms of policies and institutions supporting PPPs, but that measures have been taken at the EU level to harmonize legislative and regulatory frameworks.

2.3. Evaluating PPP Projects

Opinions on how to properly evaluate PPPs are widespread and ultimately reflect the multidimensionality of a PPP and the sometimes-conflicting interests between stakeholders. One well-researched aspect related to the evaluation of PPP contracts compared to traditional procurement methods is that PPP projects are more often completed on time and at a lower cost than traditionally procured projects (Mott MacDonald, 2002; Flyvbjerg et al., 2003; Grimsey and Lewis, 2004; Raisbeck et al., 2010). Mott MacDonald (2002) researches the outcome of traditionally procured projects in the UK and describes the optimism bias as the tendency for costs and duration of such projects to be underestimated, and benefits are overestimated. They find that the average cost overrun is 21% for traditional procurement. Flyvbjerg et al. (2003) specifically studies the cost performance in transport infrastructure projects across project types. They find that the average cost overrun is 28%. Furthermore, the authors state that cost escalation is a global phenomenon and that no learning has taken place over time, so the overruns persist. In a subsequent paper, Flyvbjerg et al. (2004) argue that delays and extended implementation should be a cause for concern for policymakers as it increases the risk for cost overruns. Another approach for evaluating PPPs is taken by Blanc-Brude et al. (2006), who study PPP road projects in Europe and estimate that the *ex-ante* cost (bidders' construction prices) of PPP projects is 24% higher than for traditionally procured projects, *ceteris paribus*. They find that the higher estimated building costs in PPPs largely equals to the final *ex-post* cost overruns in traditionally procured projects as found by Mott Macdonald (2002) and Flyvbjerg et al. (2003), implying that the outcome is similar regardless of procurement method used. Raisbeck et al. (2010) compare Australian PPP projects to traditionally procured projects based

on cost performance and timeliness. They find that PPPs demonstrate a significant cost efficiency compared to traditional projects. The cost overrun for PPPs was not statistically different from zero, whereas they found a substantial net cost overrun for traditionally procured projects. The study also found that time overruns were less likely to happen in PPP contracts, which were on average completed 3.4% ahead of schedule, while traditional contracts were completed 23.5% behind schedule. In addition, they found that PPP projects performed better in terms of transparency in the way that data was better made publicly available. To the point of whether PPPs are better in procuring public infrastructure, Engel et al. (2014) argue that it depends on the underlying economic characteristics of a project rather than its funding or financing.

One essential aspect of PPPs is whether they provide value for money. Yescombe (2007) defines value for money as “the combination of risk transfer, whole-life cost and service provided by the Facility, as a basis for deciding what offers the best value to the Public Authority” (Yescombe, 2007, p. 349). However, value for money is a broad term. For instance, Grimsey and Lewis (2005) compare different stakeholders’ views on how to assess if PPPs provide value for money. They find that there are several methodologies for assessing value for money, amongst them the Public Sector Comparator (PSC), which compares the cost of the PPP project to the cost of the government delivering the project, and the cost-benefit analysis (CBA), which compares the NPV of the entire project. The approaches to value for money assessments differ across countries. It is, however, important to also consider risk, policy, strategy, and socio-economic factors in the value for money assessment, and not solely choosing the option with the lowest cost as obtained by the PSC (Grimsey and Lewis, 2005). The authors further explain that this reflects the complexity of the term “value”, which includes trade-offs between cost, risk, and performance. Academics have criticized the PSC-PPP comparison for the arbitrariness of assumptions related to risk transfer and discount rates. This means that small changes in assumptions can have a significant impact on the outcome and thus the decision-making process. A way of overcoming this is however by conducting sensitivity analyses and robustness checks (Grimsey and Lewis, 2005).

EPEC (2016) describes how EU Member States that have continuously used PPPs have been able to deliver more effective and efficient PPP projects. One thing that contributes to this is contract stability, that is, the absence of required contract renegotiation (Soeipto and Verhoest, 2018). Soeipto and Verhoest (2018) conduct a qualitative comparative analysis of 25 European road infrastructure PPPs to study the factors that contribute to contract stability and thereby avoid contract renegotiations. They find that while macroeconomic factors contribute largely to

contract stability, so does an availability-based payment mechanism, and an extensive governmental PPP support mechanism. They also note that contract stability is crucial for the success of PPP projects (Soeipto and Verhoest, 2018). Related to this, PPP projects often fail due to poor contract design stemming from inadequate public sector expertise, a contributing reason to the failure of, for example, the Indiana Toll Road in the U.S. (Zhu and Cui, 2014). Further, Grimsey and Lewis (2004) highlight the importance of governance in a PPP in the form of effective performance monitoring, quality management, and information systems. PPPs require that the government have robust performance monitoring and management of information systems to ensure the viability of the private party and the project. Furthermore, contract managers play a crucial role in continuously auditing these systems to effectively govern PPP projects (Grimsey and Lewis, 2004).

The potential instability of PPP contracts and uncertainties in underlying assumptions can sometimes lead to adverse outcomes for the public or private party, for instance in the form of bankruptcies or restructuring. As was mentioned in section 2.1, PPPs have the lowest default risk among project finance loan subsectors, however, defaults do occur which in some cases has led to bankruptcies. For toll roads, Regan et al. (2017) conducted a case study of six Australian toll road projects, out of which two failed from a financial perspective. Forecasting errors in terms of market demand were brought up as a reason for the projects' failure, and it was suggested that the collaboration between participants should be improved to achieve a better risk allocation (Regan et al., 2017). Alcaraz Carrillo de Albornoz et al. (2021) studied PPP bankruptcies in Spain and argued that while a bankruptcy may be devastating for shareholders and creditors, the public party, users, and the society can still benefit from the project as new assets are made available. From their case studies they also concluded that while bankruptcy was not without cost for the public party, they still made large savings compared to if something similar would have occurred in a setting where the project was delivered through traditional procurement. The reason for this is that the private sector carried a majority of the risks and thus had to pay most of the unexpected costs. Furthermore, Bolaños et al. (2019) compare seven US and eleven European PPP bankruptcy cases and find that the US Chapter 11 Bankruptcy Code favors continuous operation of the projects and restructuring of debt, rather than liquidating assets. Asset liquidation is more common in European civil law countries such as France and Spain, however, this leads to higher fiscal impacts for the public, especially if guarantees are involved. Bolaños et al. (2019) note that new legal frameworks have emerged in civil law countries that resemble the US Bankruptcy Code, thereby promoting debt restructuring and minimizing the risk for a government bailout that impacts taxpayers.

2.4. PPPs in a Swedish Setting

There has been limited use of PPPs in Sweden, and the projects that have been implemented have sustained heavy criticism. The Arlandabanan project, an airport rail link, was criticized for having high ticket prices which raised concerns about the traffic volumes and lack of wider social benefits (Agerström et al., 2021). Nilsson et al. (2008) however found that the Arlandabanan project has reduced budget pressure for the public party and relieved the taxpayer burden. Moreover, the paper praised contract design and argued that although traffic volumes were at the time below estimations, the government would have limited exposure in case of default (Nilsson et al., 2008). An evaluation from the Swedish National Audit Office (2016) found that the overall outcome of the Arlandabanan PPP project was favorable, with the observation that PPPs can contribute to infrastructure projects being delivered on time and operating with few interruptions.

The Swedish PPP project Nya Karolinska Solna (NKS) has been widely discussed and criticized in media, reports, and books. A report by Yngfalk and Junker (2019) found that the decision to procure the project under a PPP scheme was biased and affected by external parties with their own commercial agenda and without transparency. Furthermore, the project was affected by lack of competition, with only one final bidder for the project. The authors also found that the decision to use PPPs were likely affected by the upcoming election, creating an urge to rush the process (Yngfalk and Junker, 2019). The authors do however comment that the NKS project would likely have sustained criticism regardless of the procurement method used. Looking at the PPP contract itself and the delivery of the project, the NKS was delivered three months ahead of time and at a fixed project cost (Swedish Hospital Partners, n.d.). However, significant additional costs for the public party arose after contract signing due to supplementary services demanded by said party.

A Debt Office Commentary from the Swedish National Debt Office (2021) argued that the benefits of PPPs in terms of socio-economic efficiency gains are uncertain, whereas the disadvantages are clear. The disadvantages brought up in the essay were for instance related to lower budgetary transparency and a significantly higher financing cost due to the state's borrowing cost being much lower than a private party's financing costs (Swedish National Debt Office, 2021). While being valid concerns for the state, Engel et al. (2010) suggest that the higher financing cost in a PPP is not an argument for using traditional public procurement. Instead, in a correctly designed PPP contract, the higher financing cost may reflect the price to be paid for the efficiency advantages that come with PPPs (Engel et al., 2010; Engel et al., 2014).

Swedish employers' organization Svenskt Näringsliv (2022) published a report investigating the preconditions for using alternative financing of infrastructure in Sweden. They found that there are no legal constraints in doing so should there be a political willingness (Svenskt Näringsliv, 2022). The report further examines the use of alternative financing in two Swedish and three international projects of which four used the PPP model. It analyzes the projects' business model, financing, organizational structure, and cash flow profile. The report argues that by using alternative financing, investments can temporarily alleviate the state budget and at the same time accelerate infrastructure investments (Svenskt Näringsliv, 2022).

Having reviewed relevant literature, a few concluding remarks can be made. One strain of previous literature has focused on the rationale for adopting PPPs, and another has attempted to evaluate the performance of PPPs relative to traditional contracts and discussed value for money considerations. No papers have, to the best of our knowledge, explored in-depth the experiences and insights of various stakeholders in a public-private partnership and applied the knowledge in a Swedish setting. We aim to bridge this research gap and thereby contribute to existing literature on PPPs and assess how they can be used in a Swedish context.

3. Methodology

3.1. Choice of Methodology

The long timeframes associated with public-private partnerships, along with the lack of scientific consensus on how to quantitatively evaluate projects, have led us to choose a qualitative research method for our thesis. Moreover, given the descriptive nature of our research question, we opted for using the case study method to answer it. Yin (2014) writes that using a case study method is preferred when the main research question is a “how” or “why” question, and when focusing on a contemporary phenomenon in their context. We argue that infrastructure investment challenges and using public-private partnerships are indeed a contemporary matter, thus making it best answered by adopting the case study method. A case study can be designed using either a single-case or a multiple-case design. A multiple-case study follows more than one case, and the selection of the cases should follow a replication logic, meaning that the cases should be carefully selected so they produce similar results, or different results but for predictable reasons (Yin, 2014). We have chosen three cases from the European road sector to illustrate how a public-private partnership can be used to meet infrastructure investment needs, and what challenges may arise. According to Eisenhardt and Graebner (2007) and Yin (2014), multiple cases, rather than one, positively affect the quality of the findings and yield more robust and generalizable data.

3.2. Data Collection

Case studies can encompass a variety of data sources. We chose to collect data using written sources, databases and through semi-structured interviews. Written sources included the websites of the respective stakeholders in the case, along with press releases, financial statements, and news articles. Databases used to find case related data were Refinitiv Eikon’s app Infrastructure 360 and EPEC’s Data Portal. Moreover, we conducted semi-structured interviews with stakeholders in public-private partnerships and individuals knowledgeable about the topic. As Yin (2014) describes, interviews focus directly on the relevant topics of the study, while also providing explanations and personal views. Since there are a variety of stakeholders in a PPP, each with different experiences and perceptions depending on their role, we deemed that semi-structured interviews would best capture the width of our topic and provide a nuanced answer to our research question.

As described by Billups (2021), semi-structured interviews are common when conducting case studies as they allow the interviewer to ask open-ended questions and follow-up on certain responses. This enables an in-depth understanding of the interviewee’s experiences and

perspectives. In a semi-structured interview, the interviewer follows an outline of topics to be covered and holds the interview in a conversational manner while following the guide (Billups, 2021). Our guide was iteratively improved and tailored to our interview subjects. For instance, if we were interviewing a person involved in one of the cases, we would naturally tailor questions to relate to the specific case.

We chose to conduct three case studies, one ongoing project and two recent, to provide a comprehensive and multifaceted analysis of PPP usage in Europe. In line with Leonard-Barton (1990), covering both real-time and retrospective cases helps cover up for eventual methodological shortcomings with the case study approach. We included three countries in our case study, namely the UK, France, and Norway, each with a different approach to PPPs. Thus, we are able to illustrate differences and similarities in how PPPs are used across the continent. Furthermore, the countries are in different stages of PPP development; the UK has experienced a boom and bust in PPP usage; France has an enduring PPP usage; Norway has been taking an experimental, evaluative approach to using PPPs, especially in transportation infrastructure. This opened for a perspective on the evolution of PPPs over time in Europe. Additionally, our cases focus on road projects as they are relatively consistent worldwide, enabling us to make comparisons and generalizations. Finally, there is a chronology in our cases with the Mersey Gateway being built first, followed by the Western Strasbourg Bypass, and the Sotra Connection that is currently under construction.

After having chosen three relevant cases that illustrate the usage and rationale of adopting PPPs in European countries, we contacted various stakeholders involved in the projects to gain their perspectives and case-specific information. We also contacted a variety of stakeholders not directly linked to the cases, representing the public sector and financiers as well as expert organizations and academia, to enhance validity of responses and to better be able to generalize our findings. Case respondents were found by researching the relevant projects while respondents not directly linked to the three cases were found by researching other projects and the Nordic and European infrastructure landscape in general. Thus, all interviewees had extensive knowledge about public-private partnerships. All respondents were contacted by telephone or email. We conducted a total of 20 interviews with 23 interviewees throughout October and early November 2023. An overview of the interviewees can be found in Table A.1 in Appendix A. All interviews except for one were held virtually and had a duration between 45 and 85 minutes. Interviewees had the option to be anonymized in the thesis, which two individuals chose. All respondents agreed to the interview being recorded for the purpose of facilitating the transcription and analysis of the interview. Having the data in text format helped

us in processing and analyzing the data, as it enabled us to search for patterns, insights, and concepts, as described by Yin (2014). As patterns and concepts emerged, we aligned them in themes that were used to extend insights from our cases and help answer our research question. Lastly, interviewees were sent the text where they were mentioned or quoted and had the option to edit or remove text, which some respondents chose to do.

3.3. Discussion of the Method

The case study method has been criticized for its lack of rigor (Miles, 1979; Yin, 1981). The rigor of the methodology depends on four factors: its construct, internal, and external validity, as well as reliability (Yin, 2014).

Construct validity involves ensuring that data collection is aligned with the research objectives and avoids any bias stemming from preconceived notions of the researchers (Flyvbjerg, 2006). Internal validity is concerned with the risk of making incorrect inferences, where one event is mistakenly assumed to lead to another, resulting in erroneous conclusions (Yin, 2014). External validity is the extent to which the results of a study can be generalized, which is limited if only a single case study is performed (Leonard-Barton, 1990). To attain construct and external validity, we used a multiple-case design with replication logic as well as combining real-time and retrospective cases, which overcomes validity limitations (Leonard-Barton, 1990). We also interviewed a broad spectrum of knowledgeable stakeholders, some of whom were affiliated with the specific cases and others who were not, to triangulate and validate our findings, achieving construct and internal validity (Eisenhardt, 1989; Yin, 2014).

Finally, the case study methodology has been criticized for its reliability issues (e.g., in Miles, 1979), that is, factors that impair the ability to replicate the study and report consistent findings and conclusions. In our thesis, reliability was slightly affected as two interviewees preferred to be anonymous, however, their opinions are likely to be echoed by other interviewees with similar professional roles and experiences. Also, based on interviewee preferences, some interviews were held in other languages than English (in Swedish and Norwegian). This introduced a risk that our transcript translation could bias the data, affecting findings and thus reliability. Nonetheless, our recorded audio allowed us to go back and carefully analyze the context of each finding, significantly limiting any such issues.

In response to skepticism towards the ability of the case study methodology to ensure validity and reliability, we implemented research-based measures and thus overcame related challenges. We believe that our chosen methodology is the most effective approach to answer our research question.

4. The Case Studies

This chapter presents the main findings from our examination of three cases and interviews with stakeholders knowledgeable about PPPs. With the cases we intend to explore the evolution and implementation of PPPs in Europe, with a focus on projects executed over the past two decades in the UK and France, as well as on a contemporary PPP in Norway. We examine the history of PPPs in each country, gain insights into the rationale behind initiating a PPP, investigate the processes and financing mechanisms of PPP projects, as well as illustrate the outcomes of the projects. A summary of the cases is provided in Table 4.1. The subsequent results presented in sections 4.4 to 4.6 further build on the concepts illustrated by the cases and allow us to develop a deeper and broader understanding of how PPPs can be used to bridge the infrastructure investment gap as well as how they can be applied in a Swedish context.

Table 4.1: Summary of the Projects

Project	Mersey Gateway	Western Strasbourg Bypass	Sotra Connection
Country	United Kingdom	France	Norway
Contract type	DBFOM	DBFOM	DBFOM
Contract size	GBP 1.86 billion	n.a.	NOK 23.1 billion
Financing	Bond, loan	Loan	Loan
Completion	2017	2021	2027 (estimated)

4.1. The Mersey Gateway Project

In this section, the Mersey Gateway project will be explored. It took off after the usage of PPPs had peaked in the UK. The project was initiated to facilitate the crossing of the Mersey River and was performed as a PPP to ensure that only those who utilize the bridge pay for it. In 2011, the bidding process began, and in 2013, Merseylink was announced as the victor. Financing was accessed through an innovative approach that included both bonds and loans. In 2017, the bridge was opened on time and budget, and has performed in line with expectations since.

Table 4.2: Summary of the Mersey Gateway Project

Contract size	Contract length	PPP type	Demand risk	Financing	Equity share	Debt source	Fin. close	Completion
GBP 1.86 bn	30 years	Availability-based	Public party	~GBP 600 m	~9%	Bond, loan	2014	2017

4.1.1. History of PPPs in the UK

As a response to a poor track record of delivering infrastructure projects on time and on budget, and with consistent underinvestment in asset maintenance, PPPs were introduced by the UK government in 1992 (OECD, 2018). This marked the beginning of the United Kingdom's extensive use of PFIs as the UK calls DBFO projects (UK Government, 2013). In a time of large and growing UK fiscal deficits, the government saw the PFI model as a mechanism to keep public debt levels low by performing projects off the balance sheet (Gaffney et al., 1999b). From 1994, it was required that private finance options were considered before being able to get approval for publicly funded investments. PPP usage reached its peak right before the global

financial crisis hit (Gaffney et al., 1999a; OECD, 2018), whereafter banks were tightly regulated, and long-term financing available shrunk and got more costly (Booth, 2018).

The criticism of PFIs in the UK has been significant over the years. Value for money of PFI projects have been in focus together with allegations of inappropriate risk allocations as well as a lack of flexibility and transparency (UK Government, 2023; HM Treasury, 2012). Responding to the criticism, the government decided to halt significant PFI projects that were in the pipeline and initiated a review of the PFI policies altogether in 2010. In 2012, the government introduced a revamped version of PFI called PF2 in the hopes of improving public confidence. PF2 aimed at enhancing value for money, boosting procurement efficiency, providing more flexibility during the operational phase, and improving transparency (OECD, 2018). Despite these changes, the public remained pessimistic and the topic controversial. This was largely because PPPs were closely associated with the construction of hospital buildings which had imposed significant costs on the National Health Service (Appleby, 2017). Between 2012 and 2018, the PF2 model was only used six times. In the 2018 Budget, it was announced that the UK government will no longer use private finance initiatives for future building projects, marking the end of the national PF2 program (HM Treasury, 2018). However, even though the PF2 program has been discontinued and criticism remain strong, there are still a few PPP projects emerging in the UK (Refinitiv Infrastructure 360, 2023). See Figure B.1 for an overview of PPP transportation projects in the UK between 1995-2021.

4.1.2. Background of the Mersey Gateway Project

South-east of Liverpool lie the cities Runcorn and Widnes. The cities are separated by the Mersey River and from 1961 the main passage over the river was the Silver Jubilee Bridge. Over the following decades, traffic volumes increased significantly to close to 80 000 vehicles every weekday (Aylen, 2020). This is about ten times more traffic than the Silver Jubilee Bridge was built for and led to congestion on the route along with a call for change (The Mersey Gateway Project, 2011b). Hence, a project to build a new bridge over the Mersey River was initiated, giving birth to the Mersey Gateway Group already in 1994. See Figure B.2 for a geographical overview of the area and the project.

“Initially the local authority wanted this to be a free crossing, fully paid for by the government. Now, the government stance was that because this is an estuary that would not be an option. Their opinion is that estuary crossings have to be tolled because there is a specific benefit to having a crossing on an estuary, which is that motorists do not have to make long detours – it is however noteworthy that there was an existing bridge across the river that was free at this point. This stance forced the [local] government to think differently about how to pay for this and so the whole PPP approach was the one that was adopted. The

contract and the approach to how to finance it changed slightly because of the impact of the recession. [...] Due to risk and uncertainty in the market, the project was split into two elements. On one side you would have the design, finance, and operate company and then you have the tolling element run by another company. As there was a risk to whether or not there would be an appetite to take on a 26.5-year tolling contract in the current environment, it was instead offered as a seven-year contract from the bridge opening to be extended based on performance.”

