13. A Framework for Assessing Public–Private Partnerships

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CosaNostra Pizza #3569 is on Vista Road just down from Kings Park Mall. Vista Road used to belong to the State of California and now is called Fairlanes, Inc. Rte. CSV-5. Its main competition used to be a U.S. Highway and is now called Cruiseways, Inc. Rte. Cal-12. Farther up the Valley, the two competing highways actually cross. Once there had been bitter disputes, the intersection closed by sporadic sniper fire. Finally, a big developer bought the entire intersection and turned it into a drive-through mall. Now the roads feed into a parking system – not a lot, not a ramp, but a system – and lose their identity. Getting through the intersection involves tracing paths through the parking system, many braided filaments of direction like the Ho Chi Minh trail. CSV-5 has better throughput, but Cal-12 has better pavement. That is typical – Fairlanes roads emphasize getting you there, for Type A drivers, and Cruiseways emphasize the enjoyment, for Type B drivers (Stephenson 1992).

13.1 INTRODUCTION

With the widened attention to privatization in its many forms, one may think that private roads are just around the bend, that travelers will soon drive on commercialized streets and highways and eschew public sector arteries. That was the vision portrayed by Neil Stephenson in his novel of the near-future Snow Crash, quoted above. However a world of unregulated private roads is a fear confronting those who currently control the roads sector as well as science fiction authors. While the archetypal private road may include no public involvement, most recent private efforts in the highway sector to date have either been government contracts, franchises, outsourcing, or have required government assistance. They certainly require government permission and have been subject to extensive government oversight. These are often referred to as 'public–private partnerships'.

Public–Private Partnerships, also known as P3 or PPP, are contracts between government agencies and private businesses that involve the

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government agency paying, reimbursing or transferring a public asset to the private sector in return for goods or services over a set time period.

PPP have existed for centuries (Levinson 2002). The turnpike era in England beginning in the 1650s and in the United States beginning in the 1790s, both lasting until the second half of the nineteenth century, illustrate many forms of public–private partnerships. In England, roads were organized as trusts, quasi-public corporations, chartered by Parliament, but with the aim of earning a profit. There was significant oversight, the right to operate turnpikes was not in perpetuity, but had to be renewed by Parliament. When turnpike organizations went bankrupt (often due to the rise of railroads), they were taken over by local government. Toll farming, the selling of the right to collect tolls, was another aspect of private involvement, reducing public sector risk (in principle) by exchanging a lump sum payment for the right to collect tolls (which were subject to the vagaries of demand and required entrepreneurship and incentive for enforcement). PPPs are returning to the forefront because governments do not have the fiscal resources and, in some instances, knowledge, to keep up with the public demand for better services. As stated by the National Council for Public–Private Partnerships (2002):

> The confluence of rising infrastructure needs and social demands, combined with tight governmental budgets and public resistance to additional tax increases, has made it essential for public authorities to turn to the innovative qualities and access to operating capital possessed by the private sector in order to fulfill responsibilities.

However, the private sector is motivated by profits, and so may give insufficient weight to quality or safety for the general public. Before the partnership is initialized, two questions must be answered: does the partnership add efficiency in use of limited resources, and will the public be better served by the partnership? (NCPPP 2002) Both partners will have risk involved with the partnership. The private businesses will have to risk their own time and money, and will have to disclose financial conditions to the public. The public sector risks overcharging by the private partners, being forced into a poor negotiating position, and the potential for declining benefits over time.

Many elements of the highway transportation system are already private. Drivers and passengers expend their own time in producing highway trips. Drivers generally own their vehicles, so those too are private. Roadside services (gas, food, lodging) are almost always private, and are necessary elements for many kinds of trips. While in some cases these may be concessions on government owned land (rest stops on toll roads), on most highways they are on private land. The origin and destination of the trip are also generally in the private sector; these trip generators (generation

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facilities) may be analogous to the generating plants in the electricity sector. The roads themselves, however, are not generally private. These network components are at issue in the discussion of partial partnerships to full privatization of roads.

Much discussion about private roads focuses on the flexibility and choices provided to travelers. A network with largely, or entirely, private elements would be very different than the one we face on a daily basis. Just as deregulation of communications created radically new products and services that were unimagined at the time, divestiture of highways may do similar things. However, unlike the American telecommunications sector, streets and highways are government owned. Furthermore, highways are presently financed through gas taxes and general revenue, rather than priced according to use or a contract between service provider and consumer.

There is clearly reluctance to privatize; otherwise we would already be living in a world with private streets and highways. This chapter explores the mechanisms of partnerships in creating private involvement in the road sector. Ultimately, we would like to be able to answer a number of questions related to PPPs:

- Is the public better served by PPPs than either public or private control?
- If so, why are relatively few PPP initiatives?
- Why do some PPP work and others do not?
- Which institutional arrangements are the most successful?
- What regulatory oversight is required?
- What levels of the road systems are best suited to partial or full private involvement?

