The Eurasia Tunnel Project

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In recent decades, growing infrastructure needs have led governments to resort to private finance. In this article, the use of Build-Operate-Transfer model in infrastructure investments is explored through an assessment of the organisational and financial structure of the Eurasia Tunnel Project in order to draw lessons for future public-private partnerships in infrastructure.

Introduction

Istanbul is located between the continents of Asia and Europe and is divided by the Bosphorus Strait. Due to its unique location and population of 15.5 million inhabitants, Istanbul is considered to be one of the megacities in the world. The accelerated population growth in the city leads to a significant increase in car ownership. Thus, urban transportation and traffic congestion have become growing problems in Istanbul. Recent statistics by the Turkish Statistical Institute (TURKSTAT 2020) show that there are around 4.4 million motor vehicles in the city. The main routes connecting the Asian and European sides of the city are especially busy during the morning and evening rush hours. The first and second Bosphorus bridge sand marine transportation have been used for Bosphorus crossings until the early 2000s.

Local authorities were required to seek alternative solutions as both bridges were operating far beyond their capacities and the traffic congestion problems continued. To minimise the number of vehicles and hence the traffic load, the Marmaray Railway Tube Tunnel Project was developed and brought into service in 2013 as an alternative way of intercontinental transport (Gundes and Ergonul 2011). The project includes the construction of a new railway system under the Bosphorus with the immersed tube tunnel technique that connects two existing railway tracks on the Asian and European sides. Meanwhile, the construction of the third Bosphorus bridge and a highway tunnel under the Bosphorus Strait was also on the agenda. These two projects would serve for different purposes; while the third Bosphorus bridge was planned to be built in the northernmost point of the strait with a focus on intercity and heavy vehicle transport, the highway Eurasia Tunnel aimed to solve the traffic congestion problem in the most densely populated regions of Istanbul.

To meet the ever-increasing demand for intercontinental transportation, the idea of the first highway tunnel connecting the Asian and European continents underneath the seafloor has been announced by the Ministry of Transport in 2006 and entered into operation in late 2016. Eurasia Tunnel or the so-called "Istanbul Strait Road Tube Crossing Project" is considered an important substitute for the other Bosphorus crossings. As the fourth highway link between two continents, the Eurasia tunnel project differentiates itself from the other three by providing the shortest route between the two continents.

The route of the two-deck Eurasia Tunnel is located between Kazlicesme on the European side and Goztepe on the Asian side. The length of the total route is approximately 14.6 km, including 5.4 km of connection roads on the European side, 3.8 km of connection roads on the Asian side, and 5.4 km of the tunnel under the seafloor. Three different methods were adopted for the construction of the 5.4 km section underneath the seafloor: the new Austrian tunneling method for 1 km, the tunnel boring machine method for 3.4 km, and cut and cover tunneling for 1 km of the project.

Build-operate-transfer (BOT) as a private finance model has been adopted by the Turkish government for the realisation of the project. BOT model is the most common approach adopted for the construction of large-scale projects in the country such as power plants, bridges, highways, and airports. Gebze Izmir Motorway and Orhangazi Bridge, the new Istanbul Airport, Canakkale 1915 bridge, and the third bridge on the Bosphorus Strait are some of the well-known examples of BOT type megaprojects of Turkey. As such, the government announced that the BOT model would also be used in the construction of the Eurasia Tunnel.

With the increasing infrastructure investment needs in the world, many governments are planning to realise huge infrastructure investments using the public-private partnerships (PPPs) model (The World Bank 2020). Thus, a better understanding of the financial and organisational mechanisms from real-world experiences has become crucial, now more than ever. This paper explores the use of BOT models in the

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realisation of basic infrastructure through an examination of the organisational and financial structure of the Eurasia Tunnel project.

