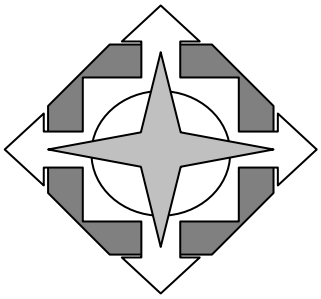

Virtuosity Consulting

Final Report

Successful Examples of Public-Private Partnerships and Private Sector Involvement in Transport Infrastructure Development

Under Contract with the
OECD/ECMT Transport Research Centre

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1. Executive Summary

Background

Ambitious transport infrastructure undertakings appear beyond the short-term fiscal capacity of public funding sources. Consequently, since the late 1970s, providers of infrastructures have looked for innovative ways of financing in the attempt to reduce traditional reliance on publicly-funded debt, including stimulating further engagement of the private sector in the provision of infrastructure[1].

There are many different models or structures whereby governments transfer management and funding responsibility in the provision of infrastructure to the private sector through deregulation, concessions, franchises and contracting, joint public-private partnerships or ventures, and various forms of Build-Operate-Transfer schemes.

Study Objective

The study was commission by the Joint OECD/ECMT Transport Research Centre to document and synthesize findings from case studies of successful public-private partnerships and private sector involvement in transportation infrastructure funding (i.e. public-private partnerships) in order to assist national officials develop policies and project design and execution approaches most likely to lead to success for different types of projects.

Study Approach

The following types of PPP arrangements were investigated:

Special Purpose Vehicle	Mixed Public-Private	Private Concession (O&M)	Build Operate Transfer (BOT)	Build Own Operate (BOO)

Public-Special Purpose Vehicle
Involves transferring responsibility for O&M services and/or capital procurement typically performed in-house by the public sector, to a "commercialized" (possibly incorporated) special purpose vehicle under public ownership/control. The intention is to achieve some degree of commercial efficiencies.

Mixed Public-Private
Involves transferring responsibility for O&M services and/or capital procurement typically performed in-house by the public sector, to a "commercialized" (possibly incorporated) special purpose vehicle under mixed public-private ownership/control.

[1] OECD (2002) p.14

Private Concession (O&M)
Involves transferring responsibility for O&M services typically performed in-house by the public sector under a fee-for-services contract, following a competitive process.

Build-Operate-Transfer (BOT)
Involves an integrated partnership of design and construction responsibilities with O&M for a single facility or group of assets to a private sector partner. This arrangement involves private financing as the up-front" capital costs are paid over time as a "lease", which may or may not involve payment for outcomes. The asset remains public.

Build-Own-Operate (BOO)
Involves the granting of ownership rights in perpetuity to develop, finance, design, build, own, operate, and maintain a transport asset. The private sector owns the asset outright and retains the operating revenue risk and any surplus operating revenue.

PPP "success" has been judged in terms of their realization of transportation infrastructure for the betterment of society:

1. in the form of ***reduced costs*** from allocative and productive efficiencies; and

2. in the form of ***increased benefits*** from the accelerated provision of cost-beneficial infrastructure services.

The study investigates 2 historical and 14 modern PPP case studies which were either:

- Extensively cited in the PPP literature (including OECD/ECMT/EU/UN); and/or
- Known, or came to the investigator's attention during extensive literature search.

Key Study Findings

The key "lessons learned" from the success factors of our PPP case studies include:

- The importance during PPP gestation and procurement (which typically lasts 4-8 years) of broadly-based political/public debate regarding project/procurement design, so as to narrow the degree of uncertainty regarding project/contract details that remain into the procurement/financing phases, which can lower is the likelihood of project success:

- Desirability of procurement/concession/financing stability during the process of selection and award of a PPP concession. Major changes will be costly, damaging to "success" and reflective of failure to address above point.

- Desirability of public sector obtaining major approvals/environmental assessment/land acquisition prior to PPP contract award to prevent unnecessary cost/delays/uncertainty and risks (unless these demonstratively are better managed by the private sector).

- Desirability of the public sector to need/seek private sector expertise/experience/solutions under the PPP – and for "off-book" access to private capital to be a secondary

consideration. There are now well defined public sector accounting rules for whether sufficient risk transfer to the private sector to justify off-book treatment of debt.