We will not answer all of these questions in this chapter; though we develop a methodology we hope will allow us to answer these in future research.

This chapter reflects on the increasing interest in PPP, as they will be used to procure the design, construction, maintenance, operation and financing of major transport infrastructure. The main types of PPP are given including a brief description of existing PPP projects. The next sections give in detail implementations of PPP initiatives, providing detailed examinations of two US cases: the Alameda Corridor in California, and the Dulles Greenway in Virginia, as well as the Tagus River Bridge in Portugal, and the Luas System in Dublin, Ireland. The prospects for the future of Public–Private Partnerships are then discussed.

13.2 TYPOLOGY AND THEORY

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When there are two entities (the public and the private sector), there must be two objectives: welfare and profit. Those objectives, while not entirely coincident, may not be totally mutually exclusive. The successful Public–Private Partnerships should both increase the quality and quantity of the public service and allow the private business to make a profit. Under PPPs, upgrades and construction to major infrastructure projects can move ahead more quickly than the government's current timeframe using its own stretched financial resources. The government agency entering a partnership hopes to achieve value for money through shorter construction periods, streamlined contracts and a simplified procurement process. Through PPPs, any combination of public and private investment is possible; the idea being that for every unit of public money put into a project, private money would also be injected.

The main types of Public–Private Partnerships are (USGAO 1999):

- Build–Own–Operate (BOO): The private business builds and operates a public facility and retains legal ownership
- Build–Operate–Transfer (BOT): The private business builds and operates the public facility for a significant time period. At the end of the time period, the facility ownership transfers to the public
- Buy–Build–Operate (BBO): The government sells the facility to the private business. The private business refurbishes and operates the facility
- Design–Build–Operate (DBO): A single contract is awarded to a private business which designs, builds, and operates the public facility, but the public retains legal ownership
- Build–Develop–Operate (BDO): The private business buys the public facility, refurbishes it with its own resources, and then operates it through a government contract.

More broadly, we can think of a continuum of governance structures between private and public as suggested by Table 13.1.

We can ask as a broader question how do roads fit into market economy. Roth (1998) suggests that weaknesses of the current road system include:

- Lack of ownership.
- No accountability to customers.
- Absence of pricing.
- Not financially independent.

Table 13.1 Realms of Private and Public Involvement

	Private Roles

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Public	Public	Federal Government	none
		State Government	none
		Local Government	none
		Homeowners Association	none
		Utility Quasi-Public Authority	Build, Own, Operate
	Outsourcing	Service Contract	Operations and Maintenance
		Management Contract	Design, Build
			Design, Build, Major Maintenance
			Design, Build, Operate
	Franchise	Project Franchise	Lease, Develop, Operate
			Build, Lease, Operate, Transfer
			Build, Transfer, Operate
			Build, Operate, Transfer
			Build, Own, Operate, Transfer
			Build, Own, Operate
Private	Divestiture	Private Entrepreneurship	Buy, Build, Operate
			Buy, Operate

Roth advocates making roads commercial. He suggests that those willing to provide roads be able to do so. In order for that to happen, a reliable payment mechanism must be developed, and road assets must be vested in owners (public or private) whose interests are to use the assets effectively. Thus a rethinking about roads from a public commons to a commercial enterprise must take place. The introduction of public–private partnerships is a step in that direction, in that it forces a reconsideration of the roles of roads in the broader economy. Moreover, to raise both the quality and accessibility of services in key areas of transport the role of public–private partnerships, or outsourcing, has become a topic of intense debate.

During the 1990s outsourcing was ideally considered a rather blunt instrument to push down the public sector expenditure. As early adopters of outsourcing have discovered, simply handing over one part of the business may have an instant impact on the bottom line but it rarely acts as the catalyst for transforming services, operations or management. Having the public sector budgets more scrutiny than ever, now it is the time to explore the real potential for partnering the public, private and not-for-profit sectors.

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Recent researches related to outsourcing have been made in different areas including e-commerce, restructured electricity markets, firm behavior in oligopoly markets, and the organization of firms and vertical relationships (Kroszner and Strahan 1999, Chevalier and Glenn Ellison 1999, Borenstein and Farrell 1999). Hubbard (1998) has used data on the trucking industry to explore the organization of trucking firms and shippers' decisions to purchase or provide their own transportation. In particular, Hubbard (1998) studied the development of onboard computer technologies investigating the determinants of diffusion for this technology and its implications for the choice between company drivers and owner-operators. Due to the economics importance of outsourcing, it is essential to evaluate if its implementation will be successful or not. Even tough it is not simple to evaluate a Public–Private Partnership project, one such model for a PPP's evaluation can be proposed.

13.3 EVALUATION

Measuring the successful implementation of a Public–Private Partnership can be a controversial issue. PPP evaluation process has to take into account parameters including:

- The support for the PPP project by the public, government, politicians, and private firms.
- The satisfaction of stated objectives (costs, demand, timetable).
- The extension of the project or undertaking of new projects with similar parties.
- The project improves the efficiency of the system, the equity of the system, the environment, and the experience of neighbors to, and users of, the project.