Overview of the Project

Table 1 demonstrates the dates of important milestones for the project. Initial feasibility studies for the Eurasia Tunnel Project started in 2003. In 2005, the Japanese engineering consulting firm Nippon Koei was awarded a contract for carrying out detailed feasibility studies of the project, including environmental impacts, approximate cost estimations, risk assessments, and route evaluations. The tender for the project was announced in 2006. However, the tender date was postponed many times to ensure that a sufficiently strong competitive environment is created and that technical competencies of bidders are aligned with the project's requirements.

An improved competitive environment is one of the most important issues in the realisation of such mega projects. However, the "no-bid" situation has been a common phenomenon in private toll road projects in the country, such as the Gebze-Izmir Highway and the Third Bosphorus Bridge projects to name a few. These projects could only be tendered successfully after some important modifications were made in the project scope and public-private risk allocation structure. Minimum traffic guarantees (MTGs) provided by the government and the assumption of the costs associated with expropriation were the most significant issues in these negotiation processes (Buyukyoran and Gundes 2018).

Project Timeline	
Tender announcement	2006
Tender & Contract Award	2008
Construction period	3 years, 11 months, 3 days
Operation period	25 years 28 days
Total concession	29 years (2013-2042)
Transfer to Turkish Government	2042

Table 1. Timeline of the Eurasia Tunnel Project
Source: Authors' own compilation

Two separate joint ventures submitted bids in the tender. The contract was awarded to the Turkish-Korean joint venture (JV) in 2008; approximately two years after the announcement of the tender. The total concession period is 29 years. Although the construction was scheduled to be completed in mid-2017, it was finished approximately 8 months earlier and the operational period started in December 2016. The tunnel will be transferred to the Turkish government at the end of 2042.

Organisational Structure and Contracts

Figure 1 shows the organisational structure of the Eurasia Tunnel Project. The client is the General Directorate of Infrastructure Investments of the Ministry of Transport and Infrastructure, Maritime Affairs and Communications. The concession contract was awarded to the Eurasia Tunnel Operation Construction and Investment Inc. (ATAS) JV. ATAS JV is comprised of the Turkey-based Yapi Merkezi and South Korean SK Engineering & Construction. Their shares in the JV are equal: each holds 50 % of the shares. The shareholders of the project company are also the contractors in the project. This is a common practice in BOT transactions; partners of the project company usually assume full responsibility for construction works. In some cases, investors in the project company may prefer to undertake only a certain part of the construction activity and contract out the remaining parts of construction works.

Several advantages exist for this type of practice in BOT projects. Firstly, when project contractors are also shareholders in the project company, the contractors are fully motivated to complete the construction in the shortest possible time. In this way, the operational period can be amended to an earlier time, thus the project company can benefit from earlier revenue streams. Second, it is argued that technical performance and quality are improved as the contractors will want to take advantage of operating a high-quality facility in the future (Babbar and Schuster 1998).

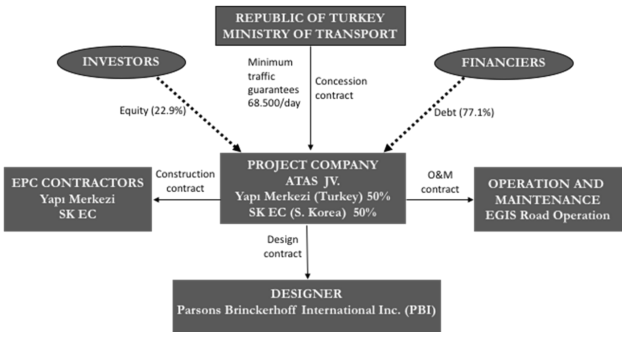

Figure 1. Organisational structure of the project
Source: Authors' own compilation

The operation and maintenance contract is awarded to EGIS Road operation. Parsons Brinckerhoff International Inc. (PBI) is the leading designer of the Eurasia Tunnel Pro-

ject. The independent design verification role is taken by the HNTB company.