– David Lyon, Secretary at Mersey Gateway Crossings Board

In 2001, Ramboll was appointed as lead technical consultant and assisted in receiving the initial approval for the project from the United Kingdom’s Department of Transport in April 2006. The new bridge would be a cable-stayed bridge with three towers, about 1 km long with 1.2 km of raised approaches and have three lanes in each direction (Ramboll, n.d.). The project also included tolling of the by then highly congested Silver Jubilee Bridge (Refinitiv Infrastructure 360, 2020b). Taking on this project would be a significant endeavor of the bid-winning consortium which is emphasized by David Lyon from the Mersey Gateway Crossings Board, *“not only are they [the chosen SPV] responsible for building the assets, financing the asset, and designing the asset, they are also responsible for maintaining it for the contract period of 30 years”*.

Between 2006 and 2010, research was undertaken in the key areas such as funding, tolling, scheme design, traffic modeling, land use, environmental impact, and affordability along with submitting necessary planning applications (Halton Borough Council, 2007). The period also included a public inquiry in 2009 which showed that the support for the scheme was largely positive (The Mersey Gateway Project, 2009). In October 2010, UK Chancellor George Osborne announced that the government would assist in the project’s land acquisition and development through a funding contribution. The government agency also stated that they would be able to provide additional long-term financing and assist in assessing the funding options for the project (Construction News, 2010). In October 2011, a detailed funding agreement for the project was signed off by the government. This stated that the Department for Transport (DfT) agreed to contribute GBP 470 million of the total project lifetime costs of around GBP 1.86 billion and hence support the Halton Borough Council in making payments to the SPV. The governmental contribution consisted of two parts, one initial capital grant of GBP 86 million and another in the form of a long-term revenue support of up to GBP 14.5 million per year for 26.5 years. Furthermore, the DfT committed to covering the council’s availability payments if there were to be shortfalls in toll revenue. To further guarantee the project funding, HM’s Treasury provided support by backing the DfT’s commitment (IJ Global, 2014).

Per the government's request, Halton Borough Council worked to further decrease costs for the project and decided to remove toll plazas and alter the bridge design. These changes were well received by the government, who stated in a news release that, "*Halton Borough Council have achieved savings of around GBP 30 million on the original proposed cost – meaning the scheme will offer better value to the taxpayer, whilst bringing vital improvements to the region. Further cost savings are expected through a competitive procurement process*" (The Mersey Gateway Project, 2011a). Having made final changes to the project and secured governmental funding, the bidding process was ready to commence.

4.1.3. *Bidding for the Mersey Gateway Project*

In October 2011, the Mersey Gateway Board published the mandatory Official Journal of the European Union (OJEU), inviting parties to express an interest in the procurement of the GBP 600 million construction project by December 2011 (Mersey Gateway Executive Board, 2011). In total, there were six bidders competing to win the 30-year contract to design, build, finance, operate and maintain the Mersey Gateway. In February 2012, the Halton Borough Council had created a shortlist of three bidders: The Merseylink consortium, The Balfour Beatty, Bouygues Travaux Publics, Egis Projects consortium, and The MGL consortium. The Mersey Gateway project director Steve Nicholson mentioned that they were "[...] *delighted with the quality and the quantity of the submissions received*" and that all groups met their requirement but that they chose to only continue with these three actors to ensure that they could "[...] *reduce bid costs whilst running an effective competition*" (New Civil Engineer, 2012). During the following year, the consortiums would further develop their proposals with the project team to provide the taxpayer with the best quality and value before submitting their final tenders. The announcement of a preferred bidder was scheduled for the spring of 2013 but since this is a critical and time-consuming step of the process, it was not until June 2013 that the winning consortium was declared (The Mersey Gateway Project, 2012). The winner was selected based on a weighted scoring system of different factors such as price and the methods used to deliver the project (D. Lyon, Interview, October 20, 2023).

Merseylink emerged as the consortium being able to deliver the best value and was officially appointed as project company in March 2014. The sponsors consisted of Macquarie Capital (37.5% of the shares), part of Macquarie Group, BBGI S.A. (37.5% of the shares), and FCC Construcción (25% of the shares), part of the FCC Group (IJ Global, 2014). The sponsor FCC Construcción was also one of the construction contractors together with Kier Construction and Samsung Construction & Trading (C&T) while the toll operator of the Merseylink consortium was Emovis, a subsidiary of the global tolling company Abertis (The Mersey Gateway Project,

2014). Please see Figure B.3 for an overview of the organization structure. On the financing side, the consortium had turned to the global bank HSBC to leverage the bank's established knowledge and expertise in developing bond funding solutions (HSBC, 2015). All in all, being a consortium consisting of highly experienced parties with great expertise worked in favor of the Merseylink consortium.

Up until 2044, Merseylink will have the responsibility to ensure that the Mersey Gateway is not only financed and built but also that the assets included in the contract are well-operated and maintained. The operations and maintenance (O&M) phase includes collecting tolls and statistics on both the new Mersey Gateway and old Silver Jubilee bridge. Toll revenue is the main funding for the entire project, contributing with around 70% of the total funding (The Mersey Gateway Project, 2013). Emovis, under the name Merseyflow, is responsible for collecting tolls as well as transferring most of the proceeds to the Halton Borough Council. Emovis' work is mainly paid for by the borough through an annual fee, a service subsidy, however, they could also gain a share of the toll revenue if the traffic volume is higher than what has been estimated. If Emovis perform their duties worse than expected, that is, if specific key performance indicators (KPIs) are not met, then money can be withheld by the Council. This means that all traffic volume risk is carried by the public sector. When it comes to other risks, the Mersey Gateway Crossings Board was careful in allocating them to the appropriate party and limiting them where possible. For example, while the construction risk was to be carried by the consortium, the Mersey Gateway Crossings Board put in an effort to limit ground condition risks. This was done through conducting various studies and performing remediation of contaminated areas as well as sharing data with the bidders (D. Lyon, Interview, October 20, 2023).

The total contract size was GBP 1.86 billion, reflecting an estimated saving of GBP 250 million from using an innovative PPP procurement model approach. Payments were to be made annually by the Halton Borough Council to the Merseylink consortium through unitary charges (The Mersey Gateway Project, 2017). The unitary charge is directly linked to service requirements set out in the contract, hence, Merseylink must showcase a performance above a base level set out in the contract. For example, the average time it takes for a car to cross the bridge cannot drop below a specified level without the unitary charge being reduced. The council will continue paying this unitary charge up until 2044, when the project assets are to be handed back to the council in good condition and with all the private financing fully repaid (The Mersey Gateway Project, 2017). Please refer to Figure B.4 for an overview of the payment flows.

“The way that the contract is set up is that [...] the unitary charge is only to start being paid at permit-to-use, that is, on the day that the bridge goes live [...], and so, the longer it takes for them to build it, the less money they get paid. [...] if they estimated the construction to take three and a half years and [...] it takes them 4 years, they would have lost 6 months’ worth of payments, which is a lot of money.”

– David Lyon, Mersey Gateway Crossing Board

4.1.4. *Financing the Mersey Gateway Project*

Being a PPP, the council only pays for availability and so the consortium had to finance the construction of the crossing on their own. A large contribution to winning the public tender was the consortium’s competitive financing, and as stated by a senior executive at a company in the finance industry with insights into the Mersey Gateway Project, *“the view is always that finance cannot win the project, but if you get the wrong financing package you can certainly lose the project [...]. For Merseylink, the financing package actually seems to have been quite important in getting to the preferred bidder stage and winning the process”*. HSBC put in significant effort to identify an appropriate project bond funding model, requiring innovation due to the lingering memory of the global financial crisis (HSBC, 2015). A senior executive at a company in the finance industry further stated, *“[...] the debt market, institutional lenders, were at the time not experienced [in this area], they really struggled with construction risk, and the creditors that could handle construction risk was the banking market, but the banks did not have a long tenor”*. Access to long-term capital was therefore largely unavailable, yet the option of refinancing the debt during the project lifetime was not viable as this would cause large uncertainties in cash flow, increasing the shareholders’ return requirements and consequently total cost. The senior executive at a company in the finance industry mentioned that the solution that HSBC found was a *“funky structure which had not been delivered before”* that tapped into the pockets of market liquidity across a wider range of the maturity spectrum. The capital structure included both project bonds and bank debt with the same seniority but different maturities. This arrangement thus enabled bank financiers, who required shorter maturities, to participate in 18-year debt, and bond investors, with extended maturity preferences, to participate in a project bond with a 29-year tenor. The usage of project bonds for the entirety of the PPP project was described by EPEC (2012) as uncommon in Europe at the time, making Merseylink a pioneer in the area.

The bond was announced to be covered by HM Treasury’s credit guarantee scheme, administered by Infrastructure UK. This was big news as this was the first greenfield project in the UK that was eligible for such a guarantee (The Banker, 2015). Under this scheme, the UK government guaranteed the bond payments, effectively shifting project risks, including the

construction risk which the debt market was unwilling to assume, to the government (HSBC, 2015; Building, 2014). As explained by the senior executive at a company in the finance industry, *“the Treasury was now effectively the controlling creditor of the bonds, and therefore HM Treasury had to get itself comfortable with the construction risk”*. Hence, HSBC worked closely together with HM Treasury to ensure that the guarantee was correctly structured. After all considerations, the final financing structure was that the 18-year bank debt was to be fully amortized before any amortization of the 29-year tenor bond kicked in. As the senior executive at a company in the finance industry explains it, *“this meant that the bonds were structurally [but not contractually] subordinated to the bank debt – there was more risk in the bonds as they are in the back-end versus the banking market that was in the front-end”*. For example, the banks were incentivized to encourage deferred maintenance expenditures while the HM’s Treasury, as guarantor of the bonds, was strictly against any such actions, thus, the structure still ensured an overall long-term perspective. Banks participating in the issuance of the GBP 257.16 million Treasury-wrapped senior bonds were HSBC and joint bookrunners Crédit Agricole, Lloyds, and SMBC (IJ Global, 2014).

Investors were quick to purchase the Aa1 rated (by Moody’s) 29-year project bonds as they were issued in late March 2014, leading to oversubscribed books dominated by pension funds and insurers. The bonds, listed on the Irish Stock Exchange, were priced only 42 bps over the 25-year UK government bonds, compared to other kinds of previously government guaranteed bonds where the lowest priced traded 185 bps above the corresponding governmental bond (IJ Global, 2014). Crédit Agricole, Lloyd, KfW, and SMBC also provided a GBP 141 million, 18-year amortizing, facility while Korea Finance Corporation financed a GBP 102.5 million bridge loan for the construction period. The Halton Borough Council is to repay this bridge loan after the construction. Lastly, Macquarie provided GBP 49 million of mezzanine debt with a 29-year tenor, and the equity sponsors together provided GBP 52 million to the SPV (IJ Global, 2014). This meant that the consortium was able to attract financing slightly above GBP 600 million, equaling the estimated construction cost of the project. See Figure B.5 for an overview of the project’s sources of financing. Consequently, work on the Mersey Gateway could start in May 2014.

4.1.5. Outcome

The building of Mersey Gateway was started in May 2014 and in its construction, 25 000 individuals from more than nine different countries were involved, requiring around five million man-hours. The bridge and surrounding infrastructure opened to traffic just after midnight on the 14th of October 2017, on time and budget (Currie and Brown, 2017).

“[The Mersey Gateway project was] massively successful as we achieved construction on time, and we had no overruns – we estimated a three-and-a-half-year build phase, and we achieved a three-and-a-half-year build phase. [...] We achieved] the right balance of public sector involvement, finance, and private sector initiatives. The risk has been nicely spread between all parties.”

– David Lyon, Mersey Gateway Crossings Board

The estimated long-term traffic volume over the crossing was 65 000 vehicles per day (ITS International, 2017). During the first half-year, the total traffic amounted to 10.3 million which corresponds to about 61 000 vehicles per day (The Mersey Gateway Project, 2018). However, already 6 months after the opening, the estimated volumes were reached, and since then, the volume trend has been steadily increasing. In the latest statistics report, the crossing broke all previous records as 6.51 million journeys were made over the third quarter 2023, corresponding to almost 71 000 crossings per day (The Mersey Gateway Project, 2023). See Figure B.6 for an overview of the journeys over the Mersey Gateway Bridge and the Silver Jubilee Bridge.

In summary, the Mersey Gateway Project can be seen as a success. The construction phase was completed on time and budget, there have been no major setbacks, and the traffic volumes, and hence revenues, are above estimations, although with an unsurprising deviation during COVID. An interviewee working as a senior executive at a company in the finance industry said that *“from a pure financing perspective, the Mersey Gateway is viewed as a success [...] but it was also constructed on time and is working well, so I believe that the project as a whole can be viewed as a significant achievement”*.

4.2. The Western Strasbourg Bypass Project

In this section, the Western Strasbourg Bypass project will be explored. France has a long history of user-paid concession contracts, where the rationale is that the user of the asset should be the one to pay for it. The Western Strasbourg Bypass project, run by the SPV Arcos, is one such project and was initiated to limit congestion in Strasbourg. The project is loan-financed, where part of the financing works as a buffer to make up for demand risk being on the private side and assure senior debt providers. The project was delayed due to external factors but has since inauguration in 2021 operated satisfactorily.

Table 4.3: Summary of the Western Strasbourg Bypass Project

Contract size	Contract length	PPP type	Demand risk	Financing	Equity share	Debt source	Fin. close	Completion
n.a.	54 years	User-paid	Private party	~EUR 600 m	~40%	Loan	2018	2021

4.2.1. History of PPPs in France

While concession contracts resembling the PPP structure have existed in France since the 17th century, the first modern legal framework for PPPs was introduced in 2004 (Bergere, 2016). In the following years, PPPs expanded greatly in many sectors, ranging from transport and energy

to education and culture. The legal framework was revised in 2018 and implemented in 2019 as the PPP Code (Job and Marshall, 2023). Today, the two most common forms of PPP contracts in France are concession agreements and partnership contracts, and the legal frameworks differ between the two forms. Concession agreements are primarily used in major infrastructure projects such as motorways and toll bridges and are user-paid. Consequently, concession agreements include operating and market risk for the concessionaire, even if the public party occasionally provides subsidies. Partnership contracts are government-paid and can be compared to the UK's Private Finance Initiative contracts. Public authorities such as the state, local authorities and public institutions are clearly central, but also players such as the Fin Infra, part of the French Treasury, play a role in the French PPP landscape (Job and Marshall, 2023). Fin Infra was set up in 2016 to advise public parties on financial and legal aspects in implementing PPPs (Fin Infra, 2020; L. Hilzenkopp and N. Vital, Interview, October 27, 2023). See Figure C.1 for an overview of PPP transportation projects in France between 1995-2021.

4.2.2. Background of the Western Strasbourg Bypass Project

The Western Strasbourg Bypass, Road A355, is a 24-kilometer dual two-lane road in eastern France that runs around Strasbourg. It stretches from Innenheim, south of Strasbourg, to Vendenheim, north of Strasbourg. Please refer to Figure C.2 for a map of the location of the road. The project was initially announced in 2006 to alleviate traffic congestion in central Strasbourg and reroute heavy traffic to outside of the city. However, it was delayed due to a deprioritization of road projects in the French transportation project pipeline (Refinitiv Infrastructure 360, 2020a). In October 2010, a tender was launched by the Ministry of Ecology, Energy, Sustainable Development and Sea (henceforth the Ministry of Ecology) and following a bidding process, Vinci was announced preferred bidder in January 2012 (Refinitiv Infrastructure 360, 2020a). However, the project would prove to be further delayed due to a lack of financing interest and various externalities.

One significant challenge with the Western Strasbourg Bypass was the riskiness of the project. Banks were skeptical toward the project due to it being a user-paid, greenfield asset with uncertainties related to traffic volumes (Refinitiv Infrastructure 360, 2020a). Vinci had explored options for financing the project but was not able to finalize a financing package before the project came to a halt in early June 2012. Construction news site Batiactu (2012) reported that the Strasbourg City Council had announced that Vinci was abandoning the project as they failed to close the financing round and that the state therefore decided not to extend their preferred bidder status. Vinci (2012), on the other hand, claimed that several banks had confirmed their participation in the project's financing, and that if their preferred bidder status would have been

extended, they would have been able to finalize the financing arrangements. The Ministry of Ecology (2012) issued a statement following this, explaining that they had already postponed the deadline twice without any progress from Vinci. According to Refinitiv Infrastructure 360 (2020a), there were political motives behind the decision to not extend the deadline. The French election had recently taken place and the new government included politicians who had opposed the project. Consequently, this could well have been the end of the long-awaited project.

4.2.3. *Bidding for the Western Strasbourg Bypass*

It was not until 2014 that the government under the then Minister for Transportation, Frédéric Cuvillier, announced that it would once again launch a tender for the project and hoped to sign a concession contract in 2015 with commissioning during 2020 (Ministry of Ecology, 2014). A government inquiry had in 2013 analyzed the previous failure of the project and reconfirmed the need for the Western Strasbourg Bypass. The inquiry did however recommend adjustments to the project. One adjustment would be to develop a two-by-two lane road instead of the initial three-by-three lane road, meaning that less land would be expropriated. Increased care for the environment, such as protection of the endangered Great Hamster of Alsace, would also be taken into consideration. The new project proposition had also gained the support of the local authorities (Ministry of Ecology, 2014). Four bidders were reported in March 2015 to be working on the financing agreements of the Western Strasbourg Bypass for which the bids were to be submitted in the end of June. The new contract draft presented by the government estimated the total cost of the project to be around EUR 500 million, which was significantly less than the former EUR 1 billion plan (Refinitiv Infrastructure 360, 2020a).

In early February 2016, Vinci announced that their special purpose vehicle (SPV), Arcos, had signed a 54-year concession contract with the Ministry of Ecology to design, finance, build, operate and maintain the Western Strasbourg Bypass (Vinci, 2016). See Figure C.3 for an overview of the project organization. Having joined Vinci in 2016, Jacques Walckenaer held the position as Chief Financial Officer of Arcos at the time of the case.

“The duration of the concession is determined by the state before launching the tender, on the basis of its preliminary calculation of the estimated investment and toll revenue from the envisioned traffic as well as by a level of return [appropriate for the concessionaire]. In the case at hand, the state came up with a duration of 54 years. Then they launched the tender and asked for bids, committed on toll tariffs, construction price, and design.”

– Jacques Walckenaer, Chief Financial Officer at Arcos

The bid from Vinci was EUR 560 million in capital expenditures during the construction phase while the total estimated financing required was just above EUR 600 million. The state required

the financing for the construction phase to be fully committed from the start. However, no external financing was available at that point and so Vinci provided Arcos with a EUR 370 million long-term facility, in addition to its equity commitment. The loan was not to be used before the actual start of the construction work, instead equity was tapped during the design and permit phase. In the end, the loan was not used at all as it was refinanced when the project successfully reached financial close (J. Walckenaer, Interview, November 2, 2023). The total expected income over the contract period was not disclosed. After contract signing, preparatory work on the project could begin.

4.2.4. Financing the Western Strasbourg Bypass

It was soon evident, however, that the turns in the project had not yet ended and that further challenges would arise, potentially affecting the project and its financial close. Environmentalist organization Alsace Nature tried to repeal the concession in the Strasbourg Court but failed in March 2017 (Rue89 Strasbourg, 2017). During the year, protests and demonstrations faced the project due to its environmental impact. Opposition culminated in September 2017 when protesters prevented Vinci construction workers from felling trees as part of preparatory work, stating that Vinci did not have the proper authorization to conduct the work (DNA, 2017). In October, the Ministry of Ecology (2017) issued a statement saying that they suspended work on the project until further environmental measures had been taken. The Ministry referred to a report by the National Council for the Protection of Nature (CNPEN) from July 2017 that had criticized Vinci's environmental plan for the project, especially related to biodiversity. CNPEN required details about biodiversity protection and a plan to compensate for the project's impact on local ecosystems and protected species. The Ministry stated that they would work together with Vinci on improving the environmental guarantees, and that a new plan would be presented to the CNPEN before proceeding. According to the Ministry, this would not delay the completion date of the project, but rather ensure better quality in the end (Ministry of Ecology, 2017). In late January 2018, the French government gave Vinci green light to resume construction of the Western Strasbourg Bypass. Vinci had prior to that worked to incorporate the additional requirements as demanded by the CNPEN. The new requirements encompassed further measures for ensuring biodiversity protection in wetland and agricultural areas (Ministry of Ecology, 2018). A monitoring committee was also installed to ensure Vinci's compliance with the sustainability commitments.