> The economic success of most partnerships for local governments clearly rests on healthy competition among the *private* partners. Those partnerships in which two *public* partners competed for the business of a private partner have been financially disastrous (Performance Perspective 1999).

It has been asserted that Public–Private Partnerships work best if the roles and responsibilities for each partner are defined. The government is responsible for defining the details of the objectives, and that the standards are met and enforced to ensure the public's benefit and safety. The private businesses operating efficiently to be profitable take risks in new approaches and designs that the government is not always able to achieve. Long-term value for money will depend on how well the private sector manages the risk

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transferred to it, and on the public sector's success to manage the contracts which can last for more than 30 years.

An empirical model shaping the success (or failure) of PPP is a function of a number of factors:

$$S = f(x_i) \qquad \text{with } i=1,\ldots N \tag{13.1}$$

where N represents the total number of factors affecting the project. Among the main factors one can mention are the experience of partners with PPP, the share (support) of private investors, the social acceptance of the projects, and timely and cost effectiveness of the project, among other ones.

One can easily observe about the complexity of determining the specifics – dependent variables, homogeneity and degree – of such a model. Studies are being made to capture exactly what kind of model should be applied but none has up to this time been fully described. When evaluating the results of such projects, on a regular basis, a group capable of representing all stakeholders' views must be convened. Then, an evaluation of the partnership must be realized in response to performance against indicators, unexpected risks, benefits identified and evolving needs (Hodges and Grayson 2001). The ideal scenario is to obtain a model similar to Equation (13.1) such as:

$$S = f(x_i) \quad = w_1 x_1 + w_2 x_2 + \ldots + w_n x_n \tag{13.2}$$

where: - x_i would represent factors of the project, as already stated, such as social acceptance of the project, support of private investors and so on; - w_i would represent weights to be determined.

Having gathered information of a number of projects (the social acceptance and private support for each project, for instance), the weights w_i could then be obtained, and Equation (13.2) could be used to forecast if a project to be initiated would be a successful one or not. As it is beyond the scope of this chapter to obtain such a model, for illustrative purposes a simpler approach has been applied on this research. We have assumed that all parameters w_i have the same weight and sum one ($\Sigma\, w_i = 1$), and the score to the factors x_i will vary from 10 (a success) to 0 (a failure). A total of four factors, x_i, are used on this chapter: the society and Government acceptance; the project being concluded on budget and on schedule. This model is applied to the four cases next described, illustrating its application.

13.4 CASES

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This section considers in depth several cases of application of Public–Private Partnerships. We do this not to evaluate the specific cases, but to establish what are the criteria that lead to success or failure of PPP and to determine if there are underlying factors that can be used in prediction helping to shape future investments.

Ireland – The Dublin Luas Tram System

The Dublin Light Rail Transit (LRT) System, the Luas tram system, is a state-of-the-art system connecting the Dublin city center with convenient stop locations and excellent levels of comfort and safety. Luas has high capacity and frequency services running on two tramlines: (i) the Red Line, connecting Tallaght to Connolly, approximately 48 minutes total journey time; (ii) the Green Line, connecting Sandyford to St. Stephen's Green, approximately 22 minutes total journey time. It is a project that can be classified as a DBFO (Design–Build–Finance–Operate) type of PPP project, an extension of a DBO (Design–Build–Operate) type of PPP project.

History

Since 1995, the Irish Government's approach to the provision of new public transport infrastructure was that any proposal should be examined in the first instance for its potential as a PPP. In particular, being the Government resources available finite and stretched to the limit, the Irish Government decided to favor full DBFO, Design–Build–Finance–Operate, PPP project whenever the circumstances allow (Department of Public Enterprise 2000). The Luas system was one of these first PPP projects where the private sector is responsible for the designing, building and financing of the project, having also the concession to operate the project for a number of years.

In 1996, the government of Ireland said that the proposed Luas system would be in operation by 2001. In December 2000, the competition for the operation of Luas lines was initiated. Nevertheless, the Government of Ireland approved only in 2002 the construction of the initial Luas system comprising 2 surface lines: Line A from Tallaght to Connolly Station, and Line B from Sandyford to St Stephen's Green using the Harcourt Street disused railway alignment. Despite all the troubles, the first completed line of the city's light rail Luas system, linking Sandyford and St Stephen's Green (the Green line), opened to the public on 30 June 2004. Afterwards, the second line was inaugurated on 28 September 2004. The Tallaght to Connolly station line has the capacity to carry 2,800 passengers every hour in each direction, and the Sandyford to St. Stephen's Green line has the capacity for a further 4,600 passengers per hour in each direction. Nowadays,

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the trams work from Monday to Sunday with a frequency of every 5 minutes at peak times.