Financial Structure

The total cost of the Eurasia Tunnel project is $ 1.245 billion and the debt to equity ratio is 77.1/22.9 (Avrasya Tuneli 2020). One can see that the majority of the funding for the project comes from lenders. In project finance transactions, normally 70% to 90% of project costs are covered by debt obtained from financial institutions. The remaining 10% to 30% of project costs are typically covered by equity investors in the project company.

Around $285 million of the total project cost is provided as equity by the shareholders of the project company, namely Yapi Merkezi and SK EC. Each company has provided the half of the equity investment in accordance with their shares of 50% in the project company. The remaining $960 million is obtained from multilateral development banks, export credit agencies, and commercial banks. More than half of the $960 million debt is raised as direct loans by three institutions, two of which are multilateral development banks, namely the European Investment Bank (EIB) and the European Bank for Reconstruction and Development. Each of these banks provided $150 million. The third one, Korea Eximbank is an export credit agency from which $250 million is obtained, working on behalf of the government to support South Korean export products and services. The remaining $200 million of debt raised by EIB is guaranteed by Turkish commercial banks and $210 million of project debt is provided by the Sumitomo Mitsui Banking Corporation, Standard Chartered Bank, and Mizuho Bank under the guarantee of Korea Eximbank and Korea Trade Insurance Corporation.

Traffic, Revenue Risks and Government Guarantees

Turkey is one of those countries that adopt a hybrid model in which the revenues of the private parties are generated from 'real tolls' and MTGs. Initial MTGs provided by the government in the Eurasia Tunnel Project were 68.500 vehicles per day (around 25 million vehicles/year) when the operational phase for the project started in December 2016. In accordance with the agreement, MTGs provided by the government are being increased by 0.5% each year. Toll rates are regulated by the Authority. While it was not possible to obtain official statistics for the actual number of vehicles passing through the tunnel in previous years, some newspaper articles covering this issue could be found. In our view, the examination of these sources could only give an approximation of actual numbers, as the numbers provided by various sources were not all the same.

The article by Tuncer (2021) states that the number of vehicles passing through the tunnel has been 15.329.565 in 2017, 17.556.265 in 2018, 17.514.551 in 2019, and 11.740.343 in 2020. This information indicates that the actual number of users has been around 61% (2017), 70% (2018), 69% (2019) and 46% (2020) of the guaranteed amounts. Based on this data one can see that while the actual traffic volume has varied between 60% to 70% of the guaranteed volume between 2017 and 2019, it has significantly decreased in 2020. The decrease of the traffic volume in 2020 is not surprising since there have been closures and transition to remote working in the country due to Covid-19. The reductions in traffic volumes have once again highlighted the long-known but long-ignored weakness of PPP toll road projects: the traffic risks.

Along with the MTG's provided by the government, "the debt assumption agreement" was signed between the Undersecretariat of Treasury and financial institutions in order to improve the bankability of the project (Yapi Merkezi 2018). According to the commitment, financial obligations of the Eurasia Tunnel Project, which includes $960 million, were assumed by the Treasury. Thus, the debt obtained by the project company could be secured if the PPP agreement between the government authority and the project company is terminated.

Conclusions

The use of PPP model in infrastructure development provides advantages in several project outcome-related aspects such as improved quality and schedule performances. However, the distribution of risks among public and private parties still appears to be a major problem. For PPP toll road projects the assumption of traffic risks by the public sector through minimum revenue or traffic guarantees is of particular concern, leading to widespread public opposition. This problem is worsened by the recent Covid-19 outbreak and the subsequent lockdowns, which once again showed the vulnerability of PPP toll roads to demand shocks.

Indeed, this problem applies equally to all demand-based PPP projects. Resolving the problem requires a full reconsideration of alternative financing and payment mechanisms. Detailed analyses and documentation of case studies incorporating both successes and failures could also add significant value. However, the success of these efforts largely depends on the transparency of project-based data, which will ultimately lead to more balanced choices about future models.

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