With the project up and running again, the next challenge for Vinci was refinancing the project and reaching financial close in the deal. As previously mentioned, Arcos is the SPV in the project and holds the concession contract with the government and previously took a term loan

provided by Vinci. At this stage, Arcos and Vinci sought a new deal to refinance the term loan, eliminating the corporate structure and implementing a project financing structure. The project was already labeled as difficult given its historical challenges, so getting external financing in place was not easy. Lenders were especially concerned about the traffic volumes, which had been projected lower than Vinci by a competing bidder in the 2012 bidding process (Refinitiv Infrastructure 360, 2020a). There was also a risk that heavy goods vehicles would take other routes through Germany instead of going through Strasbourg.

To get commercial banks interested in the project, getting the EIB on board was decisive. The EIB gave a preliminary agreement to finance the project in October 2015 (EIB, 2018). However, an ongoing legal dispute between the French State and the European Union over the protection of the endangered Great Hamster of Alsace, where France had not lived up to stipulated rules, prevented the EIB from confirming its commitment to finance the project. The Western Strasbourg Bypass project would be built in the area where the hamster was living. Thus, before the EIB could approve financing of the project, the French state had to prove to the European Commission that proper protection and mitigation measures were implemented, a process which took almost two years (J. Walckenaer, Interview, November 2, 2023). Ultimately, the EIB decided to finance the project. In late April 2018, Vinci (2018) announced that they had reached a financing deal with the EIB and a syndicate of banks. They provided Arcos with EUR 359 million soft mini-perm loans, amortizable over 27 years until 2043. A soft mini-perm loan is a type of financing which becomes subject to harsher financial terms if not refinanced by the maturity date (Thomson Reuters, 2023). The debt portion represented 60% of the total financing (J. Walckenaer, Interview, November 2, 2023). Please refer to Figure C.4 for an overview of the sources of financing.

“For concessions, this is a common debt-to-equity ratio. For government-paid PPPs, the gearing would be more aggressive; you could come down to 90% debt financing, sometimes more. But with motorway concessions with traffic risk, 60-to-40 is more common. It is a way to reduce the risk.”

– Jacques Walckenaer, Chief Financial Officer at Arcos

Vinci (2018) reported that EUR 186 million was provided via a banking syndicate comprised of Auxifip SA (a subsidiary of Crédit Agricole), Banka IMI S.p.A, CaixaBank SA, Crédit Agricole C&I Bank, ČSOB, and KBC Bank NV. The EIB provided loans totaling EUR 173 million, whereof EUR 117 million is a senior loan, and EUR 56 million is structured as a senior debt credit enhancement (SDCE) facility. This facility had the structure of a senior bridge loan maturing at the end of the construction phase, whereafter it would be refinanced and structured

as a junior mezzanine buffer to make up for traffic risk (Refinitiv Infrastructure 360, 2020a). Credit enhancements from the EIB are guarantee mechanisms that in various ways support projects and thus improve the credit quality of senior debt. Additionally, them being provided by the EIB has a positive signaling effect and attracts additional private financing (EIB, 2023). In this case, the investment by the EIB was part of the European Fund for Strategic Investments, aimed at addressing the investment gap in European infrastructure (Vinci, 2018). The mezzanine buffer provided by the EIB would be paid back *pari-passu* the senior debt if the project performed as expected. However, if revenues for the first years of operations would not be sufficient, the buffer would not have to be serviced, i.e., interests could be capitalized and repayments could be postponed, which provides more financial flexibility.

“So far, this flexibility in repayment has not been triggered. Considering the revenues generated over the first 2 years of operations, it is likely that it will not be the case in the future. But the mezzanine buffer enabled the other lenders to be more comfortable with the project risk profile at financial close.”

– Jacques Walckenaer, Chief Financial Officer at Arcos

Thus, if the project would turn out to underperform in terms of turnover and returns, it would follow a minimum repayment profile. However, if the project performs just as expected or better, a cash sweep would follow where a fraction of the free cash flows every six months would be dedicated to early repayment of the loans. In effect, this creates a much shorter tenor for the loans if the project performs as expected. There are also step-up margins involved with this mechanism, which means that Arcos is incentivized to refinance the loans before their contractual term (J. Walckenaer, Interview, November 2, 2023).

With the EIB providing roughly half of the debt, the exposure of the commercial banks is around 31% of the total financing. Jacques Walckenaer explained that the EIB usually stays in projects longer than commercial banks, so they may stay as a financier following the refinancing in the coming years, while the other banks are likely to be satisfied when refinanced and get out. Moreover, in a project like this, reputational risk is a key consideration for stakeholders, such as Vinci and financiers like the EIB, Walckenaer explained. In 2016, the EIB received a complaint from Alsace Nature that was hoping to get the EIB’s decision to finance the Western Strasbourg Bypass re-examined (EIB, 2020). The financing was not repealed but EIB was ordered to publish additional environmental documentation related to the project.

4.2.5. Outcome

After three years of land acquisition, design, permitting, preparatory works and getting the financing in place, the construction phase of the Western Strasbourg Bypass was initiated in

October 2018. An additional three years after that, and after a pandemic that temporarily halted construction for six weeks, the Western Strasbourg Bypass was inaugurated in December 2021 by France's Prime Minister Jean Castex, executives from Vinci, and locally elected officials (Vinci, 2021b). However, the inauguration was not attended and celebrated by all. Despite the additional environmental measures taken at the end of 2017, the project was heavily criticized by environmental groups. The mayor of Strasbourg, environmentalist Jeanne Barseghian, boycotted the ceremony and called it unnecessary and expensive (France Bleu, 2021).

Vinci announced that the total project cost amounted to EUR 561 million, that the project would enable annual time savings of 10 million hours, and that 6 000 people and 300 companies had been involved (Vinci, 2021b). In December 2021, Vinci entered the operation and maintenance phase of the project. They would now be tasked with ensuring that the road is well-functioning for the remainder of the concession period, in exchange for collecting tolls from road users. As the Western Strasbourg Bypass is a user-paid concession, this means that the repayment to debt and equity holders is solely coming from the road users. The toll levels are specified in the concession contract together with a stipulated indexation mechanism which is linked to the CPI and O&M costs to a limited extent. Jacques Walckenaer explained that it follows the usual pattern in France. The only way that Vinci can alter the toll fees is by setting them lower than the cap, which may be done occasionally to drive user demand.

An objective ex-post assessment of the Western Strasbourg Bypass project is due to be released. The assessment will review the overall performance after one year and five years of operation and evaluate if the project achieves what was expected. However, two ways of already determining the success of the project are to compare the actual cost and timing of the project with the estimates. The bid for the project was EUR 560 million in 2016. Compared to the EUR 561 million cost reported by Vinci at project completion, this is a 0.18% cost overrun. As a comparison, Flyvbjerg et al. (2003) found that the average cost overrun in large road infrastructure projects was 20%. Furthermore, the timeline set out in the concession contract with the French government stipulated that the project was to be finished no later than 56 months after the concession contract was signed (Ministry of Ecology, 2016). This means the project should have been finished by September 2020. However, due to delays caused by protests, legal cases, and the Covid pandemic, the commissioning date was extended to the end of 2021, hence there was a one-year delay. Based on these factors, the project can be deemed a partial success, with delivery slightly above the bid and delays due to several externalities.

Furthermore, one objective of the project was to reduce traffic and air pollution in the city of Strasbourg. The former main road, the A35, ran through the city and approximately 160 000 vehicles per day were using the busiest part of the road in 2013, of which around 10% were heavy goods vehicles (HGV) (DNA, 2013). After commissioning of the A355, traffic levels on the A35, subsequently renamed M35, had decreased. Measures had been taken to limit traffic on the old road, such as prohibiting the usage of HGVs, reducing speed limits, and establishing reserved lanes for carpooling and public transportation (ADEUS, 2023). Consequently, eighteen months after opening, the Western Strasbourg Bypass, DNA (2023) reported that pollutants originating from traffic had dropped in the Strasbourg metropolitan area. Lastly, the project set new standards for ecological considerations in road projects in France. Of the EUR 561 million investment, EUR 130 million was earmarked towards environmental measures. For instance, 130 wildlife passages were installed together with a vast program of compensation measures covering more than 1 300 hectares, along with long-term commitments by the SPV (Vinci, 2021a).

Jacques Walckenaer explains that for a highway project like the Western Strasbourg Bypass, where there is a free motorway nearby, a ramp-up period is to be expected before reaching the expected long-term traffic levels. However, traffic levels have been satisfactory. Having left the role of CFO at Arcos after the commissioning of the road, Jacques Walckenaer reflects back on the years involved in the project.

“I see that most opposition kind of vanished, because after two years of operation, the project has proven useful to the population of Strasbourg and to the travelers in transit who do not need to be stuck in traffic jams for hours but can just bypass the city.”

– Jacques Walckenaer, Chief Financial Officer at Arcos

4.3. The Sotra Connection Project

In this section, the Sotra Connection project will be explored. Since the early 2000s, Norway has procured six PPP road projects, with the Sotra Connection project being the most recent. The project was initiated to limit travel times between Bergen and Sotra and is delivered as a PPP to attract international expertise for building suspension bridges. The SPV, Sotra Link, is loan-financed by international banks. The project is currently proceeding according to plan but has faced cultural challenges and problems related to unbalanced incentives.

Table 4.4: Summary of the Sotra Connection Project

Contract size	Contract length	PPP type	Demand risk	Financing	Equity share	Debt source	Fin. close	Completion
NOK 23.1 bn	20 years	Availability-based	Public party	~NOK 8.1 bn	~8%	Loan	2022	2027 (est.)

4.3.1. History of PPPs in Norway

Norway has had a history of procuring infrastructure projects as PPPs since the early 2000s, especially in core infrastructure and more specifically road projects. The emergence of PPPs in the Norwegian transportation sector stems from a Parliament decree from 1998 ordering an inquiry into increased private participation in road infrastructure procurement, stating that the government should propose projects that could be delivered by the private sector (St.meld. nr. 46 (1999-2000), p. 180). Following the 1998 decision, the Ministry of Transport delivered the National Transportation Plan 2002-2011 in September 2000 to the Parliament. The document reads that *“The government will try out public-private partnerships (PPPs) as a new form for organizing the development of transport infrastructure. In the first instance this will apply to the road sector. The main purpose is to evaluate if such a model can provide efficiency gains while still ensuring that the public sector retains control and has the possibility to make politically based decisions”* (St.Meld. Nr. 46, 2000, p. 6). Following the Transportation Plan and the new framework for PPPs, the Norwegian government decided on and oversaw the implementation of three PPP projects under the first scheme. In an evaluation of the implemented projects, Transportøkonomisk Institutt (2007) found that faster project delivery and a favorable risk allocation between the public and private parties were the biggest gains from using PPPs. Other benefits observed were innovative solutions when it came to organization, financing models, and contract strategy. However, no cost savings could be concluded from the evaluation. See Figure D.1 for an overview of PPP transportation projects in Norway between 1995-2023.

4.3.2. Background of the Sotra Connection Project

In a 2015 reform package for the road sector, the Norwegian government presented an updated PPP framework and a desire to cultivate PPPs as an implementation strategy. Part of the proposed reforms were to further incentivize the private party to a speedy project delivery. It was decided that the state should pay back a larger part of the investment cost soon after the project had been delivered, but still ensure that the private party had incentives to focus on quality throughout the project’s lifecycle. Moreover, the government declared that only the projects that can provide additional benefits from being procured as PPPs should be delivered using the model (Meld.St. 25, 2015, pp. 22-26). Following the updated framework, the government presented a new National Transportation Plan in 2017 where they listed three new road projects to be delivered as PPPs: Hedmarksvegen, Hålogalandsvegen, and Sotrasambandet (henceforth called the Sotra Connection project). Since then, the Hedmarksvegen project has been constructed and Statens Vegvesen (2020) has proclaimed the project to have been completed earlier than planned and at 20% lower cost than the estimates.

In the Norwegian PPP setting for road projects, Statens Vegvesen (Norwegian Public Roads Administration, NPRA) is the public party that contracts with a private party and permits them to design, build, finance, operate and maintain a road project for 20-25 years (Statens Vegvesen, 2020). In 2018, preparation studies for the Sotra Connection project were initiated by the NPRA. The Sotra Connection project is the largest fixed-price road infrastructure contract in Norway and consists of a 9.4 kilometer four-lane road to be built in the Bergen region in Western Norway. Please refer to Figure D.2 for an overview of the location of the project. The project includes the construction of 4.6 kilometers of tunnels and a four-lane suspension bridge of 900 meters, alleviating the old two-lane Sotra Bridge which is heavily trafficked and currently the only land connection between the municipalities Øygarden and Bergen (Statens Vegvesen, 2023).

4.3.3. *Bidding for the Sotra Connection*

During 2020, Statens Vegvesen launched the bidding process for the Sotra Connection and pre-qualified three consortia that submitted their initial bids at the end of the year. The three consortia were *Sotra Link*, consisting of FCC Construcción, Webuild, SK Ecoplant, and Macquarie; *ITIAS*, consisting of Itinera, IHI Corporation, and ASTM; *Via Sotra*, consisting of Vinci Concessions, Vinci Highways, Acciona Concesiones, and Implenia Switzerland (NTB, 2020). Concerns were voiced that no domestic firms were represented among the bidders.

“One of the reasons for why people were against this PPP in Norway was that the contract is so big that Norwegian companies were not able to make an offer. There has been a lot of talk about that, that it is Spanish, Italian, and South Korean companies building this project instead of Norwegian companies. But first of all, there have not been any Norwegian companies building suspension bridges for the last 20 years or something, so we need to have companies with the technical competence come from somewhere else. South Korea and China are two countries that are far ahead in this field. Then again, at the moment, 80% of the companies working on this project are local Norwegian companies, so it is still not what people thought that it would be at first.”

– Lene Sælen Rivenes, Project Leader at Statens Vegvesen

After the initial bids were placed, Statens Vegvesen continued talks with the three consortia to adjust and revise their proposals. By the time of the final bid submission deadline in August 2021, the *Via Sotra* consortium had pulled out from the bidding process, making *ITIAS* and *Sotra Link* the final bidders. In early September 2021, Statens Vegvesen announced that it had awarded the PPP contract to the *Sotra Link* SPV, citing that they had the best price-quality ratio (Statens Vegvesen, 2021). It was the largest single contract awarded in Norway and one of the largest PPP contracts in Europe in 2021, with a value of NOK 19.8 billion, which was later adjusted upwards to NOK 23.1 billion due to rising costs in 2021 (Statens Vegvesen, 2021). At

the time, the Sotra Link SPV consisted of Macquarie with a 70% ownership stake, SK Ecoplant with a 20% stake and Webuild with a 10% stake. FCC initially intended to join the SPV but decided not to, and instead only joined the Construction Joint Venture (CJV). Sotra Link's O&M contractor, Intertoll, had also expressed a desire to own shares in the SPV, but was denied for reasons unknown to the respondents. See Figure D.3 for an overview of the project setup.

“FCC decided to step down from the SPV pretty early in the tender phase. I think that it is difficult to say why, but it could be due to relationship and political issues. The people behind FCC have a relationship with Macquarie, which is sometimes good, sometimes not. They do business on many different deals and on this one, they got a bit upset with each other and FCC decided to step down.”

– Philip Vreeken, Chief Operating Officer at Sotra Link

4.3.4. Financing the Sotra Connection Project

Once the contract was signed, the Sotra Link consortium had to work towards reaching financial close for the project, which was achieved in March 2022. IJ Global (2022) reported that the project had raised USD 910 million in financing from eight lenders across three tranches. Using the exchange rate as of 16 March 2022, the financing is equivalent to circa NOK 8.11 billion, of which debt accounted for NOK 7.46 billion, and equity NOK 0.65 billion (Norges Bank, n.d.; IJ Global, 2022). See Figure D.4 for an overview of the sources of financing for the project at financial close. The eight banks participating in the syndicate were Banco Santander, Bank of China, CaixaBank, Credit Agricole, DZ Bank, KfW IPEX-Bank, Korea Development Bank, and Export-Import Bank of Korea. The financing deal also included Export Credit Agency (ECA) guarantees by Korean Trade Insurance Corporation (guaranteeing 31% of debt) and Export-Import Bank of Korea (13%) (IJ Global, 2022). Macquarie's extensive network and established role as a sponsor to PPP projects contributed to a lucrative financing deal for Sotra Link.

“Having Macquarie onboard increases your chance of success significantly in the initial phase of the project. They want to get lending at a very low rate, and they are good at getting it. Now, money comes from China and South Korea where there is potential to lend at a low rate. Macquarie's main focus is finance, not technical aspects or construction, and they have a great network of people who are specialized in doing tenders. Doing PPP tenders is a difficult sport. In less than a year, you must go from scratch to a full-sized bid – not only technical but also financial – and you need to be the best. Also, the client and other stakeholders ask questions and try to get a cheaper deal, so there are many aspects to address.”

– Philip Vreeken, Chief Operating Officer at Sotra Link

As for the PPP's payment mechanism, the project is funded through milestone and availability payments provided by Statens Vegvesen. This means that traffic risk sits with the public party.

The availability payments to the SPV will be impacted if the contractor cannot manage to keep the road available and at a specific standard set out in the contract (Prop. 41 S., 2018). Philip Vreeken described the penalty structure as harsh for the project compared to how most other roads in Norway are managed. Moreover, the O&M contractor Intertoll will collect the tolls set in the governmental proposition Prop. 41 S. (2018) which will only be changed in accordance with indexation clauses (e.g., for inflation). In Prop. 1 S. (2021), the Norwegian government states that from the opening day of the road and 15 years into the future, the O&M contractor, in this case Intertoll, will operate and maintain the road and consequently receive availability payments. This contract was initially set to last for 25 years, but due to a limited availability of long-term NOK-denominated loans, the contract period was reduced (Prop. 1 S., 2021). After the contracted 15 years of operation and maintenance, there will be a possibility of a ten-year O&M contract extension contingent on performance.

One common rationale for using PPP as a procurement method is if the public party cannot borrow money on their own. However, Norway has an AAA credit rating and can easily finance projects even at this size by themselves, which has raised concerns for why a PPP was chosen for this project.

“Many local politicians still do not approve of this project being a PPP. It is difficult for them to understand why we should [indirectly] pay interest to banks when we could finance the project by ourselves.”

– Lene Sælen Rivenes, Project Leader at Statens Vegvesen

Philip Vreeken at Sotra Link also shed some light on this financing dilemma and explained that the rationale for choosing to deliver this project as a PPP ultimately did not come down to financing.

“Norway is not a poor country; they could easily have financed this in a traditional contract setup. Rather, it is about attracting foreign investors and foreign contractors to Norway. Statens Vegvesen could have divided the project into four phases and gotten international contractors onboard, but the international contractors are mainly looking for the PPP setup as it is safer for them and gives them a long-term chance of making money during the operational phase. By setting up this project as a PPP, Statens Vegvesen can also incentivize contractors to improve quality and make sure they keep the road open and available for users in the long term. [...] I think Statens Vegvesen gets the better end of the deal here. The contract captures the first major refurbishment of the road, which they will not have to pay for. The other advantage is that Statens Vegvesen are learning from international contractors what new, advanced technology can bring. It is important knowledge for them, especially when looking at the projected infrastructure investments in Norway for the coming decades. That is what Statens Vegvesen is buying with this project as a PPP. It is therefore important to zoom out and focus on the bigger picture, not just a single PPP.”

- Philip Vreeken, Chief Operating Officer at Sotra Link

4.3.5. Outcome: Recent Developments

After years of extensive preparatory work, on-site work was initiated in March 2023. Since then, work has continued, and the construction companies have mobilized under the supervision of Statens Vegvesen as the client and Sotra Link as the client's representative. As previously mentioned, design and construction of the project is performed by the CJV consisting of FCC Construcción (35%), Webuild (35%), and SK Ecoplant (30%). Intertoll is responsible for operating tolls and keeping the road clear from snow and similar, which is roughly 50% of the O&M. They are preparing to start operating at the road's opening in 2027. Maintenance and lifecycle management is to be done by Sotra Link, the SPV. Together, Sotra Link and Intertoll will set up an operations and maintenance center that will coordinate O&M aspects when the road is opened. However, the many different stakeholders involved, and their diverging interests have sparked discussions.

“This project is unbalanced, which makes things difficult. The main shareholder of the SPV is interested in the operations phase, which is when they will get their money back. They are not very interested in the construction phase, which is five years. On the other hand, SK Ecoplant and Webuild are mainly here for the construction, so their interest in the long-term operations is very limited, even though they are also invested in the SPV. Then we have FCC, who are really not interested in the long-term operations and maintenance, only the construction phase. They want to optimize as much as possible and not sustain any major claims during the defect liability period of 2-10 years. Put simply, the SPV has a long-term focus, whereas the CJV has a short-term focus. It is important to consider that a PPP setup goes hand in hand with a balanced partnership. It is possible to set it up unbalanced, but you will have different problems arising in different stages of the project, and the mindsets of the partners will differ.”