Financial Assistance

In 1996, the government said the Luas tram system would cost €279 million being in operation by 2001. By 2001, the cost had more than doubled to €635 million and the start date put back to 2003. By the end of 2003, it was learned that the Luas contractor would receive a bonus if it completed the light rail system by its June (to the Sandyford line) and August 2004 (the Tallaght line) deadlines under a new deal agreed with the Railway Procurement Agency (RPA). Under the new agreement, there was a bonus if the construction finished on time with the contractors buying some of the risk. The bonus payment was included in the RPA's latest 2003 Luas cost estimates of €775 million, including the risk fund of €84 million.

Discussion

The building of the Luas project in Ireland shows many of the problems that can arise during the execution of a PPP project. Even by 2003, one year before the inauguration of the first Luas line, there was news stating that the cost was heading for €1 billion, and that the two unconnected lines would not be in service before 2005 (*The Sunday Business Post* 31/08/03). A number of issues discussed included: unnecessary traffic delays and missed construction deadlines, failure to deal with disrupted businesses, poor site management and lack of concern for pedestrians. Nevertheless, the Government of Ireland has stated that systems similar to Luas are popular worldwide being the obvious choice for a dynamic capital city like Dublin, connecting suburbs to the city center with a high capacity and high frequency service.

Portugal, Tagus River Bridge, Lisbon

The Portuguese Government decided to build a new bridge in 1991 to the east of Lisbon, through the river Tagus. This new bridge called 'Vasco da Gama' bridge was completed slightly ahead of schedule in March 1998. It had a total cost of €1 billion being financed by the private sector and the European Union. It is a 17km bridge that eases traffic congestion in Lisbon because traffic traveling between the north and south of the country is more easily able to bypass the capital. It is a project that can be classified as a DBO (Design–Build–Operate) type of PPP one.

History

The Portuguese Government created in 1991 the Office for the Crossing of the Tagus at Lisbon called GATTEL. Since the Tagus estuary at Lisbon is

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very broad, up to 20km in places, any new crossing would be an expensive and technically challenging enterprise. By September 1991, GATTEL concluded a series of studies discarding the construction of a possible tunnel as a solution. GATTEL compared three corridors for a new road bridge: eastern (Sacavém Montijo), central (Chelas Barreiro) and western (Algés-Trafaria). After economical and environmental analysis, the Sacavém Montijo bridge project was chosen, later being called the Vasco da Gama bridge.

Legislation was approved to establish the location and financing model of the bridge, based on a joint concession of the new and the existing bridge. In April 1994, following a lengthy procedure, the consortium called Lusoponte won the concession contract. To prepare for the Lusoponte takeover in 1996, the tolls of the existing bridge were raised in June 1994. Even though there were further discussions regarding environmental and social issues during the implementation of the project, the Vasco da Grama bridge was finally completed in March 1998.

Financial Assistance

The lower cost was one of the chief arguments to justify the option for the location of the Vasco da Gama bridge, even tough this argument is disputed by some social parties including Non Governmental Organizations (NGOs). The contract between the Portuguese Government and Lusoponte established that the financial risks should fall to Lusoponte, and the revenues of the concession should come from tolls. Lusoponte won the contract not only for the new Vasco da Gama bridge but also obtained the right to explore the already existing bridge, called '25 of April', which was built in 1966.

The 30 year term cash flow of Lusoponte amounts to about €2 billion, according to the Ministry of Planning (MPAT 1994). Lusoponte is receiving an income from a toll charged for the 15 minute drive across the Vasco da Gama bridge, which by the year 1998 was expected to carry up to 130,000 vehicles per day. The consortium Lusoponte has the right to the reposition of financial equilibrium, if legislative changes have a significant direct impact on revenues or operation costs of the crossings.

Discussion

The building of the Vasco da Gama bridge complements the construction of a rail link along the existing 25 of April bridge, further west along the Tagus River in Lisbon. Financed mainly by private sector and European Union cohesion funds, the project was completed slightly ahead of schedule. This was one of the most controversial public works ever developed in Portugal. Nevertheless, for many Portuguese lawmakers, the new Vasco da Gama bridge symbolizes the spirit with which Portugal modernized itself at the end

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of the millennium. With the experience gained in the implementation of this Public–Private Project, Portugal and the European Union hope to have made the implementation of PPP projects easier and more efficient.

Alameda Corridor, California

The Alameda Corridor is a system of rail routes connecting the ports of Los Angeles and Long Beach to downtown Los Angeles, California, 20 miles north. The ports of Los Angeles and Long Beach, also known as the San Pedro Bay Ports, in the 1990s became the busiest ports in the United States due to the enormous expansion in trade with the Pacific Rim nations. Los Angeles and Long Beach ports are first and second in the United States for container shipments, with 5.18 and 4.46 million TEUs (20 foot equivalent units) respectively for the year 2001. The San Pedro Bay ports are third in the world for container shipments, behind Hong Kong (17.8 million TEU) and Singapore (15.5 million TEU) (Goodwin 2002). Congestion on the rail routes caused congestion for Alameda Street that parallels the rail routes. The Alameda Corridor project aimed to increase efficiency in movement of cargo throughout the United States and to overseas markets. It is a project that can be classified as a DBO (Design–Build–Operate) type of PPP project.

History

The Southern California Association of Governments (SCAG) formed the Ports Advisory Committee (PAC) in October 1981 with the goal of improving the transportation system for highway and rail access. PAC members included local elected officials, representatives of the ports of Los Angeles and Long Beach, the U.S. Navy, the U.S. Army Corps of Engineers, the railroads, the trucking industry, and the Los Angeles County Transportation Commission (LACTC). First, PAC dealt with the problems of highway access to the ports. The committee recommended numerous highway improvements, such as the widening of certain streets, which were completed in 1982. Rail access and the impact of future train traffic on the northern communities of the corridor were determined next. Three routing alternatives were analyzed and it was concluded that consolidating the trains on an up-graded Southern Pacific San Pedro Branch right-of-way would be the most efficient alternative. This phase was completed in 1984.

The Alameda Corridor Task Force (ACTF) was created in February 1985 by SCAG, with members similar to that of PAC, plus the addition of the California Public Utilities Commission (CPUC) and each of the cities along the corridor. The ACTF concluded that a Joint Powers Authority should be created to have design and construction responsibility for the Alameda Corridor. The Alameda Corridor Transportation Authority (ACTA) was

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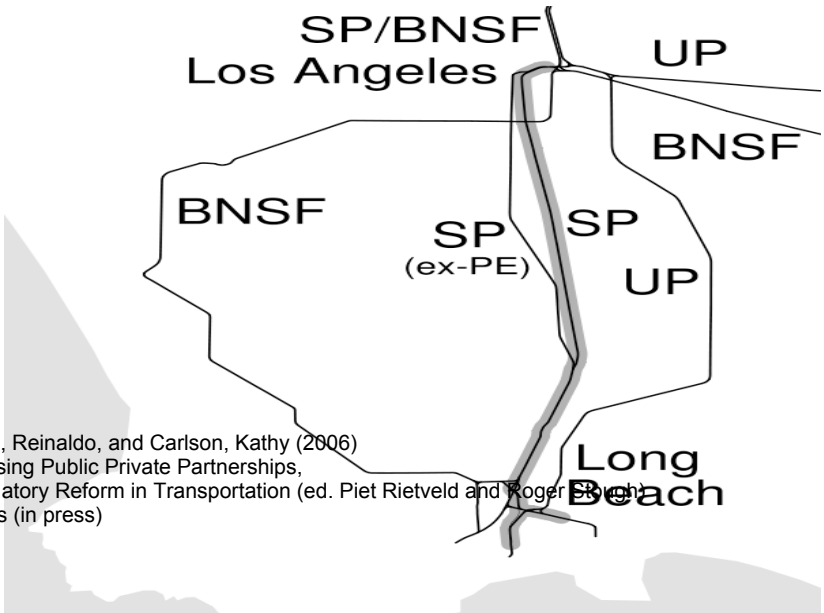
created in August of 1989 by the cities of Long Beach and Los Angeles. A seven-member board representing the cities and ports of Long Beach and Los Angeles and the Los Angeles County Metropolitan Transportation Authority (MTA) governs ACTA. The Alameda Corridor Project was opened on April 12, 2002 and began operation on April 15, 2002 with 33 trains per day using the corridor.

Financial Assistance

The ACTA believed that the project was not going to be accomplished without intervention and invited Congressmen and other elected officials to the ports to see the seriousness of the situation. Congress in 1995 identified the Alameda Corridor as a 'Project of National Significance', which secured federal funding for the project. Congress appropriated $57 million as a loan for the project in 1997. The U.S. Department of Transportation authorized a $400 million 30 year loan for the project in 1998. The ports provided $394 million for the purchase of right-of-way and start-ups. ACTA sold also $1.2 billion revenue bonds in January 1999. The remaining funding came from California state grants and sources administered by the Los Angeles Metropolitan Transportation Authority. The total financing package was approximately $2.43 billion (Hankla 2001). The loans, grants, and bonds will be repaid by user fees from the railroads, ranging from $15 for a 20 foot and $30 for a 40 foot container.

Discussion

The Alameda Corridor was completed on time and on budget. The objectives of the project were to reduce highway traffic delays, increase rail productivity, reduce accidents, and improve air quality due to fewer emissions from congested vehicles and trains. It consolidated the Union Pacific/Southern Pacific (UP) and the Burlington Northern Santa Fe (BNSF) 90 miles of rail into 20 miles. The entire Alameda Corridor project eliminated or severely reduced 200 at-grade railroad crossings and added almost 50 new bridges. Figure 13.1 is a map of the Alameda Corridor.