- Philip Vreeken, Chief Operating Officer at Sotra Link

The project is currently proceeding according to plan, on track for completion in 2027. Before opening the road to traffic there are six project milestones that the contractor should reach. In late September, one of six project milestones were achieved when foundations for the suspension bridge came into place (NRK, 2023). The next milestone is reaching a breakthrough of a tunnel in 2024. The role of Statens Vegvesen at this stage is to make sure that the contractors are working in accordance with the contract, which is inflexible once signed. Consequently, Statens Vegvesen must supervise the project in detail.

“There is significant reputation risk for Statens Vegvesen with this project, which requires us to continuously guide the SPV and contractors on how to reduce the risk, follow up, and move forward. If something goes wrong with the project, it will be Statens Vegvesen's reputation that is on the line.”

– Lene Sælen Rivenes, Project Leader at Statens Vegvesen

External factors have already affected the project. In May 2023, the project site was subject to a labor inspection which resulted in the CJV receiving several remarks that they were not living up to standards, which they have since addressed (Sotra Link, 2023). Lene Sælen Rivenes believes that even though it made a footprint in the media and people were blaming the PPP, the problems were not a consequence of the PPP setup itself, but rather due cultural differences among the stakeholders.

“It is a big project, and they [the CJV] are building up a company very fast, so not everything was in place the way it should have been. It is not uncommon for these things to happen, but the news made it look like it was the first time and politicians linked it to the PPP. [...] We have some language and cultural challenges. In Norway, the project leader is at the same level as the workers, the hierarchy is not that obvious. But for our contractors coming from different parts of the world, it is a bit different.”

– Lene Sælen Rivenes, Project Leader at Statens Vegvesen

Moreover, little more than a year after financial close, news broke in early April 2023 that infrastructure investor John Laing had acquired the 70% majority stake in the Sotra Link SPV from Macquarie (John Laing, 2023). Philip Vreeken believed that Macquarie got what they came for, and that their interest in the long-term exposure of this project is limited.

“For Macquarie, this deal has all in all been very good. Their setup is such that they receive money when they form the consortium, then again when submitting their preliminary bid. When they have the BAFO [best and final offer], they get paid again. At financial close, which is what they are here for, they are probably already in the green. So, when they sell their remaining shares to John Laing, it only adds up to their profits.”

– Philip Vreeken, Chief Operating Officer at Sotra Link

John Laing does not have a long-standing relationship with the builders which Macquarie had, which means that they have less negotiating power and can influence the CJV less than Macquarie could. Furthermore, the other shareholders in the SPV, SK Ecoplant and Webuild, cannot sell their shares during the construction phase, but there is nothing preventing them from doing so as soon as the road is commissioned, especially due to risks during the operations and maintenance phase that may not cater to their risk preferences (P. Vreeken, Interview, October 20, 2023). As previously stated, the project is currently on time, but the complexity of the project that comes with the many tunnels and constructions made respondents express concerns about reaching value for money in line with previous Norwegian PPP projects.

4.4. Using PPPs for Infrastructure Development

Having examined the three cases illustrating how PPPs can be used to deliver European road projects, section 4.4 will detail what role PPPs generally play in building infrastructure. We further present reasons for initiating PPP projects, sectors, and situations where they may be appropriate, and the importance of political open-mindedness and willingness. Regardless of whether infrastructure is financed using public-private partnerships or other methods, all respondents stated that the private sector plays a significant role in financing infrastructure in Europe. It was mentioned how the acceptance for and usage of private capital in infrastructure is growing but that there are geopolitical risks in transferring some components of infrastructure to the private sector. Consequently, there are many situations where neither full privatization nor traditional public procurement is the answer, which calls for alternative ways of delivering infrastructure.

4.4.1. The Role of PPPs

The public and private sector have always interacted, and the questions about who should do what have always existed. Björn Hasselgren, Senior Advisor at Trafikverket, explained how at some points in time, technology has been the deciding factor in whether to use private involvement or traditional public procurement for infrastructure, whereas in other time periods, political views have been the dominant determinant. Out of the many ways to procure infrastructure assets, the public-private partnership is one.

“There is one question that should always be asked in public circles that wish to initiate a new infrastructure project: ‘Which tool am I going to use to deliver this specific piece of infrastructure?’ The automatic assumption is that it is just going to be funded publicly, and the question does not even arise, which is a shame [...] as the best decisions are made by identifying options and selecting the best one. There is a lack of awareness that this [PPP] is an option. It might not be the right option, but at least it should be considered. For me that’s one of the problems in the public sector across Europe – there is still not enough of that question being asked.”

– Edward Farquharson, Principal Adviser for EPEC at EIB

Several respondents expressed a similar view and stated that while PPPs constitute a small portion of public infrastructure delivery overall, they should indeed play a role and be considered for individual projects. For instance, Laure Hilzenkopp, Project Director at Fin Infra, French Treasury, described PPPs as not being relevant in every situation and how it is not reasonable to make every project into a PPP, but that it is a question of how to manage public resources in a context of limited resources. In such a context, procuring a project as a PPP may provide the public authority with flexibility to invest in other projects. Nicolas Vital, also

Project Director at Fin Infra, agreed and described that PPPs can be particularly useful for public authorities when dealing with projects that are large, which then can free up public resources without giving up too much control.

Moreover, a common theme was to describe PPPs as an important tool in infrastructure procurement but stressing that it is not a quick fix. Johanna Dingertz, Project Leader at Luleå Hamn described the importance of finding a business case for the project in order for it to be procured as a PPP, so that it does not end up becoming too expensive or inefficient for the parties involved.

“PPPs are like a hammer, a tool. In the right hands, it can be extremely effective, but in the wrong hands it can be extremely destructive. [...] The PPP should not drive the project, the project should drive the PPP.”

– Edward Farquharson, Principal Adviser for EPEC at EIB

4.4.2. Reasons for Initiating a PPP

When exploring the reasons for initiating a PPP in the three cases and through interviews with stakeholders, we found some reasons to be in line with what was discussed in existing literature, but we also made other findings. The interviewee working as a senior executive at a company in the finance industry stated that the decision to use PPPs should not be driven by balance sheet treatment, that is, initiating PPPs to avoid the financing being recorded on public accounts. As described in section 4.1, this treatment was likely the reason for the overuse of PPPs in the UK and what ultimately led to PPPs’ demise in the country as projects not suitable for PPPs were still procured as such. Interviewees stated that PPPs should rather be used for specific projects where it is reasonable to assume that the procurement form will lead to better value for money, innovation, and risk allocation or if the project is too complex for the public party to procure on its own. This is what we found in the case of the Sotra Connection, where Philip Vreeken, Chief Operating Officer at Sotra Link, described that access to experienced foreign investors and contractors as well as leading technology was a likely driver for the Norwegian state to procure the Sotra Connection as a PPP. An interviewee from the Nordic Investment Bank (NIB) further explained how Sotra Link included firms that had previously demonstrated extensive experience in building suspension bridges and using innovative project design.

Edward Farquharson from EPEC at EIB explained how a public party, for example a municipality, that aims to launch a project but currently lacks the fiscal space to do so can achieve additional economic benefit by procuring an asset through a PPP. This allows them to make the project happen sooner and consequently yield many years of economic benefit, which

would not otherwise have been possible. We found this to have been the case for Luleå Municipality, which recently has decided to use a PPP to increase the capacity of their port.

Current PPPs in Sweden: The Port of Luleå Project

To meet future demand generated by the green industrial expansion that is currently taking place in Northern Sweden, the Port of Luleå (owned by Luleå Municipality) needs to be expanded for approximately SEK ten billion in capital expenditures (the total contract sum is expected to be around SEK 40 billion). Johanna Dingertz at Luleå Hamn explained that this is money that neither Luleå Municipality nor Port of Luleå (a municipal company) has, which made them start looking into how to finance the project. For the municipality and the port company, it has always been important to retain control of the land and remain a general port, which meant that going fully private and selling it was not an option. When looking into the options, they found that a PPP was the way forward, giving the concessionaire responsibility for designing, building, financing, operating and maintaining (DBFOM) the project for 30-40 years. Since the customers to the Port of Luleå are the ones that need the expansion of the port, they will be paying for the project in the end, reducing the burden for local taxpayers. The municipality will finance surrounding projects which are in their normal scope as a local government, such as water and waste. Including a dredging project called Malmporten, the surrounding projects will amount to SEK 3.6 billion, which will be repaid by the concessionaire through a concession fee. Furthermore, Johanna Dingertz explained that initial work on the project started in October 2021, and that the tender process was started in October 2022. Following the current timeline, the project will be awarded in March 2024. One large customer of the port needs some parts of the port operational by the end of 2025, thereby timeliness is an important factor, which also was a driver for procuring the project as a PPP.

4.4.3. Situations Where PPP Projects are Appropriate

Respondents pointed towards PPP contracts being inflexible, which would make PPPs better suited for projects where the scope is clearly defined and where it is possible to ring-fence the asset. Edward Farquharson described how projects where contracted needs and requirements might change over time are ill-suited for using the PPP as a tool. This is in line with what was outlined about the Nya Karolinska Solna (NKS) PPP project in the literature review, and as detailed by respondents such as Björn Hasselgren at Trafikverket who called the NKS a poor example of a PPP due to its lack of competition in the bidding process and subsequent additions and changes to the contract, making it inefficient. To this point, Lene Sælen Rivenes at Statens Vegvesen also described PPP contracts as inflexible once signed, and costly should the public party issue a change order. However, Edward Farquharson explained that this can also be seen as a feature of PPPs, meaning that the public party is incentivized to spend more time in

understanding and preparing a project upfront to avoid future change orders to the extent possible.

Torgeir Haugland at DNB mentioned that PPPs are ill-suited for projects with new, emerging, technology. The reason for this is that these projects are inherently riskier and harder for financiers to assess, especially due to the long-term perspective of PPP. This causes a higher cost of financing, a higher percentage of equity being assumed, and a decreased interest from financiers. As PPP contracts are highly inflexible, the consequences of new technology not working as intended could also have significant implications. Thus, PPPs are better suited for mature, straightforward infrastructure assets that can more easily attract long-term capital.

When it comes to the project size and its suitability for PPP, all respondents agreed on PPPs being most suitable for large projects. However, projects should not be too large either as it can get difficult to assess the long-term demand and socio-economic benefits, as mentioned by Nils Paul, Policy Expert at Svenskt Näringsliv. An interviewee at NIB explained that if Nordic projects are very large, e.g., over EUR one billion, it could mean that there is a smaller selection of Nordic firms with a capacity to bid on such projects, which may create an illiquid market if not specifically attractive for international players. The interviewee added that this may also lead to an increased risk in the case of larger issues as there is a limited pool of Nordic contractors able to replace the first contractor.

Torgeir Haugland at DNB explained that it is important to think twice before going forward with projects where the project size is too small as there may be a very limited interest from banks. Also, since PPPs entail a high level of e.g., contractual and financial technicalities, it makes the process too costly for smaller projects. This is unless some smaller projects are bundled together under a common scheme (for instance, several smaller public service assets of the same nature, such as schools), which Jacques Walckenaer at Vinci Concessions described.

“[When using PPPs] It needs to be the right object, the right size, the right design, and have a true spirit of cooperation between the public and the private partners.”

– Jacques Walckenaer, Project Director at Vinci Concessions

Sectors Where PPPs Should be Specifically Considered

Laure Hilzenkopp at Fin Infra noted that all sectors can benefit from using PPPs and that the benefits are rather dependent on the project itself. However, one sector where the underlying economics is particularly commercially viable is the transportation sector, since it is possible to finance roads and collect revenue from tolls, which we also saw in our cases. On the same topic, Edward Farquharson from EPEC at EIB mentioned that sectors where there are straightforward assets and a stable nature of public demand over its economic life are good for considering as

PPPs, for example the transportation sector, specifically roads. Social infrastructure with projects such as schools, universities, hospitals, university accommodation, affordable housing, government buildings, courts, prisons, fire stations, and street lighting could also benefit from being procured as PPPs.

Christian Andre Dahl, Senior Credit Analyst at KLP and Mats Berg, Head of Business Relations at Bodens Kommun, described the situation with aged water and sewage systems in the Nordics. While the former mentioned that PPPs could be considered for those projects, the latter lifted the security risks with letting a private party into the local water and sewage systems, even if only as an operator for a limited period and the public party remaining as asset owner. Moreover, the energy sector was frequently mentioned as a sector that could benefit from PPPs. While respondents mentioned that renewable energy projects such as wind and solar are mainly driven by pure-play private financing and private sector risk-taking, they also mentioned the challenges with the energy transition and the importance of considering what PPP as a tool can bring to energy projects. However, for the energy sector, respondents recognized public and private cooperation to be crucial in general, which brings us to the next topic.

4.4.4. Political Willingness

Political willingness was frequently mentioned by respondents as crucial for involving private financing in public infrastructure. No matter the advantages or efficiency benefits potentially arising from using public-private partnerships, they will only be done if political willingness exists, as evidenced by all of our three main cases and the Port of Luleå. Edward Farquharson discussed how inevitably there is politics surrounding PPPs, but that in an ideal world, the approach to using it or not should be primarily technically driven. He and several other respondents described how they found the general communication about PPPs to revolve around misconceptions about PPPs being synonymous to privatizations and thus containing a strong political hue. However, PPPs are, as respondents stated, not privatizing anything. The asset belongs to the government, and it is simply the private sector that builds, finances, operates and maintains the asset over the contract lifespan, whereafter the asset is handed back to the government. The negative reporting surrounding PPP projects in many countries, including Sweden, was also described by Johanna Dingertz at Luleå Hamn. In their case, this led them to not mention the word PPP specifically to decision makers, but rather telling them about the situation in the port and current best practice of operating ports in Europe.

Political willingness, together with historical and cultural aspects, was described by Laure Hilzenkopp at Fin Infra as being part of the explanation to why attitudes towards PPPs vastly differ between countries. Regarding the political willingness in Sweden, respondents described

the long tradition of having a big state being responsible for public infrastructure procurement as a reason to why the public is not comfortable with involving a private party in delivering projects. Nor has the perception of the state's responsibility changed with shifts in government. This, together with arguments that the government is financing projects cheaper by themselves, causes PPPs to be disregarded. Torgeir Haugland at DNB pointed out that in doing so, one misses important considerations such as the effect of healthy risk distribution. For instance, by transferring budget risk to the private party, they are more likely to meet the budget than if the public client would bear the risk. He further mentioned that political unwillingness might stem from a lack of knowledge. If public officials knowledgeable about PPP projects were to express a belief in such projects and advise decision makers to engage in them, PPPs would likely be considered to a greater extent, Haugland said.

Nils Paul stated that politicians focus too much on the current public opinion and thereby lose the long-term perspective. Liisa Raasakka, Head of the EIB Group Office for Sweden at EIB, seconded this view and stated that politicians' limited terms in power may be an explaining factor for the unwillingness to consider entering long-term PPP contracts. Lastly, a couple of respondents highlighted that Sweden's political unwillingness is also evident in its unique status as the only EU country not being a member of the EPEC. The advisory unit within the EIB, EPEC, exists to support the public sector in PPP delivery by sharing best practice, assisting in policy development, and supporting in preparing projects (EPEC, n.d.-b).

This section has detailed how PPPs are one of many tools to deliver infrastructure projects and how the decision to use a PPP should be driven by the specific project. PPPs can bring added value in certain mature, straightforward projects where there is a long-term user demand, such as projects in the transportation sector. However, the usage of PPPs is contingent on political willingness, which varies across Europe. While competencies to deliver projects using PPPs are existent, PPPs have become a controversial issue in countries such as Sweden, which has led to it being dismissed and not considered as a tool for project delivery among others.

4.5. Procuring and Delivering PPP Projects

As our research explores how European countries can use public-private partnerships to bridge their infrastructure investment gaps, section 4.5 aims to further develop an understanding of what exactly PPPs can contribute with and examine arguments against PPPs. Thus, we investigate areas related to PPP's financing, value for money, project delivery, inter-project relationships, risks, and evaluation.

4.5.1. Financing

The interviewee working as a senior executive at a company in the finance industry explained how the PPP setup narrows the range of possible outcomes compared to other project forms, making it easier to conduct financials projections and thus enabling access to long-term financing for PPP deals. This ability to relatively well consider the different scenarios, risks, and outcomes for PPPs also allows for higher leverage. Hence, the WACC for the project, not necessarily the cost of debt, is typically lower than it would be for a corporate entity as the cost of debt is cheaper than the cost of equity. Consequently, equity contributions for availability-based projects are usually below 10%, and as low as 7.5% in financially stronger countries, Torgeir Haugland at DNB stated. In financially strong countries, PPPs have managed to attract bond financing with only a slight difference in cost compared to public bonds, sometimes with a pickup of less than 50 basis points, as described in the Mersey Gateway case. The aspects above do however render PPPs highly inflexible in many ways, which could have disadvantages in some practical areas, but in the case of financing costs is beneficial.

An integral part of PPP projects is their limited recourse financing structure which is crucial for limiting sponsor liability in an SPV as explained by Philip Vreeken, Chief Operating Officer at Sotra Link. If this structure was not applied, sponsors would not be able to take on several projects at the same time as their risk exposure would be too large. Another benefit is that it causes the project itself to be commercially scrutinized at an early stage – if it does not look commercially viable on its own, lenders will not make an investment.

Given the relative stability and long-term perspective of PPPs, good projects are often associated with fierce competition from a financier's perspective as stated by Torgeir Haugland at DNB. Since it takes a lot of resources for a bank to prepare a financing package to use in the competitive bidding process, as for example seen in the Mersey Gateway case, it is highly important that resources are spent on a project that suits the bank well, and that the project is done together with contractors that the bank is comfortable with, that is, that they trust their creditworthiness and ability to perform. Having various institutions sharing risk based on their risk preferences is also an important part of financing PPPs. Sara Fiehn and Lars-Åke Svensk at SEB made the example of institutional investors not being very keen on carrying construction phase risk, but having an appetite for financing long-term operations, while multilateral institutions such as the Nordic Investment Bank, European Investment Bank, and the European Bank for Reconstruction and Development generally have a higher risk mandate and thus can handle construction risk well. Apart from construction risk, these institutions can also take on

risks such as demand risk, which was a key factor for attracting financiers in the Western Strasbourg Bypass case.

4.5.2. Overall Cost and Value for Money

Where the PPP structure commonly meets public and political resistance is in discussing its value for money. Our goal with this section is not to unravel an objective truth regarding this subject, simply because it does not seem to exist. This view is supported by all of our interviewees, including Christian Andre Dahl at KLP, who stated that research regarding PPP's value for money has ambiguous conclusions and that you will always be able to find data and conclusions supporting your personal or organization's view. Reports requested on the area also seem to have a tendency to be biased based on the views of the party ordering the report. Yet, what can be done is to provide valuable insights on the topic from experienced professionals and inform the debate.

The senior executive at a company in the finance industry explained that the value for money concept is not as simple as measuring the actual cost of the project and comparing this to the assumed cost for an alternative structure. Rather, one must also factor in the cost of the risk transferred from the public sector to the private sector. If something breaks down under the PPP framework, there is an obligation for the private sector to solve it and ensure that everything is operational and works as stipulated in the contract. If a project instead is procured under a traditional measure, e.g., design and build, such a protection would not be available, thus, the PPP structure provides value for money in terms of a comprehensive, and largely unquantifiable, insurance. Apart from explaining this difficulty in assessing value for money, the senior executive also provided an example of the Royal Liverpool Hospital, which is regarded as a failed PPP, linked to the collapse of the UK builder Carillon. The UK's National Debt Office conducted a report that estimated how much money the public and private sector lost which clearly showed that the private sector lost far more money than the public, indicating the elevated risk-taking of the private party and consequent protection of the public side. Another occasion where PPP proved their worth, but still received negative publicity, was when parts of the walls of PPP schools in Edinburgh collapsed after the construction phase was finished. While this occurrence in itself was bad, it had little to do with the PPP model as it could have happened under traditional procurement as well. What was a feature of it being a PPP however was the consequent repair which was quickly performed without the public sector being charged a penny. This shows, contrary to public belief, that the private sector in most cases does carry a whole lot more risk than the public sector in a PPP setup and it should not be

surprising that this comes with a price. Thus, this must be factored in when trying to evaluate the success and value for money of PPPs.

“It is a bit like your car insurance [PPPs], when you get to the end of the year and have not had a bang, you think that you have paid all the insurance premiums for nothing! But if you would have had a bang, then you would definitely be grateful for the insurance.”