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Source: Wikipedia – Alameda Corridor (2007)

Figure 13.1 Map of the Alameda Corridor

People credited this success to using Design–Build instead of the Design–Bid–Build process for the trench construction in particular. Time savings are estimated at 14 to 20 months. The process divided the risk among the partners, quality construction was achieved, scope creep was avoided, and contractor-initiated changes were less than 3 percent. Job training and local hire goals were reached (Doherty 2002). The Alameda Corridor Project had to overcome many obstacles, but with the joint effort of the public and private sectors a significant economic and environmental benefit to California was achieved.

Dulles Greenway, Virginia

The Dulles Greenway is a 22.5km (14 mile) western extension of the Dulles Toll Road. It connects Washington Dulles International Airport with U.S. Route 15, Leesburg. It consisted of seven interchanges, 36 bridges, a toll plaza, 12 ramp toll barriers, an administration building, and four operational lanes at the beginning of operation. It allowed for construction of two additional lanes, two additional interchanges, and for a rail system in the median (Advanced Transportation Technology News 1995). It is a project that can be classified as a DBO (Design–Build–Operate) type of PPP project.

History

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Dulles Greenway, Virginia, is one of the first toll highways in the United States that was designed, built, and financed by the private sector since the end of the nineteenth century turnpike era. The Dulles Greenway originated in 1988 with the Virginia General Assembly authorizing the private development of toll roads. Dulles Greenway is the fourth highway segment comprising the Dulles Transportation Corridor. The first main highway in the corridor was the Dulles Airport Access Road (DAAR). This was built by the Federal Aviation Agency (FAA) and opened in 1962 along with the Washington Dulles International Airport. Then the Virginia Department of Transportation (VDOT) built the Dulles Toll Road (DTR), which opened in 1984. Next, the third highway segment, was the Dulles Access Road Extension (DARE), extending eastward from the DAAR and DTR to I-66 by Falls Church and it was completed in 1985 (Kozel 1997).

Financial Assistance

Toll Road Investors Partnership II (TRIP II) owns the Dulles Greenway. TRIP II is comprised of Lochnau Ltd., Autostrada International from Italy, and Kellogg Brown and Root, Inc. Autostrada Internatonal operates the toll systems and Kellogg Brown and Root is the general contractor. Lochnau Ltd. is the main investor with a stake of $68 million. The potential return ranges from negative to a Virginia Commonwealth limit of 30 percent. Lochnau Ltd. owns property in the vicinity and may have substantial profits in land appreciation due to increase development. The $350 million project is being financed by long-term, fixed-rate notes due in 2022 and 2026, under the direction of CIGNA Investments, Prudential, and John Hancock (Engineering News-Record 1993). The initial toll was $1.75 each way and did not vary either with the length traveled along the highway or the time of day. The volume of traffic averaged 11,000 vehicles daily compared with initial estimates of 25,000 vehicles per day (*The Washington Post* 1996). Suggestions for increasing patrons included: lowering the toll for non-rush hours and weekends, pricing comparable for length traveled along the highway, better marketing strategies, increasing the speed limit from 55mph to 65mph, and establishing electronic tolling.

The Virginia Senate, in February 1996, passed bills allowing the Dulles Greenway to have a speed limit of 65mph and to obtain Federal Highway loans. The toll was reduced from $1.75 to $1.00 in 1996, doubling the volume, but TRIP II missed a $7 million interest payment to its creditors and a $3.6 million payment to the State of Virginia in July 1996 (*The Washington Post* 1996). TRIP II was given time to refinance the $350 million debt and succeeded it in April 1999. A higher speed limit of 65mph, electronic toll collection, and a frequent user program were credited with the highway having a flow of 40,000 vehicles per day in 1999 (*PR Newswire* 1999).

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Development expanded significantly in 1999 with MCI WorldCom and America Online (AOL) having offices in the corridor. Tolls were increased for the Dulles Greenway to $1.40 for cash and $1.15 for electronic payment. Future population projections resulted in TRIP II expanding the Dulles Greenway. Construction for an eastbound lane began in June 2000 and was completed in December 2000. The westbound lane began construction in the Spring of 2001 and was completed in August 2001. Construction costs for the additional five miles of two lanes were estimated at $10.4 million (Sullivan 2000). Usage of the Dulles Greenway increased to over 60,000 vehicles per day in June 2002 – a 7 percent increase from a year earlier (Meehan 2002).

Discussion

The Dulles Greenway is one of the few experiments with private building and financing of a project that had in the past been accomplished with public resources. The risks that the private partners incurred were: an extremely large leveraged debt, a long time frame before profitability, a project subject to economic downturns, and competition from no toll roads. In addition, Dulles Greenway could not raise its toll above $2.00 unless the Virginia State Corporation Commission (SCC) gave TRIP II permission. The main advantage that the Dulles Greenway highway realized was the willing of the lenders to negotiate and wait for payments. Moreover, the highway was built in an area that was expanding and growing rapidly.

13.5 APPLICATION OF THE MODEL

Measuring the successful implementation of a Public–Private Partnership can be very controversial because the public, government and private agents can have complete different views about the PPP implementation. As it was previously stated, a total of four factors, x_i, are used on the applied model: the society and Government acceptance; the project being concluded on budget and on schedule. Prior to analyze the results obtained, some caution comments must be made.

First, in the cases where not all society agents were in accordance to the PPP implementation, the score of 10 meaning full approval by the society was not given. In particular, the society approval score of 0 was given to the Lisbon project due to all the controversial statements given about it, even after its conclusion. Second, the score for the Government approval was considered 10 for the four cases because the main government agents had always a favorable view about the PPP implementation. Third, if the projects

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were realized on time and on budget, a score of 10 was given to those factors; otherwise, a score of 0 was given.

The model described in Equation 13.2 is then applied assuming the weights, w_i, to be identical to 0.25 ($w_i = 0.25$). By the results stated on Table 13.2, the projects of the Alameda Corridor and the Dulles Greenway were the ones with the highest scores equal to 8.75. The projects of the Luas System and the Tagus river bridge obtained the lowest scores identical to 5.00. These differences in the projects' scores were because both the Dublin and the Lisbon projects had at least two factors rated 0, while none of the factors in the USA projects had a 0 score. This illustrative example shows how valuable such a tool can be to better quantify the success of a project.

Table 13.2 Measures of Success for Public–Private Partnerships (MSPPP) for Selected Projects

Project	Society Acceptance	Government Acceptance	Budget	On Schedule	Score - S
Ireland – Luas System (Dublin)	10	10	0	0	5
Portugal – Tagus Bridge (Lisbon)	0	10	0	10	5
USA – Alameda Corridor (Los Angeles)	5	10	10	10	8.75
USA – Dulles Greenway (Virgina)	5	10	10	10	8.75

An important note must be added regarding the chosen factors: society and government approval, on budget, and on schedule. As it was previously said, the ideal scenario would be to develop a model where having gathered the data set for a number of projects, the model could be calibrated obtaining the w_i values. Then it could be asked: how to forecast the score of an incipient PPP project not knowing if the project will be concluded on time and on budget?

To solve the above problem, we can observe the private investors that are participating in the PPP projects, discovering what other projects they have taken part in the past. Then, it can be obtained approximate scores to their respective factors, depending on if they have finished their past projects on time and on budget. Finally, the model could then be applied to forecast how

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successful will be the just initiated PPP project. As one can see, this is an interesting field where further research and studies are needed to address all these issues.

13.5 APPLICATION OF THE MODEL

Public–Private Partnerships are aimed at increasing the delivery of road services in an era of public financial constraints by using resources of the private sector for public aims. In that sense, it aims to improve the efficiency of service delivery providing more service for less government outlay. However, it has been limited because of a variety of reasons including a clear reluctance of the public sector to fully privatize roads. The risks of course are that the public and private sectors have different interests, the government is ideally concerned with maximizing welfare while firms aim for profit.

We observe that successful PPPs have well-defined roles that both improve the quality and quantity of transportation and provide at least a normal profit to private participants. We measured success across a number of criteria, including a general assessment of the support for the project by the various stakeholders: public, government (civil service), political, and private; looking at adherence to initial forecasts (on-time, on-budget, demand realized); considering whether the project was extended or the parties undertook additional projects (success breeds success); and considering more objective assessments of whether the project served the public good (was efficiency, equity, the environment, and the experience of users and non-users alike improved?).

Public–Private Partnerships represent a flexible solution to establish infrastructure services. Moreover, PPPs involve the sharing of risks and responsibilities between public and private sectors. Notwithstanding the positive commitment in the United States and in Europe towards Public–Private Partnerships, there are still obstacles to be overcome to promote the PPP concept more widely. In many European countries there is no legal framework for PPPs. To implement PPPs, a robust system of commercial laws needs to be in place. Private sector interests have to be protected under the existing laws, and government agencies have to facilitate the involvement of the private sector in infrastructure projects or public utilities.

In Northern European countries, a PPP formula is being envisaged for a sustainable development strategy, integrating economic, social and environmental dimensions. It has been observed that all modes of transport are likely to expand and future PPP projects must also reinforce links with

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the rest of Europe, and especially to improve the inter-modal capacities of port terminals.

The perception of high risk attached to lending on project finance in Southeast Europe is also difficult to overcome, deterring private commercial banks from lending to the region. Country credit risk is an important factor as private commercial banks are frequently reluctant to enter Southeast European markets, due to the general legal and regulatory weakness characterizing these markets. In the medium term, as the Southeast European countries economies will progressively develop, the PPP market will grow.

This chapter also describes a new approach to 'measure' the success of Public–Private Partnerships. Further research must be made not only to determine the robustness of the new approach but also to include other parameters in the proposed model. Discussions to determine the independence of the parameters must also be taken because if the government approves a PPP project, it can strongly market it possibly affecting the personal approval ratings of the society. Nevertheless, one can say that the proposed approach can be applied to give an idea about the quality of a PPP initiative.