– Interviewee, senior executive at a company in the finance industry

Edward Farquharson from EPEC at EIB, explained that in a PPP, the aim is to leverage private capital to enhance value for money and manage risk. This is akin to holding private capital “hostage”, with the promise of its return contingent on delivering the services as stipulated in the contract. Not only should this increase the builders’ and sponsors’ incentive to be on time and start generating revenues, but it should also cause them to ensure the asset is well-built, ensuring future high-standard delivery and thus being able to secure future cash flow. This long-term perspective of the builder may both cause them to become more innovative in their construction approach and spend more money within the construction phase to create structures that are more cost-efficient in the long run. For example, as PPPs for long were extremely common in the UK, this led to innovative approaches to increase profits that would not have happened otherwise, such as modularizing some construction designs meaning that you could order components of buildings such as schools like Lego bricks. However, as private capital is more expensive than public capital, the question of the actual benefits derived from this approach is still often raised. Farquharson mentioned that the key is to determine the optimal amount of private capital to engage, an amount to drive performance incentives, but not so much that it becomes cost prohibitive. The remaining financing required after this optimal level is regarded as reached should be sourced from cheaper public capital. This allows for an overall cost-effectiveness as the project also gains from performance incentives from the private capital “hostage”. Liisa Raasakka, Head of the EIB Group Office for Sweden at EIB, added that using less of the cheaper public funds for projects with a business case, as PPPs should have, showcases a good management of public funds as these are better suited for projects that cannot provide any returns at all. All things considered, Farquharson did however make it clear that while there is evidence for a slightly more innovative and long-term approach of the builders, these positives should not be overstated, nor should PPPs be glorified.

The long-term perspective arising from the PPP usage is also reflected in the public sector approach, Edward Farquharson explained. Knowing that they will go into a contract lasting for more than a pair of decades, the public sector is forced to think about life-cycle costs of the assets, and if it is found that those costs would be too high, then the project will be halted. This

is undoubtedly something that should be done no matter how infrastructure is delivered, but incentives to do so are normally limited and focus rather lies on building the asset, not future maintenance. This has caused traditionally procured projects to be built without a healthy life-cycle cost analysis having been performed, thus, some of those assets have been badly maintained as the appropriate costs have not been correctly budgeted for. Hence, as stated by Anna-Karin Ljung at SEK, while PPPs can be bureaucratic, requiring negotiation on everything from large to minute details, they help provide a comprehensive overview of the project and a clear understanding of costs and requirements from an early stage.

Thus, while PPPs do not invariably lead to lower costs and better value for money, they can help all parties to take on a long-term view – building assets not for today, but for the future with better allocated risks and incentives.

4.5.3. Project Delivery, Maintenance and Asset Transfer

In purely theoretical terms, as Björn Hasselgren at Trafikverket explained, if one can arrange market-like forms with reasonably good transparency and competition, a good resource allocation arises in the economy. While it is not impossible to achieve similar efficiency in a regulated public sector environment, research and experience has proven that the public sector systems have limitations when it comes to governance and aligning incentives which makes it more challenging to achieve high levels of efficiency. Given the general superior performance of freer markets, it becomes important to evaluate what makes infrastructure unique in terms of why it should be publicly run.

Hasselgren argued that infrastructure in many cases does not really need to be run publicly at all, but that this is rarely discussed, especially in Sweden. He provided examples such as Arlandabanan, as well as the Øresund Bridge, which is owned by the Swedish and Danish states but operated by a commonly owned private corporation. Both are uncommon projects from a Swedish standpoint in that they are non-publicly operated infrastructure assets, and yet they are highly efficient in terms of them having very low downtime and generating a financial surplus. When it comes to infrastructure operated by Trafikverket, Hasselgren identified issues such as high administrative fees in toll station operations as well as extensive periods of road maintenance affecting traffic flow. These cases of poor efficiency can to some extent be explained by the weak efficiency incentives and less obvious user-perspective in public sector organizations compared to privately run organizations. He stated that transferring some specifically chosen parts of infrastructure operations to the private sector is not a remedy to cost and efficiency problems, but that it could very well increase maintenance and operational efficiency if done correctly. For example, one could create concession contracts, and tolling, of

major roads connecting Sweden's largest cities. Further, Hasselgren mentioned that considering PPPs to begin with, to ensure that the status quo is challenged, is a good first step towards achieving more efficient resource allocation.

As the SPV is only a temporary operator of the underlying asset, the time will come when the asset is to be handed back to the public party and the contract terminated. Edward Farquharson from EPEC at EIB explained that this is an important aspect for the public party to keep in mind and thus, it is reasonable to start preparing for this moment about five to seven years before the termination of the PPP project. The public side must decide on how they will handle the asset from the day of termination and onwards, regarding its maintenance and operations. One important consideration is for example whether a contract with a private operator should be established through a competitive bidding process or if the operations should become part of a public authority or organization.

Another important consideration of the public party, as brought forward by Farquharson, is that as the contract approaches termination, most of the private financing has likely been repaid. Equity holders have received most of their expected dividends and are at this point more interested in keeping the associated costs to a minimum. Hence, at this stage there is an incentive for the private side to cut corners. The public side must therefore keep an eye on the private party and the asset to ensure that it gets properly maintained and stays in good shape, in line with the contract. After all, it will be handed back to the public side in a few years' time and any corners cut will cost money or time for the public party, either in legal processes or for them to manage any issues themselves.

4.5.4. Procurement Process and Public-Private Relation

Competition in providing the best package deal for a PPP project is highly important, and on some occasions, it can be hard to attract competitors for projects. As previously explained, this could be due to the project itself not being attractive or, as explained by Edward Farquharson, the current market situation affecting the private sector's actions or risk appetite. Christian Andre Dahl stated that the public party must be allowed to be selective in their choosing of bidders. There are many aspects requiring a match apart from the costs, among these, cultural fit and the contractors' understanding of the regional climate. If no competition emerges, or no good matches can be made, one should act cautiously. Anna-Karin Ljung at SEK mentioned that this is one of the good mechanisms arising through competitive bidding for PPPs. If a project is too advanced and it is difficult to estimate risks, no one will bid on it, which confirms that the project is not feasible and should be canceled, changed, or broken into smaller pieces.

In the PPP process, one of the largest challenges for the private party is winning the competitive process, said the interviewee working as a senior executive at a company in the finance industry. If a party loses, it is a costly loss as nothing is paid out and nothing is gained on the 12-18 months' worth of work. The interviewee added that working with the government can sometimes be frustrating as they tend to be hesitant in making decisions which gets costly. Such a situation was evidenced in the case of the Western Strasbourg Bypass, where the government was pulling the project back in the early stages before committing to getting it done.

Since PPP projects will last for a long time and require a lot of resources from both the private and public parties, the respondents at Fin Infra mentioned the importance of building good relationships and establishing trust between the parties. Additionally, Anna-Karin Ljung at SEK described how PPPs should involve collaboration where possible, to be able to yield better results for both parties as processes become more efficient. A good relationship and established trust allow for communication that enables better risk management, cost transparency, and project delivery. Jacques Walckenaer, Project Director at Vinci Concessions highlighted the importance of cooperation in the Western Strasbourg Bypass project. When the project was delayed, the SPV and the EPC had to cooperate efficiently, to keep delays and additional costs to a minimum. According to Walckenaer, partnership is also a necessary element for limiting overall risk, and it is equally important for all stakeholders in the partnership, including lenders and their advisors.

4.5.5. Project Risks

As previously established, a key aspect of PPPs is the risk allocation and substantial transfer of risk to the private sector. As Edward Farquharson explained, allocating risks in the written PPP contract is important, but the contract also has to be well-managed during the project lifetime, or else the risks may shift to a party not obliged nor fit to handle them. The interviewee working as a senior executive at a company in the finance industry further stated that risk allocation is not collaborative, it is competitive. The reasoning is that a risk is to be assumed by the party who, in a competitive setting, prices the risk the lowest. Risk pricing is based on the party's ability to handle and understand the risk and its consequences. If a party prices the risk lower than other actors, they should still be able to profit from carrying it as the only difference between them and other actors is that they have a better understanding of the risk's real worth and prices it lower due to less uncertainties. Hence, the top risk mitigation strategy is competitive pressure. The importance of ensuring that risk is carried by the party that prices it the lowest and how competition can help in allocating this correctly got evident in an example by Lene Sælen Rivenes regarding the Sotra Connection project. In the first offer that was received on the Sotra

Connection project, the private actor had taken on an excessive amount of risk that they could not fully comprehend, hence, it was highly priced. Other bidders proposed that this risk was to be carried by the public party instead which led to the project price being almost NOK 10 billion less than the initial bid. Since the public party was more comfortable in carrying this risk, they priced it lower than NOK 10 billion, and consequently accepted this offer. This shows how important competition is to identify and achieve the most efficient risk distribution.

External risks such as significant input price volatility are difficult for the private sector to mitigate and may severely increase their project pricing. Hence, it has become more common that parts of these external risks are borne by the public client to share the burden, Torgeir Haugland at DNB explained. Another risk that is difficult to handle contractually is the political risk, that is, the risk that politicians will change regulations or alter contracts after signing. Lars-Åke Svensk at SEB mentioned how a common misconception is that there are no political risks in Western Europe affecting contracts, but how he has seen projects in the region where changing regulations had adversely impacted infrastructure investors. Marcus Falkman at AP4 was of a similar opinion, stating that the biggest concern for any regulated business is the sudden change in the regulatory environment, which can have detrimental effects on the outcome of the project. Lastly, reputational risk is a major consideration, both for the public party as mentioned by Lene Sælen Rivenes with the Sotra Connection project, and financiers as described by Stine Beate Pettersen at DNB. Reputational risk in this case is the risk that a party would take an adverse action which may reflect badly on the other.

4.5.6. Evaluating PPPs

Different stakeholders have different approaches to evaluating PPPs. For that reason, the perceived success for one party may be a perceived disaster for another. Edward Farquharson from EPEC at the EIB described how the Eurotunnel was a success from the public sector view, but from the perspective of a bank or a sponsor financing the initial phase of the project, it was not such a good outcome as the equity investors lost all their money and banks lost some. Consequently, there are many ways to assess success. As Marcus Falkman at AP4 noted, the key to a successful PPP lies in the mutual satisfaction of both parties involved. If one party were to enter into a contract with the intention of exploiting the other, the PPP is unlikely to succeed, and no future entity would go into a contract with this actor again.

Section 4.5 has explored important aspects of how PPPs are financed and further stated that while value for money is hard to assess, PPP projects drive a well-needed long-term perspective for both the public and private party. The section has also highlighted the importance of

competitiveness in achieving an efficient project with good risk allocation. Finally, relationships built on trust are important, but so are public sector governance and contract management.

4.6. Public Opinion and Public Sector View

During interviews with stakeholders, it became evident that the public opinion and public sector view are important factors that heavily influence the success and acceptance of PPPs and that countries have different experiences and thereby perceptions of PPPs. These perceptions are also often dependent on the country's political, economic, social, cultural, and historical contexts. In section 4.4.4, we described how political willingness is essential for using PPPs, while in this section, we illustrate the varying perceptions across countries, and how it influences the implementation and evaluation of PPPs.

Jacques Walckenaer at Vinci Concessions described how history and legal frameworks are likely explaining factors to the differences in attitudes toward PPPs. For example, France has had a long history of concessions and public-private partnerships, especially user-paid contracts, and there is a general acceptance toward them. However, Laure Hilzenkopp at Fin Infra explained that there is more skepticism in France towards the government-paid PPPs. The reason for this, she argued, is that people are used to paying a toll fee, but they are not fond of paying taxes for roads which they may not use at all. Adding to this, she mentioned how it sometimes can be difficult for people and public authorities to understand the advantages and disadvantages of different contracts for different situations. Therefore, it often requires much negotiation to get things done, which is time consuming and unnecessarily complicated.

Respondents described how previous experiences set the tone for the future usage and perception of PPPs. An interviewee at NIB said that this was probably the case for Sweden with the Nya Karolinska Solna (NKS) project that in many ways became overly complex while other countries may have had more positive experiences. Furthermore, Kent Eriksson, Professor at KTH and Director at the Sustainable Finance Lab, described that in many other countries, when mistakes have been made, they have learnt from them, moved on, and advanced their PPP frameworks and contracts instead of dismissing PPPs – for instance in Australia. Similarly, Liisa Raasakka at EIB described how European countries that have used PPPs for a long time, such as the UK, France, Spain, and Portugal learnt their lessons from mistakes made, which have let them create extensive knowledge banks and best practices. An interviewee at NIB mentioned that countries that are infrequently using PPPs can however still leverage international expertise and knowledge that exists in large, multinational advisory firms, law firms, or intergovernmental organizations such as EPEC at EIB. Being able to leverage international

expertise for PPP projects was evidenced in the cases of the Mersey Gateway, Western Strasbourg Bypass, and Sotra Connection projects. Johanna Dingertz at Luleå Hamn also mentioned how they used international consulting companies with experience from PPP projects in Sweden and Europe for their Port of Luleå project.

Interviewees also explained the role of media in driving public opinion and thereby the public sector view of PPPs. Edward Farquharson mentioned how media reporting is often based on misconceptions which are rooted in PPPs being a complex concept, often causing the PPP to become a scapegoat for various issues related to the underlying project.

“Sometimes the criticism is misplaced as it is not the PPPs that are at fault, but rather the underlying project. [...] Maybe the project should just not have been built in the first place, and if you would have used public money to finance the project, you would be in a place just as bad, if not worse.”

– Edward Farquharson, Principal Adviser for EPEC at EIB

The senior executive at a company in the finance industry describes how PPPs have a very bad reputation in the UK and that many perceive it as the private sector making large profits from the public through the PPPs, without providing any wider societal benefits. The interviewee noted that the opinion about certain PPP projects, for example those within road and bridges, are somewhat more favorable than for others, such as PPPs for schools and hospitals. The slightly more favorable perception of road and bridge projects is in line with what we found in the Mersey Gateway case, where no major setbacks were experienced, and the public were generally satisfied with the outcome of the project.

Respondents noted that Sweden is unique with regards to both politicians’ and the public sentiment towards PPPs being very negative, which was exemplified in section 4.4.4 with Sweden not having joined EPEC. However, Björn Hasselgren described how the Swedish public entity Trafikverket is trying to implement some well-functioning aspects of PPPs into other types of contracts, such as functional contracts where the contractor takes a greater responsibility for the planning and implementation of projects. Although, to that point, Torgeir Haugland at DNB said that doing so is an experimental process and that it may be better to instead use the entire PPP model for a well-suited project. The reason for this being that the PPP is a model that stakeholders and advisors (legal, technical, and insurance) are familiar with and have deep knowledge of. Consequently, PPP as an execution model for infrastructure has a higher possibility of attracting relevant parties. Given the resistance at the national level, Anna-Karin Ljung at SEK noted that there may be an opportunity for the PPP model to be tried out at the municipal or regional level, as now seen with the Port of Luleå project. Mats Berg at Bodens

Kommun had a similar opinion, saying that the usage of PPPs is probably necessary on a local level as public money alone will not be able to finance the infrastructure gap.

Furthermore, the Swedish approach to PPPs is in stark contrast to the Norwegian. Both countries have similar cultural, political, and social histories, which respondents have previously mentioned are factors affecting the public opinion and public sector view towards PPPs. While Christian Andre Dahl at KLP described that there is some skepticism in Norway towards using private finance for public infrastructure projects as the state could easily finance such projects themselves, Anna-Karin Ljung mentioned how wealthy states like Norway still seem to find benefits with PPPs. This is in line with what we found in the case of the Sotra Connection project. Also, Björn Hasselgren at Trafikverket noted that there are quite significant differences between Sweden and Norway which could explain the contrasting approaches toward PPPs, especially in the transportation sector. For instance, the countries are geographically different. In Norway, road building is a complicated matter due to it being a mountainous country, while in Sweden, the projects are comparably straight-forward. The nature and history of more complicated infrastructure has created a greater acceptance toward paying for local ferries and tolls in Norway, which has driven an understanding of different methods to procure and operate infrastructure assets.

Lastly, Torgeir Haugland at DNB described how Germany, a country with the highest possible credit rating, is a frequent user of PPPs, especially in road projects. He mentioned how the public sector view is that this achieves an effective risk distribution between the public and private parties and offer a way for institutional investors like life insurance companies or pension funds to invest in secure, long-term assets to meet their long-term liabilities. Similar points were brought up by other respondents as well, providing examples of countries like Canada and Australia having pension funds and life insurance companies financing projects through PPPs. The senior executive at a company in the finance industry described how the participation of institutional investors can improve how PPPs are publicly received as this makes the public the ultimate beneficiary of the PPP model. On the one hand, public infrastructure assets are delivered, and on the other, parts of the profits made from the public sector paying the private goes right back into, for example, pension funds, benefiting the people. Section 4.6 has provided insights into why countries have taken different approaches towards using PPPs. It also mentioned how not conducting PPP projects could cause a country to miss out on building national PPP expertise and explored that even for countries with AAA credit ratings, PPPs can bring additional value to the public.

5. Discussion

In the following section, we discuss our findings from the three PPP road project cases and interviews with practitioners from the PPP landscape to further explore how PPPs can help bridge the European infrastructure investment gap. Furthermore, we connect our findings to existing literature in the field and discuss how we contribute to it. Finally, we discuss the implications for Sweden and consider the limitations with our research.

5.1. Using PPPs to Finance Infrastructure

The cases made it evident that the PPP model is used to deliver infrastructure projects for a variety of reasons, however, interviewees emphasized that no matter the underlying reason for initiating a PPP, the project must be well-suited. Nonetheless, one reason for using the PPP model is to transfer risk to the private sector (Hwang et al., 2013; Wang et al., 2018), which was one of the reasons for conducting the Western Strasbourg Bypass project as a PPP. As described by Almarri (2019), PPPs can also be used to allow the public sector to benefit from the private sector's experience and expertise, which was indicated to have been the case in the Sotra Connection project. For the Port of Luleå, we found that it was chosen both to ensure a timelier project delivery to satisfy requirements of end-users as well as to access private capital due to municipal budget constraints – a reasoning echoed by Chan et al. (2009). Further, from interviews we suggest that using the PPP model for freeing up capital to invest in other projects that would be ill-suited for a PPP setup, or to limit fiscal burden, is an acceptable strategy provided that the PPP project can bring additional socio-economic benefits that may not have been achievable had the project not been privately financed.

One common criticism towards PPPs is that they are more expensive than traditional public infrastructure delivery methods due to their use of private capital and that they should therefore not be used. However, our research has found that countries that could easily finance infrastructure projects by themselves and at very low costs, such as Norway, still benefit from using PPPs, which is in line with Engel et al. (2010). The higher financing cost can be seen as the price paid for the efficiency benefits of PPPs as described in Engel et al. (2014). We also found that it can be seen as a cost for better risk allocation and project innovation as well as a fee for accessing international construction expertise, as evidenced in the case of the Sotra Connection. Additionally, it can be regarded as an insurance premium, where the higher financing cost is compensated by the private party assuming the operational and maintenance risk.

Through competitive forces, PPPs more efficiently transfer risks to the party most suitable for carrying it (e.g., Grimsey and Lewis, 2002). For instance, the private party generally carries the construction risk and is penalized if the asset is not finished on time and budget. Thus, they are incentivized to be innovative and effective, and as they are also responsible for asset maintenance, they are motivated to build with high quality to maximize contract lifetime profits. Our findings from the Mersey Gateway project illustrate these effects where the local government, together with experienced contractors and financiers, was able to deliver a project on budget and on time, bridging a local infrastructure investment gap and bringing benefits to the country and local community.

PPP projects have been able to attract a variety of long-term financing solutions. This is attributable to the inflexible nature of PPP contracts and the low variability in project outcomes which allows for high leverage and thus, a relatively low WACC. The relative stability of PPPs is also reflected in the low default rate as described by Moody's (2022). While the Sotra Connection and Mersey Gateways project both showcased this high leverage, it was not present in the Western Strasbourg Bypass project. The reason for this was that it was deemed too risky due to it being a user-paid PPP with uncertain traffic demand. Hence, the Western Strasbourg Bypass is in many aspects the riskiest project out of the three that we have described in our thesis. As described by Regan et al. (2017), forecasting errors have been a reason for the failure of toll road projects in the past. Regan et al. (2017) further mentioned increased collaboration to manage risk. In the Western Strasbourg Bypass project, the demand risk was largely mitigated through a greater equity share, as well as the junior mezzanine buffer provided by the EIB to cover potential traffic shortfalls. This points to the importance of a carefully thought-through financing structure. To help in achieving optimal financing, a situation with bidders competing to offer the best financing packages is desirable. This allows for an optimal mitigation of inherent project risk and manages to offer investment options that suit the risk preference of various financiers. For instance, PPP projects have attracted long-term bond financing with only a slight pickup compared to public bonds. A great example of such an outcome is the innovative and highly competitive financing package provided by the Merseylink consortium in the Mersey Gateway project. As investment options are presented to suitable actors, long-term capital could for example be provided by pension funds. Some interviewees regarded this as something to strive for as it provides societal benefits and causes a positive impact on the public image of PPPs. The reason for this is that the pension funds' financing contributes to building public assets while gains made from the project directly benefit current and future pensioners.