Despite all the challenges, Public–Private Partnerships have become increasingly attractive as reflected in many global infrastructure initiatives. As PPPs can also achieve social and environmental objectives, PPPs can emerge as a major mechanism to raise the standard of living of the society.

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REFERENCES

A&L Goodbody Consulting (2002), *Ireland's Infrastructure Deficit*, Dublin, Ireland: A&L Goodbody Consulting.

Advanced Transportation Technology News (1995), 'Dulles Greenway Get Green Light', *Business Communications CO*, **2** (7).

Advanced Transportation Technology News (1996), 'Lower Tolls to Save Greenway?', *Business Communications CO*, **2** (10).

Alameda Corridor-East Construction Authority, California State Auditor (2000), http://www.bsa.ca.gov/bsa/pdfs/99135.pdf.

Alameda Corridor Transportation Authority (1997), http://www.acta.org/Acta/PressRelIndex/pressrelindex.html.

Levinson, David, Garcia, Reinaldo, and Carlson, Kathy (2006)
A Framework for Assessing Public Private Partnerships,
in Institutions and Regulatory Reform in Transportation (ed. Piet Rietveld and Roger Stough)
Edward Elgar Publishers (in press)

Alameda Corridor Transportation Authority (1999), http://www.acta.org/main_menu_acta.htm.
Alameda Corridor Transportation Authority (1995), http://www.scbbs.com/alameda/alameda.htm.
Baker, G.P. and Hubbard, T.N. (2000), 'Contractibility and Asset Ownership: On-Board Computers and Governance in U.S. Trucking', NBER Working Paper No. 7634.
Borenstein, S. and Farrel, J. (1999), 'Do Investors Forecast Fat Firms? Evidence from the Gold Mining Industry', NBER Working Paper No. 7075.
Chevalier, J.A. and Ellison, G. (1999), 'Career Concerns of Mutual Fund Managers', *Quarterly Journal of Economics*, **114**.
Department of Public Enterprise (2000), *A New Institutional and Regulatory Framework for Public Transport*, Dublin, Ireland: The Stationery Office.
Dulles Greenway, http://www.dullesgreenway.com/cgi-bin/dgmap.cfm.
Doherty, John (2002), 'A Project of National Significance: The Alameda Corridor', http://www.thebfc.com/Doherty_files/frame.htm.
Engineering News-Record (1993), 'Bryant Family Puts Down a $68-Million Bet', **231** (20), 14.
Engineering News-Record (1993), 'Toll Road Funds Finally Flow, **231** (20), 13.
Goodwin, Arthur (2002), 'Alameda Corridor A Project of National Significance', http://gulliver,trb.org/publications/mb/2002Ports/06Goodwin.pdf.
Hankla, James C. (2001), 'The Alameda Corridor Project: Its Successes and Challenges', http://reform.house.gov/gefmir/hearings/2001hearings/0416_alameda/0416hankla.htm.
Hodges, A. and D. Grayson (2001), 'Everybody's Business', London, UK: International Business Leaders Forum – The Prince of Wales.
Hubbard, T.N. (1998), 'Why Are Process Monitoring Technologies Valuable? The Use of On-Board Information Technology in the Trucking Industry', NBER Working Paper No. 6482.
Innovative Finance, Dulles Greenway (2001), http://www.innovativefinance.org/projects/highways/dulles.asp.
Johnson, Roger and Streeter, William (2001), 'Toll Road Investors Partnership II, L.P., Virginia Dulles Greenway Toll Road', Fitch IBCA, New York, NY: Duff & Phelps.
Kozel, S. (1997), 'Dulles Transportation Corridor', available in http://www.roadstothefuture.com/Dulles_Trans_Corridor.html.
Kroszne, R.S. and P.E. Strahan (1999), 'Bankers on Boards: Monitoring, Conflicts of Interest, and Lender Liability', NBER Working Paper No. 7319.
Levinson, D. (2002), *Financing Transportation Networks*, Cheltenham, UK and Northampton, US: Edward Elgar.
Meehan, Sean (2002), 'Dulles Greenway Single-Day Traffic Exceeds 60,000', http://dullesgreenway.com/cgi-bin/dgpress26.cfm?home=.
National Council for Public Private Partnerships (2002), 'For the Good of the People: Using Public Private Partnerships to Meet America's Essential Needs' http://ncppp.org/presskit/ncpppwhitepaper.pdf, Washington, D.C.
Performance Perspective (1999), 'Effective Public Private Partnerships', http://www.cityofseattle.net/audit/report_files/PP_1999-8.pdf, City of Seattle, Washington,.

Levinson, David, Garcia, Reinaldo, and Carlson, Kathy (2006)
A Framework for Assessing Public Private Partnerships,
in Institutions and Regulatory Reform in Transportation (ed. Piet Rietveld and Roger Stough)
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