Admittedly, there are challenges in using PPPs, which is why they are not suitable for all types of public infrastructure projects. There are some important features that significantly increase the project's ability to benefit from the PPP model and avoid failure as they attract bidders and generate competitiveness – a cornerstone of PPPs. The case studies in our research have focused on road projects, which are typically well-suited for being delivered using PPPs because of their typically clearly defined scope as well as long-term and stable user demand enabling favorable project economics. Further, we found that projects must be large enough to attract interest, use mature technologies to limit project risks, and have well-written contracts that limit the chance of contract modification. PPP contracts are inherently inflexible as they outline the entire project in detail and thus, any modifications made are likely to have large implications, requiring all parties to put in an extensive effort in realizing any adjustments. Soeipto and Verhoest (2018) note that contract stability, and avoiding renegotiations, is crucial for the success of PPP projects, which calls for robust governance mechanisms from the public party (Grimsey and Lewis, 2004). In addition to this, we found that the occurrence of costly renegotiations and change orders in PPPs do not make them bad. Instead, it can be seen as a feature of PPPs that incentivizes the public party to better understand and define the projects at their starting points.

Our case studies include PPP projects that can be regarded as successful based on the fact that they have not been renegotiated or defaulted on their debt at the time of our study. However, we know from reviewing literature that PPP projects occasionally fail and go bankrupt (e.g., Alcaraz Carrillo de Albornoz et al., 2021). As Bolaños et al. (2019) mentioned, in the event of a financial failure, it is likely less costly for the public party to restructure debt rather than liquidating the assets. Thus, an important consideration for Nordic public parties in particular, as our respondents mentioned, is to make sure that PPP projects are not too large or in other ways unattractive to the private sector, so that continuous operations through another company can be ensured in case of financial failure of the original firm. We observed a lack of Nordic firms in the bidding process for the Sotra Connection project, however, the project did aim to attract international bidders. Although should the project fail financially, it may prove difficult to find new actors willing to take over this sizable project in Northern Europe.

If a potential PPP project is well-defined and fulfills the previously mentioned requirements, it is likely to attract interest that significantly increases the chance for optimized delivery. However, if interest is low, it is important to understand why bidders dismiss the project and make an informed decision about whether to proceed or not, noting that the PPP model's competitive forces are not in effect. As mentioned by Yngfalk and Junker (2019), the Nya Karolinska Solna (NKS) project would probably have encountered criticism regardless of it

being delivered as a PPP or not. Our respondents further suggested that this specific PPP project should not have been initiated at all due to its lack of competition in the bidding process. Thus, a project should only be undertaken as a PPP if it emerges as an option suitable for it, i.e., seems able to attract bidders. After the bidding process has been performed, the public party should only proceed to the next stage if one of the bidders has presented a viable project approach and a promising financial package. As for Swedish decision makers, they should not be discouraged by a previously failed approach (NKS) but should rather learn from past mistakes and consider what specific delivery methods, including PPPs, can bring to specific projects. We also found that the mere consideration of using the PPP model for an infrastructure project can bring valuable insights to the public party as it requires them to analyze the project's cost and viability from a long-term perspective.

Our research addressed how the usage and perception of PPPs vary across European countries, illustrated by the case studies and interviews with stakeholders in the PPP landscape. Verhoest et al. (2015) found Sweden to score the second lowest when it comes to governmental support for PPPs. Since we were unable to obtain interview data from Swedish government representatives, we relied on responses from PPP experts who confirmed the findings of previous research. They stated that the topic of PPPs is largely avoided in Sweden, which can explain the political unwillingness to use them. In contrast, the French PPP landscape widely accepts the model, especially concession contracts. While the Western Strasbourg Bypass project did experience public resistance in the form of protests, we found them to have been motivated by the project's ecological impact rather than the PPP approach. Furthermore, it is likely that the UK would score lower on the PPP support study by Verhoest et al. (2015) after their discontinuation of the PF2 program. We did however note that PPPs are still being performed in the country, which indicates that individual projects may still benefit from being delivered as PPPs. Norway's repeated usage of PPPs in the transportation sector also suggest that they do provide benefits for countries similar to Sweden. Thus, Swedish decision makers could work closely with and learn from their Norwegian counterparts in using PPPs for trial projects.

Finally, one central aspect regarding the role of PPPs is if they provide value for money. That is, building upon the definition in Yescombe (2007), if they manage to provide enhanced value by transferring the optimal amount of risk, cost, and delivery to the private party. As Grimsey and Lewis (2005) note, assessing value for money is complex. Blanc-Brude et al. (2006) also find that the PPP projects' costlier financing is largely corresponding to the optimism bias of traditional procurement. Adding to this previous research, we also find in our cases and

interviews that the discussion about value for money tends to be biased, which could lead to different conclusions regarding whether PPPs should be used or not. Therefore, we find that the discussion surrounding value for money tends to be somewhat redundant. It shifts the focus from the benefits that PPPs are able to bring to infrastructure delivery, such as innovative solutions, better risk-allocation, “asset insurance”, incentives for on-time project delivery, and attractive investment options, to a discussion primarily concerning costs. To conclude this section, we call for considering PPPs for what they are; a tool for delivering infrastructure assets, which for certain projects can provide benefits.

5.2. Implications for Sweden

In the Swedish government investigation SOU 2017:13, it was suggested that three infrastructure projects should be delivered using PPPs, whereafter potential benefits would be evaluated. Based on our research, we do agree that the model should be tried out on the national level in Sweden. However, it is important to keep in mind that in doing so, the PPP should not be driving the project delivery; the projects should drive the PPP. We recommend decision makers to have an agnostic attitude toward PPPs and consider them as one possible way of delivering projects among others. More specifically, Trafikverket (the Swedish Transport Administration) is an example of a government entity that should consider PPPs and evaluate for which projects it could be used. Given the findings in our study, we do strongly encourage PPPs to be considered and, if well-suited, used for transportation infrastructure projects.

We also find that PPPs can be particularly useful in connection to the green transition, where in some cases, it can be motivated to encourage private sector risk-taking instead of letting taxpayers bear the burden of developing such projects. This was evidenced in the Port of Luleå project, where the local municipality was driven by a sense of urgency to deliver a project on time, but at the same time was unwilling, and currently did not have the fiscal space, to finance the project themselves. Thus, for projects where a capacity increase or change in infrastructure is warranted by the green transition and thus requiring the investment sooner rather than later, PPPs could be a good way forward. Furthermore, in addressing the infrastructure investment gap and societal challenges, we see the potential to consider PPPs to deliver other kinds of infrastructure assets with good project economics that are of urgent need and that can benefit from on-time project delivery, such as prison buildings or other straightforward assets.

Lastly, it is important to note that PPPs are not a shortcut to closing the infrastructure investment gap and should only account for the small portion of public projects that fit the PPP method well. While Sweden may have missed out on learning about and perfecting the PPP

delivery method up until now, our research evidence that there is plenty of expertise that can be leveraged from organizations involved in PPPs all over Europe, such as the ones in our thesis, and particularly expert organizations such as the EPEC at EIB. To conclude this section, we recommend that decision makers in Sweden consider the option of using PPPs in their strategic planning and decision-making process for infrastructure projects, which can lead to more innovative and cost-effective solutions for infrastructure development in the long run, resulting in additional economic development.

5.3. Limitations

Our thesis set out to explore and provide insights on how European countries can use public-private partnerships to address their infrastructure investment gaps. While it does help in answering how countries can make use of the method and illustrates this by contributing with in-depth insights from case studies and interviews, there are some limitations with the case study methodology and thereby our findings. For instance, the case study method has been criticized for its ability to make generalizations. While we addressed this by conducting multiple case studies and conducting many interviews, we cannot capture the entire width of PPPs in infrastructure. For instance, our selection of cases may have affected the generalizations and thereby the reliability of our study. Studying additional cases would likely have helped in making generalizations.

We have not attempted to find statistically significant results that for instance explain factors affecting PPP usage in countries, nor have we quantitatively analyzed the overall efficiency and value for money of PPPs. Instead, given the exploratory nature of our research question, we believed that a qualitative, case-study method could best illustrate and answer how PPPs can play a role in bridging the infrastructure investment gap in Europe. We do however acknowledge that our results may be biased due to the interviewees who decided to participate in our study may have a different view of PPPs than professionals in general. We have strived to control for this factor by reaching out to various practitioners across the PPP landscape. Moreover, even though our research question addresses Europe as a broad term, we specifically focus on Western European countries and are aware that it is difficult to generalize and provide a consistent answer to how *all* European countries can use PPPs. This is especially difficult since frameworks vary across the region which has been proven in previous studies such as Medda et al. (2013) and Verhoest et al. (2015). Nonetheless, we provide insights on the broader topic, and its implications for Sweden in particular.

6. Conclusions

6.1. Concluding Remarks

By analyzing three European PPP projects and conducting interviews with 23 professionals knowledgeable about PPPs, we are able to carefully explore the PPP model and draw conclusions to answer the question: *how can public-private partnerships help European countries, and Sweden in particular, bridge their infrastructure investment gaps?*

Our findings reveal that while PPPs are not a superior alternative to traditional methods in delivering infrastructure assets, they have the potential to yield numerous benefits when used for the right cause and right project. Hence, PPPs should always be considered as an option in delivering infrastructure projects, both to ensure that the optimal model is chosen, but also to impose a long-term view of the project for the public party. However, in Sweden PPPs are rarely taken into consideration and hence, no PPP expertise is built. This is since the public and politicians are generally negative towards PPPs due to a history of a strong state and misconceptions about the model. To benefit from PPPs, countries like Sweden must begin to consider using the PPP method for delivering infrastructure projects.

While the private financing of PPPs is more expensive than publicly financed projects, we conclude that market forces in a competitive PPP bidding process, along with the inherent nature of PPPs, transfer risks to the party most suitable for carrying it and hence lower overall expected costs. That the private party is carrying construction risk and being subject to penalization if the asset is not finished on time and budget contributes to a healthy risk allocation in PPPs. Similarly, the risk of asset downtime, which would reduce the project company's profits, increases their incentive to build high-quality assets that require low maintenance for the lowest cost possible. Thus, we find that PPPs generally allocate risk well and limit the risk carried by the public party. Together with the reduced financial commitment from the public side, this is concluded to be a significant contributor to facilitating infrastructure asset delivery, narrowing the infrastructure investment gap.

Nonetheless, we emphasize that PPP projects principally only gain advantages over traditional public procurement if they can induce a competitive interest in the project. If the interest in the project is low, the public party must understand why bidders dismiss the opportunity and make an informed decision about how to proceed to avoid misallocated risks, suboptimal financing, and high costs. We conclude that generally, projects that generate competitiveness are relatively large, have a clearly defined scope with manageable risk through mature technologies as well as

underlying assets with stable demand and economics. Therefore, it is highly important that the project drives the PPP model and not the other way around.

By exploring PPPs usefulness in delivering infrastructure projects in Europe, with a Swedish perspective, we have addressed a gap in the PPP research with the aspiration to ignite and inform the PPP debate in Sweden. We conclude that by embracing the PPP model as an option for infrastructure delivery and selecting it for well-suited projects, Sweden and other European countries are able to more efficiently deliver new infrastructure, ultimately closing the infrastructure investment gap sooner than if solely traditional methods were to be used.

6.2. Suggestions for Future Research

While we set out to inform the debate, especially in Sweden, and found that PPPs should consistently be considered as one of the methods for delivering specific infrastructure projects, there is still a need for further research to guide decision makers. From our thesis, it should be clear what high-level characteristics an infrastructure project should have to be able to benefit from the usage of PPPs. However, further research is required to assist in the decision making for specific infrastructure segments, e.g., when PPPs should and should not be used for assets such as schools, hospitals, bridges, sewage systems, and electricity grids.

Studies, for instance extensive surveys, should be performed to improve the understanding of how politicians and citizens of various countries view PPPs. Furthermore, research should be conducted to investigate how well-suited different countries' procurement systems are for various types of PPP projects as well as how these impact the usage and success of projects.

We have stated that reports that try to find an overall truth about the effectiveness of PPPs come to different conclusions and could be biased by the report-ordering party. Still, we encourage further quantitative studies on the overall subject to allow for meta-analyses that may help in concluding best practices in conducting PPP projects and finding if some specific elements affect PPPs success in delivering assets.

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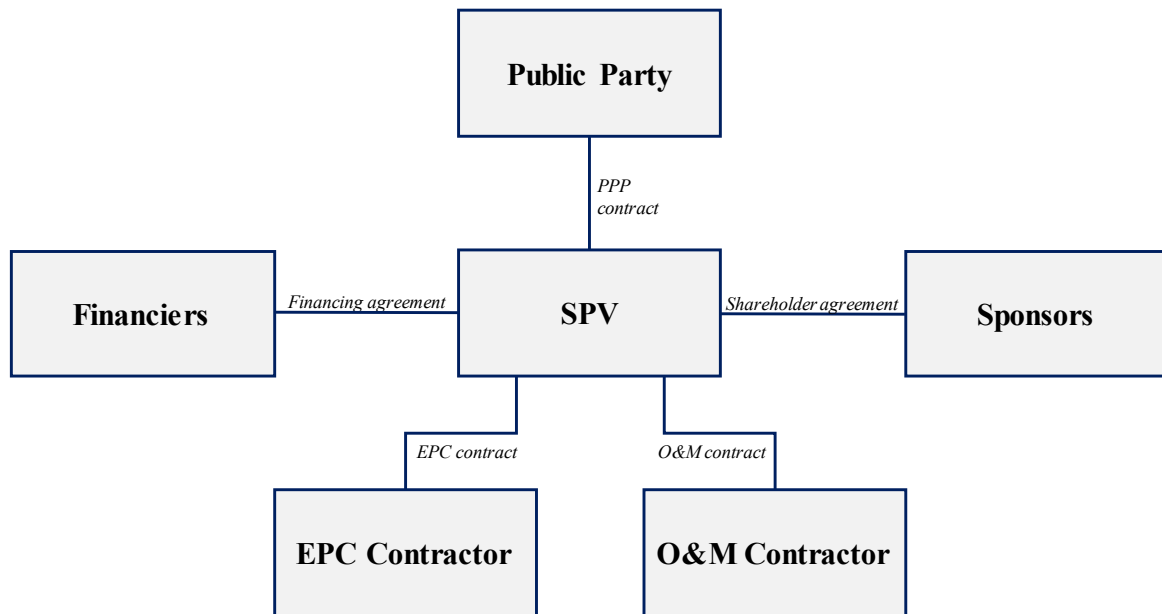
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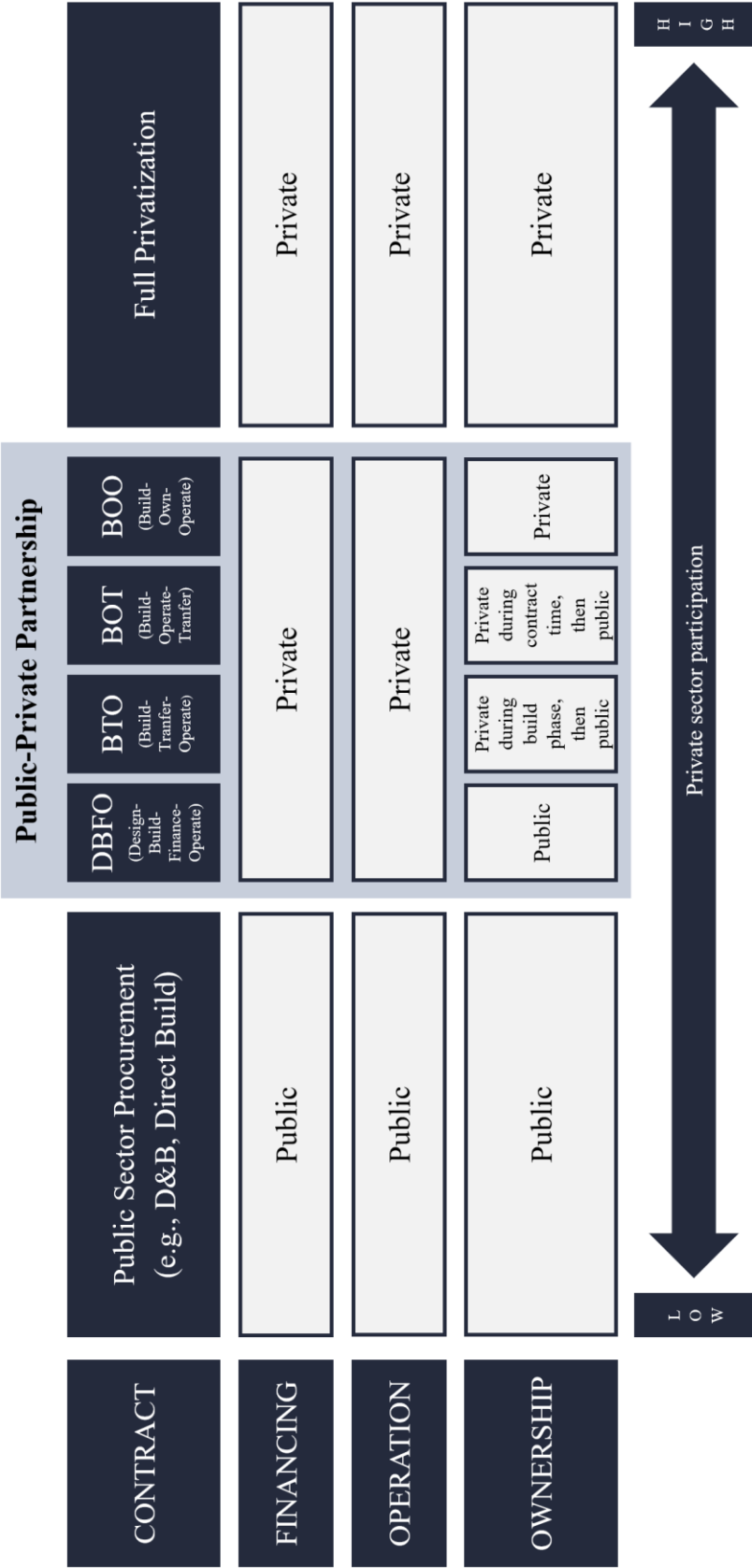
Appendix A

Figure A.1: Overview of a Common Organizational Structure for a Public-Private Partnership



Source: Inspired by Yescombe and Farquharson (2018).

Figure A.2: Contract Types with Different Degrees of Public and Private Participation



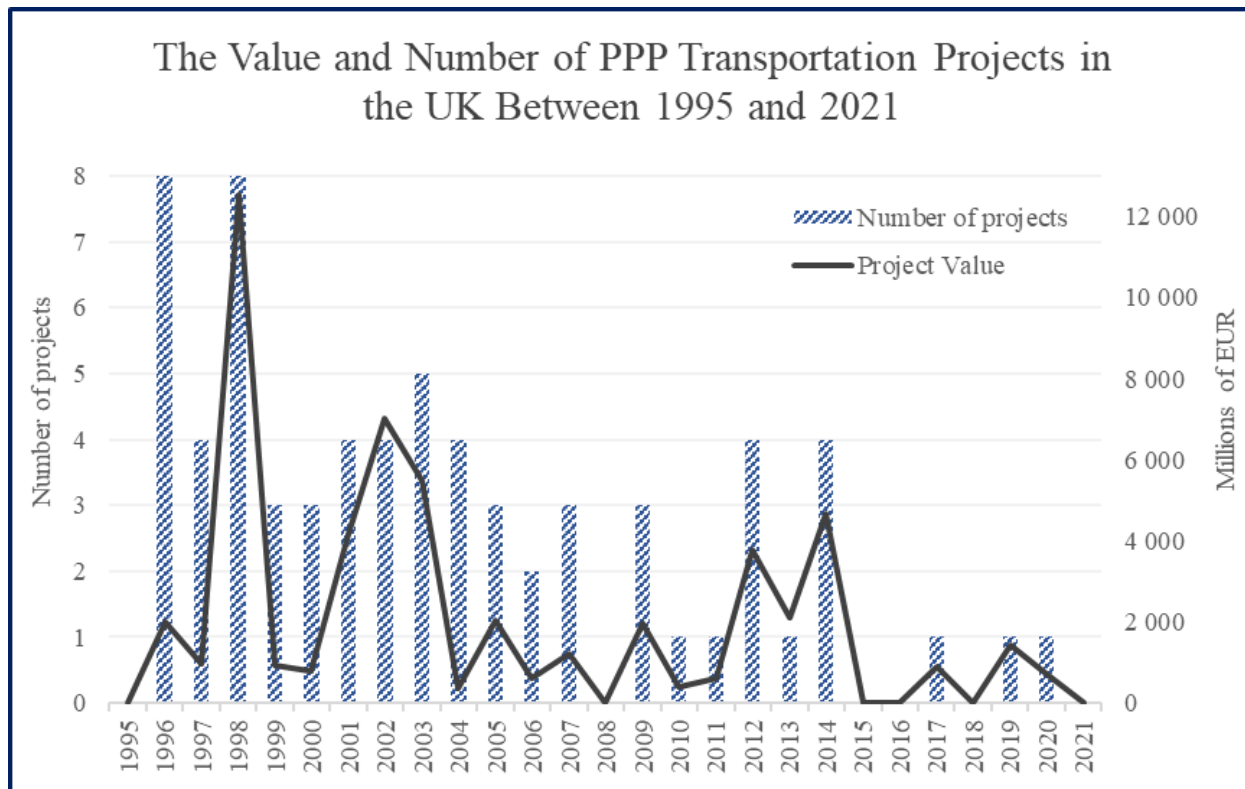
Source: Inspired by Yescombe and Farquharson (2018).

Table A.1: Interview List

Interview date	Interviewee	Role and company	Interview length
2023-10-11	Liisa Raasakka	Head of the EIB Group Office for Sweden at EIB	60 minutes
2023-10-17	Interviewee	Senior executive at a company in the finance industry	60 minutes
2023-10-18	Mats Berg	Head of Business Relations at Bodens Kommun	60 minutes
2023-10-18	Kent Eriksson	Professor at KTH and Director at the Sustainable Finance Lab	60 minutes
2023-10-18	Lene Sælen Rivenes	Project Leader at Statens Vegvesen	60 minutes
2023-10-19	Torgeir Haugland	Senior Vice President at DNB	60 minutes
2023-10-19	Sara Fiehn	Head of Project & Infrastructure Finance Sweden at SEB	45 minutes
	Lars-Åke Svensk	Senior Transaction Manager at SEB	
2023-10-19	Edward Farquharson	Principal Adviser for EPEC at EIB	70 minutes
2023-10-20	David Lyon	Secretary at Mersey Gateway Crossings Board	45 minutes
2023-10-20	Philip Vreeken	Chief Operating Officer at Sotra Link	65 minutes
2023-10-23	Anna-Karin Ljung	Senior Client Executive at Svensk Exportkredit	45 minutes
2023-10-24	Stine Beate Pettersen	Senior Vice President at DNB	45 minutes
2023-10-25	Björn Hasselgren	Senior Advisor at Trafikverket	60 minutes
2023-10-25	Marcus Falkman	Portfolio Manager at AP4	60 minutes
2023-10-26	Johanna Dingertz	Project Leader at Luleå Hamn	60 minutes
2023-10-27	Harald Rokke	Director of Infrastructure at NIB	60 minutes
	Interviewee	Employee at NIB	
2023-10-27	Nils Paul	Policy Expert at Svenskt Näringsliv	45 minutes
2023-10-27	Christian Andre Dahl	Senior Credit Analyst at KLP	45 minutes
2023-10-27	Laure Hilzenkopp	Project Director at Fin Infra, French Treasury	60 minutes
	Nicolas Vital	Project Director at Fin Infra, French Treasury	
2023-11-02	Jacques Walckenaer	Project Director at Vinci Concessions	85 minutes

Appendix B

Figure B.1: The Value and Number of PPP Transportation Projects in the UK Between 1995 and 2021



Source: EPEC (n.d.-a).

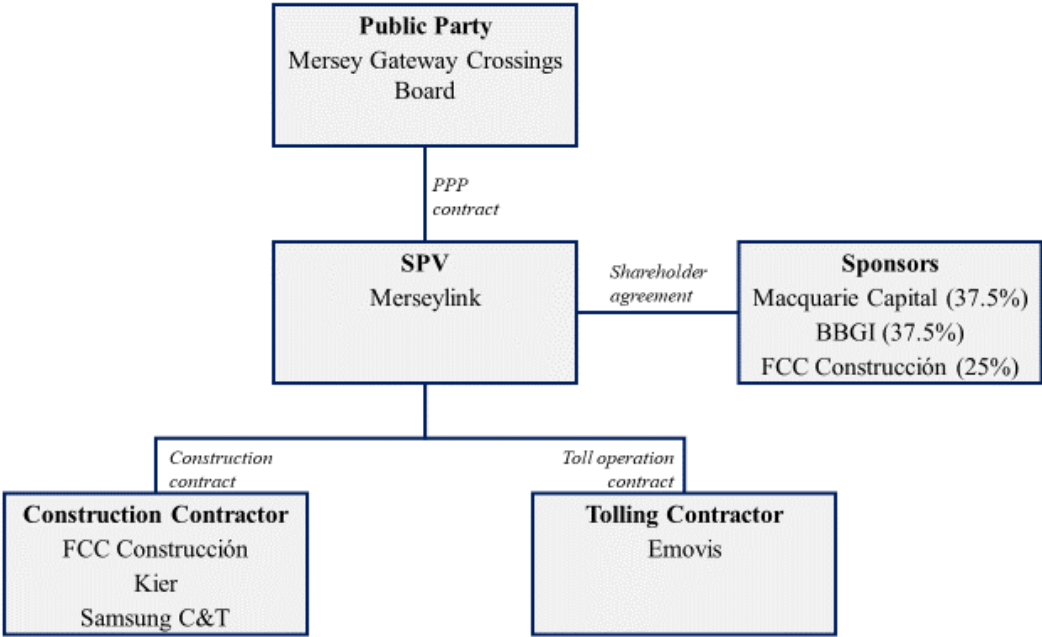
Figure B.2: Map Over the Mersey Gateway Project

Red is the approximate scope of the project, while blue indicates the tolling of the Silver Jubilee Bridge.



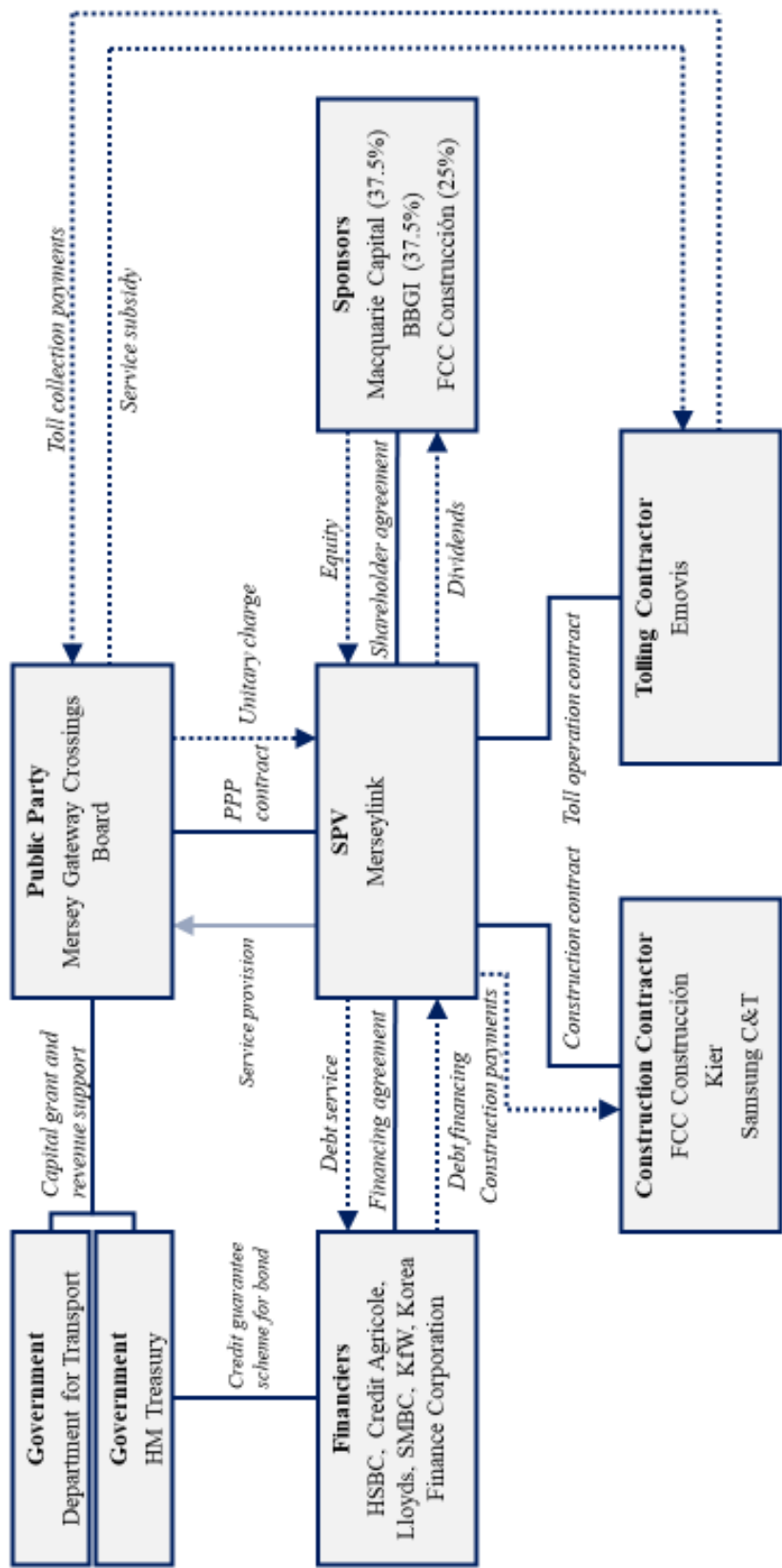
Source: ArcGIS, The Mersey Gateway Project (n.d.-a)

Figure B.3: Mersey Gateway Project Organization Structure



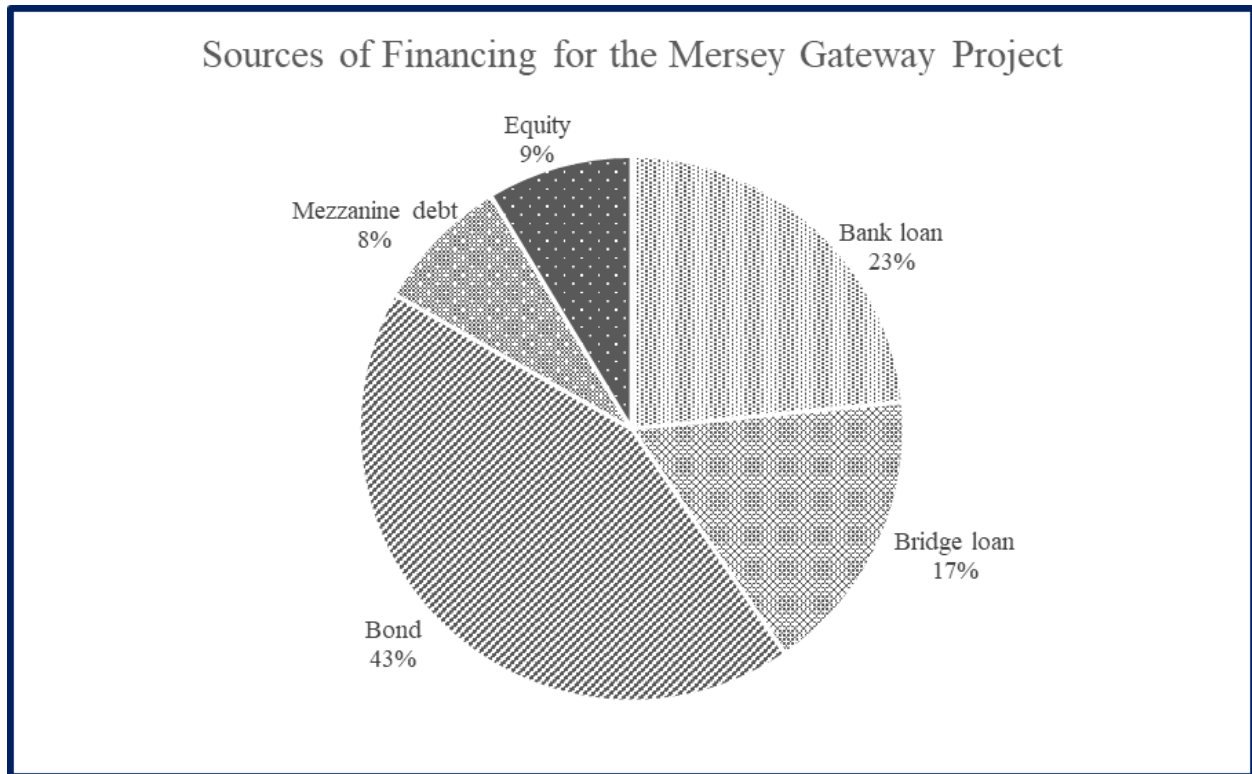
Source: *The Mersey Gateway Project* (2014).

Figure B.4: Mersey Gateway Project Payment Flows



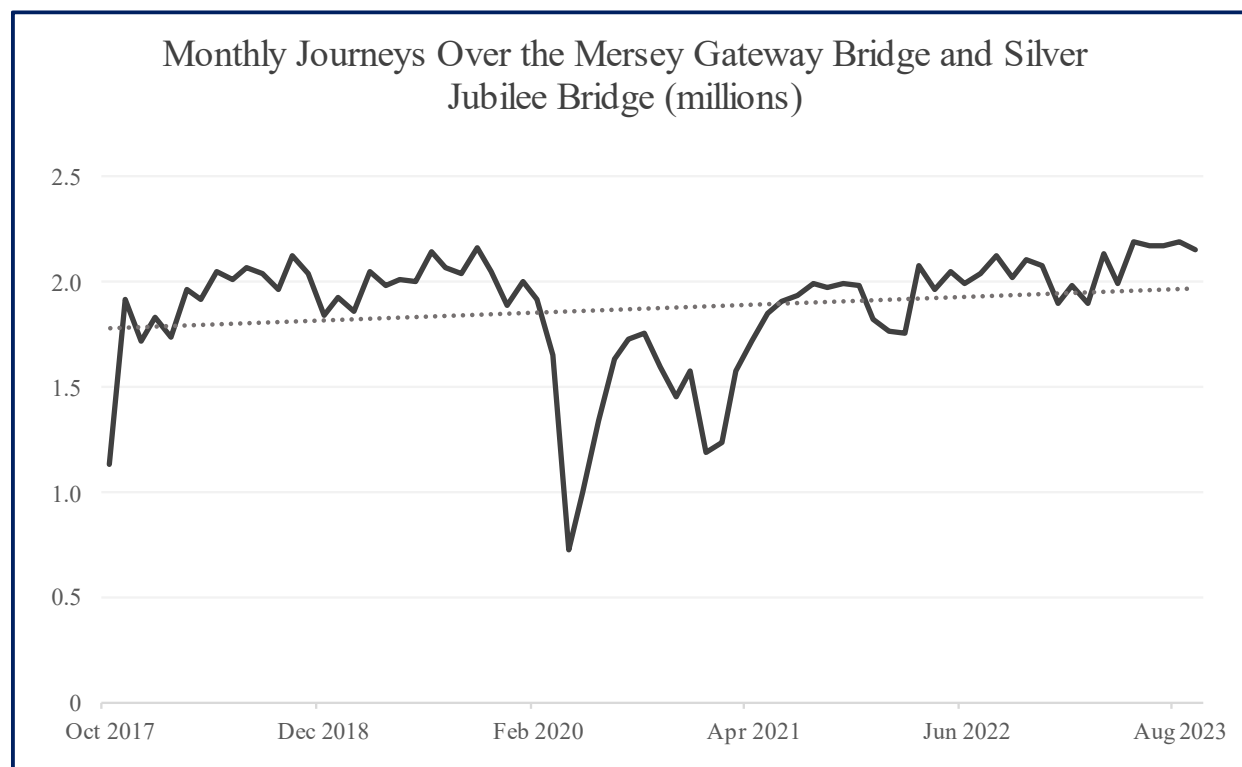
Source: The Mersey Gateway Project (2014); HSBC (2015); IJ Global (2014).

Figure B.5: Sources of Financing for the Mersey Gateway Project



Source: IJ Global (2014).

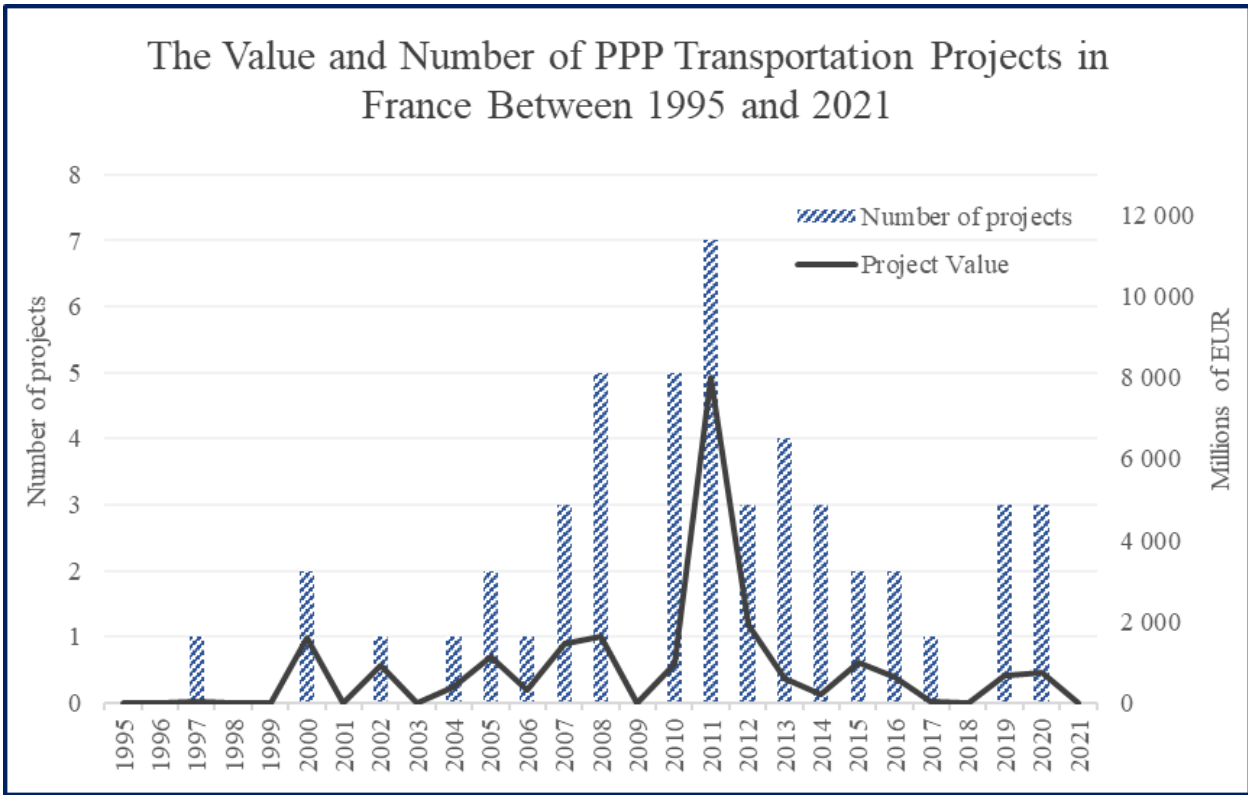
Figure B.6: Monthly Journeys Over the Mersey Gateway Bridge and Silver Jubilee Bridge



Source: The Mersey Gateway Project (n.d.-b).

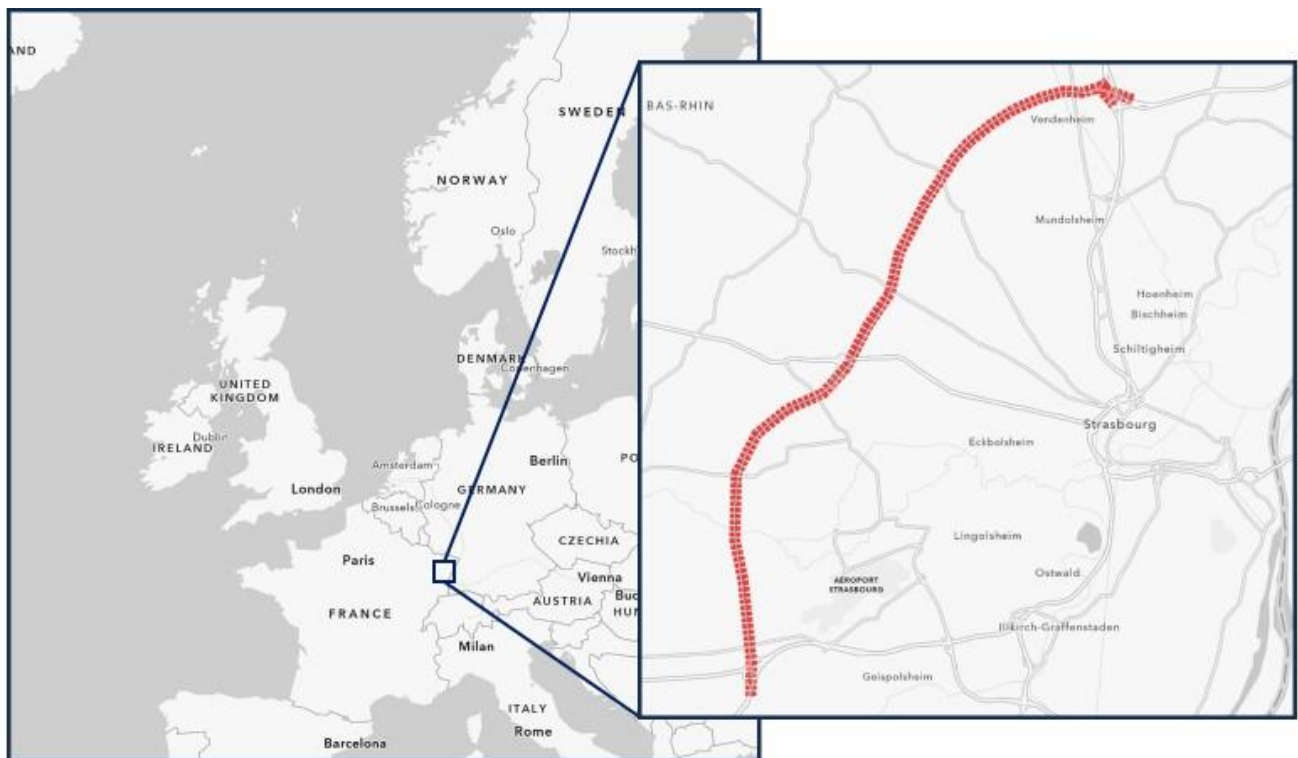
Appendix C

Figure C.1: The Value and Number of PPP Transportation Projects in France Between 1995 and 2021



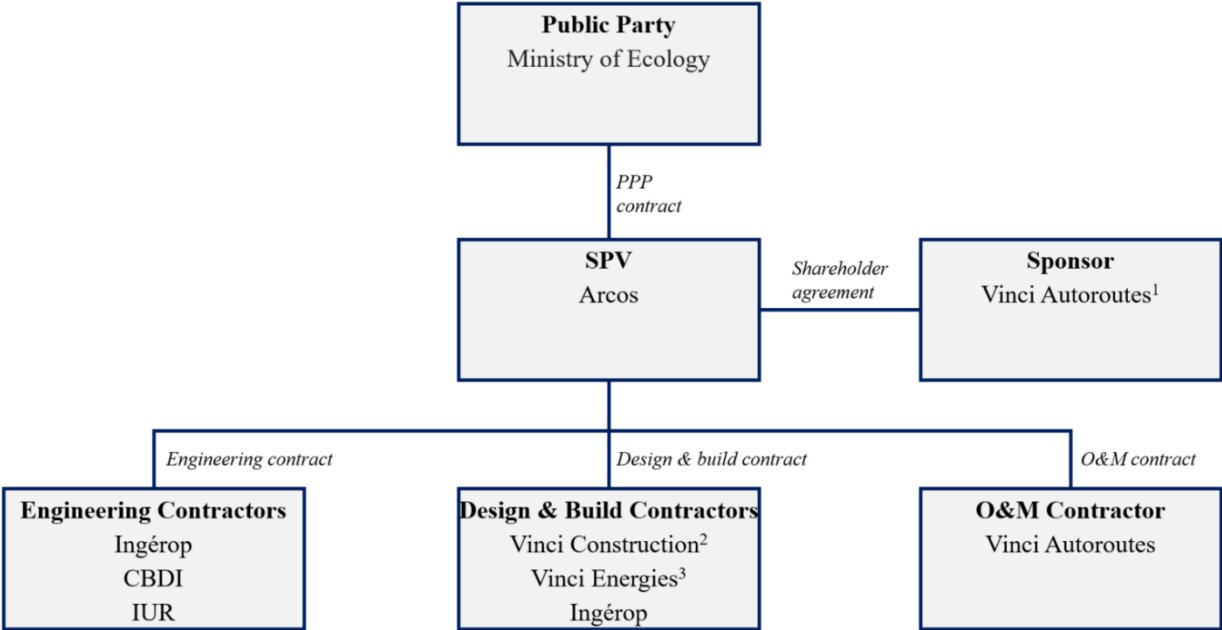
Source: EPEC (n.d.-a).

Figure C.2: Map of the Western Strasbourg Bypass



Source: ArcGIS; Vinci Autoroutes (2023).

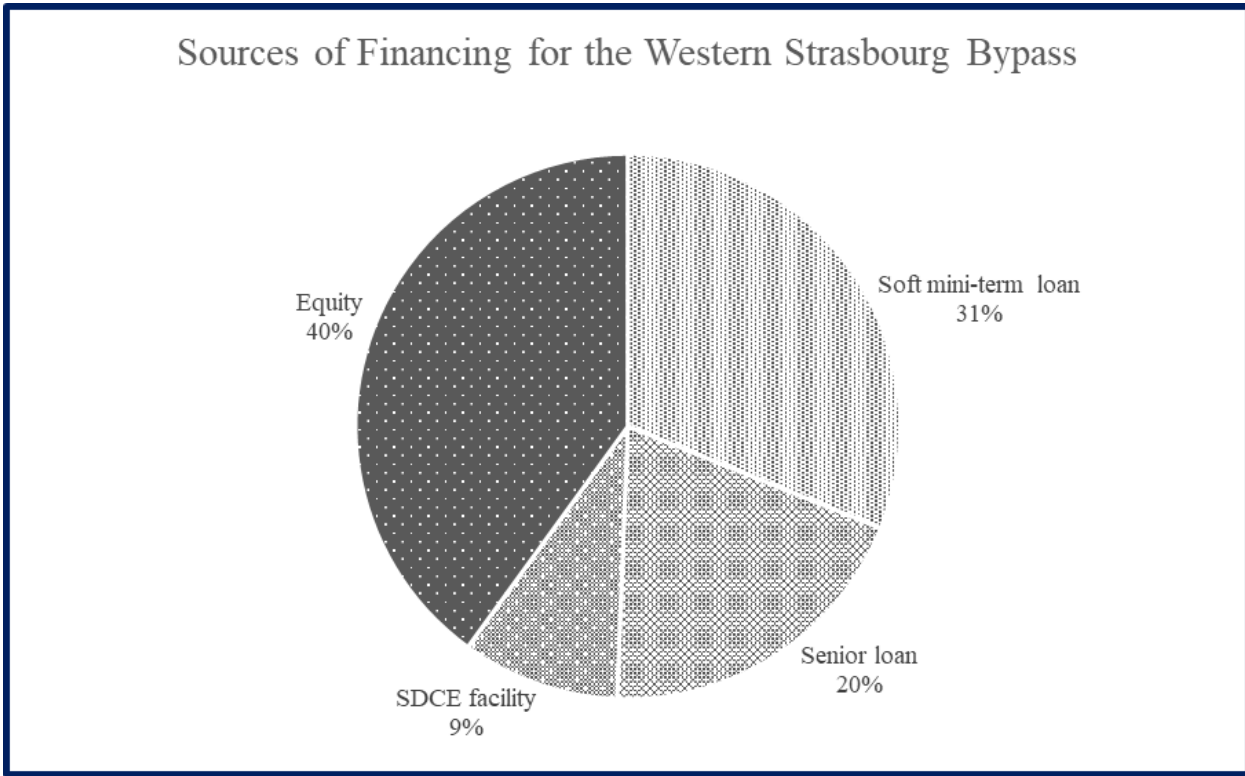
Figure C.3: Western Strasbourg Bypass Project Organization Structure



¹Arcos is listed as a subsidiary of Vinci Autoroutes (Vinci Autoroutes, n.d.) | ²Vinci Construction consisted of Dodin Campenon Bernard as lead company, Vinci Construction Terrassement, Vinci Construction France, and Eurovia (Vinci, 2021). | ³Vinci Energies consisted of Cegelec Mobility (Vinci, 2021).

Source: Vinci Autoroutes (n.d.); Vinci (2016); Vinci (2021b).

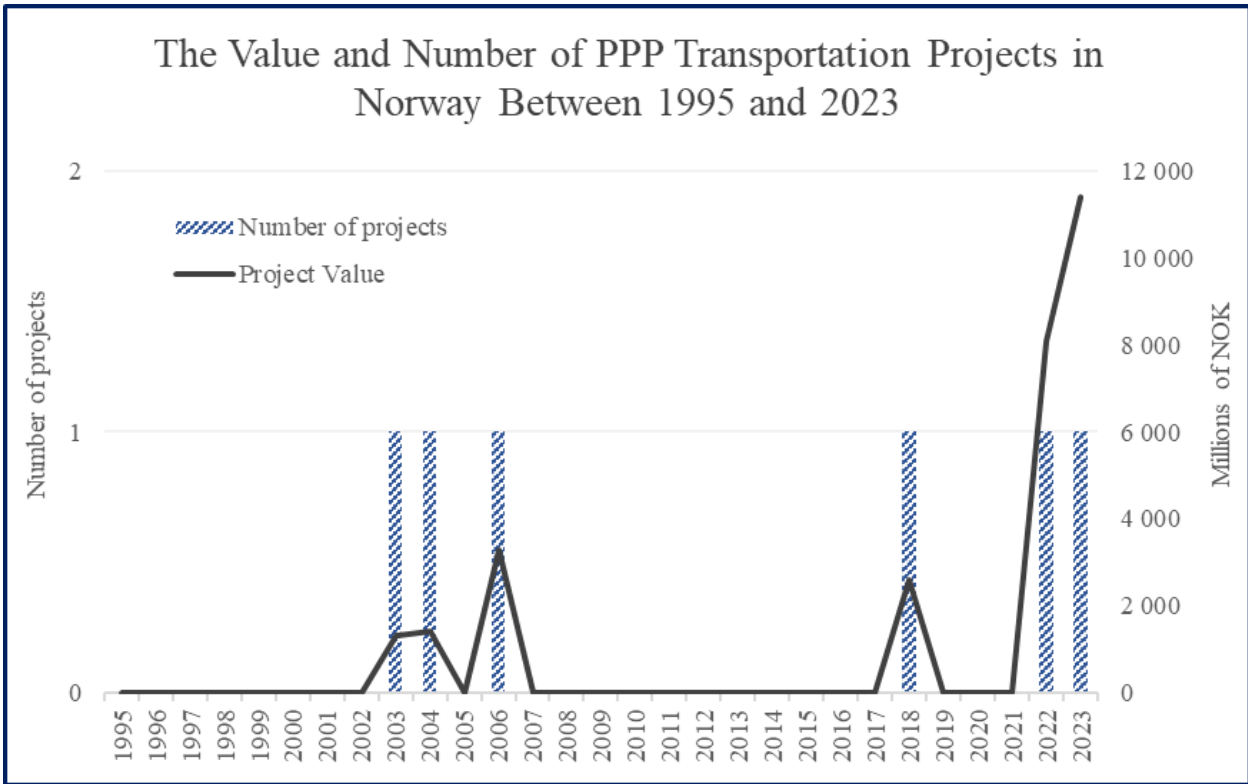
Figure C.4: Sources of Financing for the Western Strasbourg Bypass



Source: Vinci (2018); J. Walckenaer, Interview, November 2, 2023.

Appendix D

Figure D.1: The Value and Number of PPP Transportation Projects in Norway Between 1995 and 2023



Source: Agder OPS Vegselskap (n.d.); EIB (n.d.); IJ Global (2022); Skanska (2018); Skanska (n.d.-a); Skanska (n.d.-b); Statens Vegvesen (2002); Statens Vegvesen (n.d.).

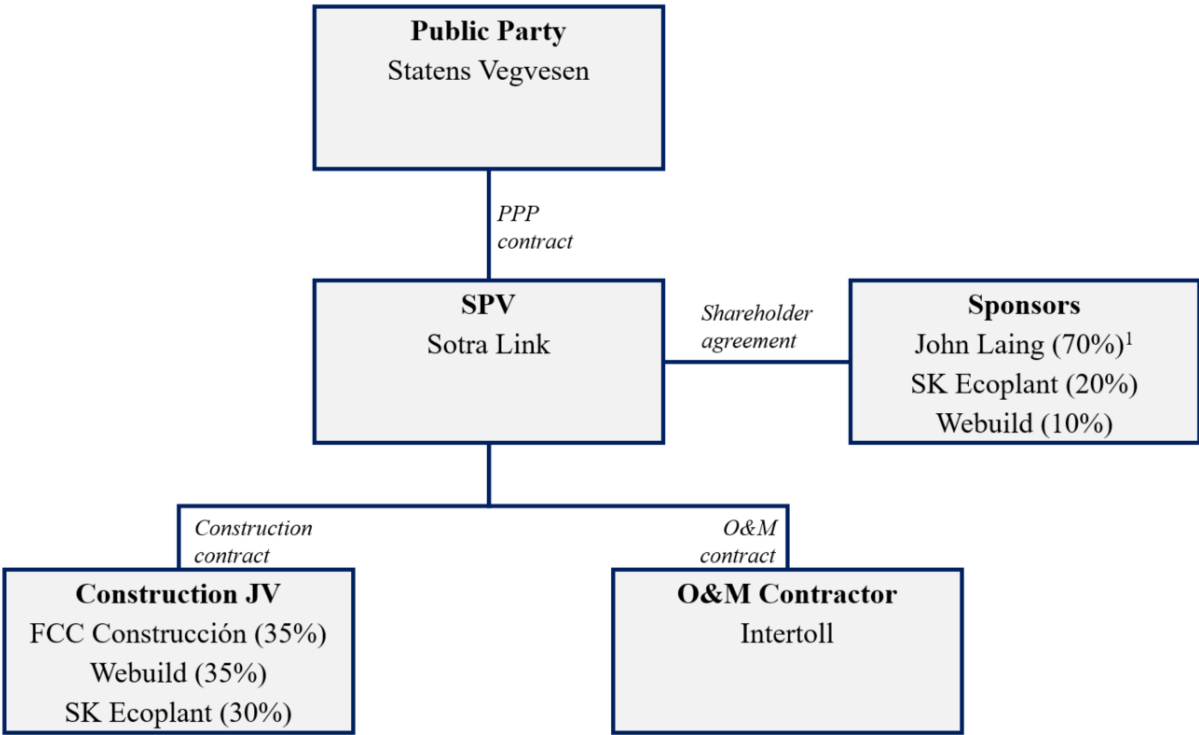
Note that this data was manually collected from various sources cited above. The project value refers to the amount raised at financial close.

Figure D.2: Map of the Sotra Connection Project



Source: ArcGIS; Statens Vegvesen (2023).

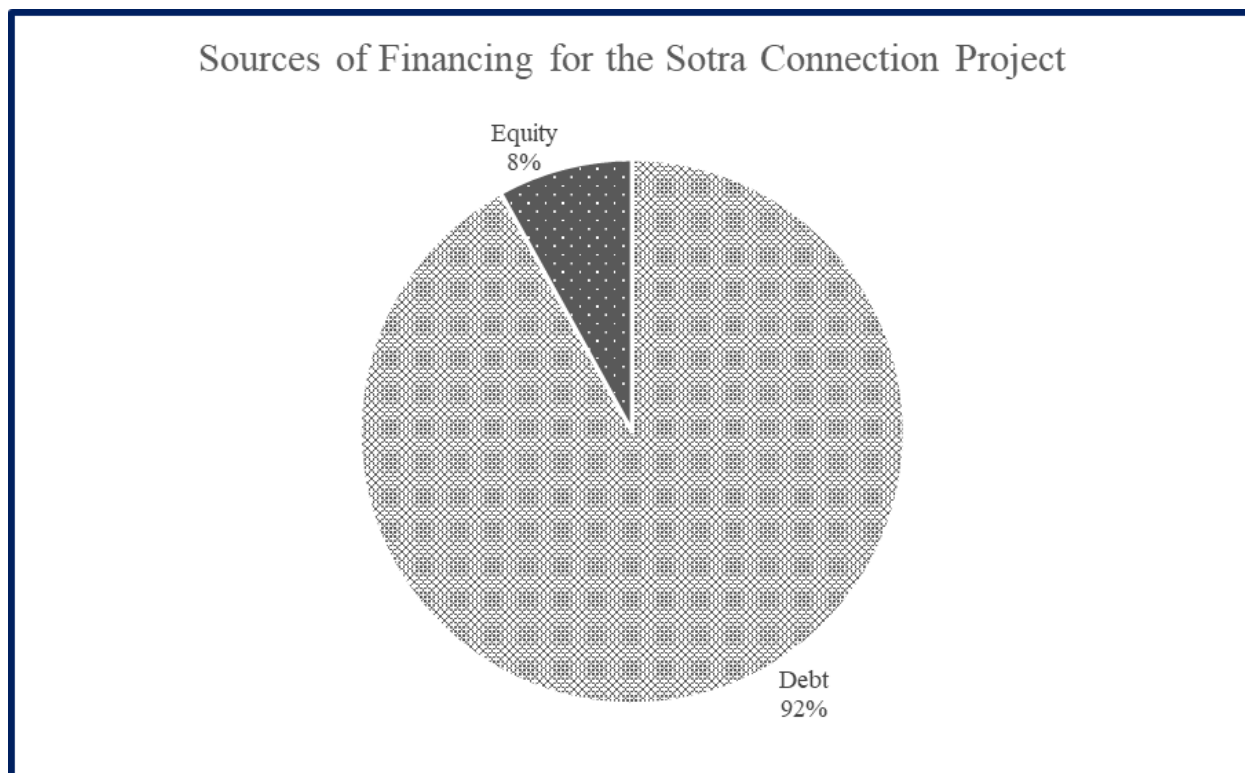
Figure D.3: Sotra Connection Project Organization Structure



¹John Laing acquired the 70% stake from Macquarie in April 2023.

Source: P. Vreeken, Interview, October 20, 2023.

Figure D.4: Sources of Financing for the Sotra Connection Project



Source: IJ Global (2022).

Appendix E

Recommendations to Stakeholders

As a final question, we asked interviewees to provide recommendations to the stakeholders in the PPP ecosystem that they perceived needed the recommendation the most. The responses are presented in Table E.1.

Table E.1: Recommendations to Stakeholders

Recommendation to stakeholder	Topic of recommendation	Advice
All Parties	Procurement Process and Public-Private Relation	Read the contracts carefully.
All Parties	The Role of PPPs	Look at international, comparable PPP projects. See how they did, and what the outcome for them was.
All Parties	Procurement Process and Public-Private Relation	Read the contracts carefully as there are multiple of contracts in the PPP structure making it complex and difficult to have an overview of.
All Parties	Project Risks	Ensure that the risk allocation is correct, that the party that is most capable of understanding and pricing the risk also carries it.
All Parties	Procurement Process and Public-Private Relation	Make sure that you are both happy entering into the contract and that you put in enough clauses and backstops to be able to sort out your issues once you are not happy with each other.
All Parties (especially Public)	Procurement Process and Public-Private Relation	Trust each other more – it is a long-term partnership and it needs to rely on trust. Sometimes the public authority is convinced that the private sector is only concerned about themselves and vice versa, but they need to trust each other.
All Parties (especially SPV)	Financing	When establishing a project, ensure that long-term financiers are able to contribute with enough capital that is in line with their longer duration.
EPC Contractor	Project Delivery, Maintenance and Asset Transfer	Read the contract and offer carefully as well as what was stipulated to be delivered in the contract.
SPV	Procurement Process and Public-Private Relation	Develop the best relationship with the public sector counterparty that you possibly can – foster a more flexible administration of an inflexible contract.
Public Party	The Role of PPPs	PPPs are a way to utilize both private and public money, so it is something that the public party should consider for important, large infrastructure investments. Especially if they need to get it done quickly, and they have many projects at the same time, this could be one way of doing it and something they should consider.
Public Party	Project Risks	Choose the right contractor. Usually, the public party tends to go with the company bidding for the lowest price without looking carefully at the quality of the contractor, but the PPP projects that have defaulted during construction have mostly done so because the contractor has had liquidity issues.
Public Party	Procurement Process and Public-Private Relation	Within the EIB there is something called EPEC, which is an advisory unit that gives support to PPP projects. One can become a member of EPEC and gain access to lots of research and information about PPPs. EPEC can give advice and share lessons learned for PPPs.
Public Party	Procurement Process and Public-Private Relation	A poor public client leads to poor results; client competence, project analysis, and risk assessments are crucial.
Public Party	Procurement Process and Public-Private Relation	Be thorough with planning, bring in good experiences, and consider what happens after the bidding process is finished and the project starts, when resources need to be in place. Follow-ups and supervision is needed.
Public Party	Reasons for Initiating a PPP	Be very clear-sighted on the rationale, the reasons for doing a PPP and the public sector's capacity to do it.
Public Party	The Role of PPPs	Dare to try the model out! And evaluate afterwards.