- The importance of adequate competition during procurement, and transparency of the procurement approach, to optimizing the public subsidy and generating cost efficiencies:

- Use of a Public-Special Purpose Vehicle (or dedicated unit within bureaucracy), with appropriate PPP procurement/financial skills and political direction, to represent the Government owner/concession granting authority. It is desirable (for efficiency, transparency) if this SPV reports on a fully commercial basis (i.e. full financial statements with balance sheet).

- BOT-Concession length would of 30-35-year range (beyond this is likely to be sub-optimal for taxpayers).

- Concession provisions allowing for government oversight/regulation over various aspects of the contractual arrangement (which are of vital importance for protecting the public interest), recognizing that these will have a "cost" in terms of private sector risk/reward.

- If the PPP project is "bankable" with real tolls alone, the only form of public subsidy should be in the form of "in-kind" public works ancillary to the project, along with approvals process management and land acquisition.

- If the PPP project is not "bankable" with real tolls alone, the form of public subsidy should be carefully considered, in terms of the legitimate basis for its defence and establishment of amount.

- If the public sector is expected to bear the full revenue risk for a project, this may be a bad sign and may indicate that: the project may not be cost-beneficial, the public sector is not getting full cost-efficiency from a concession, and/or the PPP would be better structured as a Design-Build (DB) contract. Despite this point, the full assumption by the private sector of demand/traffic risk should be carefully assessed in light of the PPP risk allocation principle that risks should be assigned to the party best able to manage/mitigate the risk.

- Generally speaking, rail/intermodal/inland water PPP projects will require substantial public capital, either in the form of capital grants, loans or (less often in the modern context) land grants. For these, it will be critical that there be: extensive prior political/public debate, procurement competition, and transparency to optimize the amount of the public subsidy so as to achieve value-for-money for the taxpayer and some appropriate risk transfer to the private sector. In particular, the temptation to underestimate the required public subsidy (so as to achieve greater political/public acceptance) should be strongly resisted, as this will give rise to instability, uncertainty and likely higher costs.

- Generally speaking, rail/intermodal/inland water PPP projects will involve only limited amounts of private equity (as opposed to private debt), and greater attention needs to be

paid to risk transfer to the private sector. In particular, consideration of "shadow-toll" models to encourage DB and O&M efficiency have still to be widely tried (the UK ROC experience being of some interest here in terms of "partial success").

Relationship of Study Findings to Broader Literature

There is general agreement between the "lessons learned" from the PPP case studies and the broader PPP literature.

- Generally, the success of the PPP case studies has been more completely achieved with respect to the second factor than from clear evidence as to the first. This finding is fully supported by the broader literature, which – while containing evidence that certain PPP examples have likely resulted in allocative and productive efficiencies – is more notably for the general lack of evidence on this score.

- Where PPPs have almost universally succeeded (provided they built needed infrastructure, and resulted in project completion) is in overcoming existing public capital constraints, political financial paranoia, and taxpayer reluctance to accrue higher taxes and/or greater public debt.

- The focus of PPP for transportation infrastructure *procurement* – rather than *financing* – has been shown to be an important success factor which (partially) distinguishes between outright PPP project "success" (e.g. Confederation Bridge, Cross-Israel Highway, Melbourne City Link, Arlanda Express) and project "qualified success/partial failure" (e.g. Wijkertunnel, Vasco da Gama bridge, Sydney Harbour Tunnel, M-6 Toll).

- The generally poor degree of PPP project transparency and *ex post* evaluation of financial/traffic/cost performance are (perhaps) the main reasons why – despite clear examples of PPP success – there remains public skepticism of PPP arrangements.

- There are clear limits to the degree to which the PPP model can be broadly applied across countries, transport modes, and network components within a mode.

- There are transparency and accountability concerns from pursuing "off-book" public accounting treatment of project debt unless:

    1. the asset classification as "privately-owned" due to assumption of construction risks and one of either a) availability risk (depending on the performance of the partner); and/or b) demand risk (relating to the behaviour of final users of the assets) is fully justified on the basis of the PPP risk allocation principle that risks should be assigned to the party best able to manage/mitigate the risk; and

    2. there is more fulsome reporting of public liabilities from future risks and payments under the PPP contract, and monitoring of the private sector financial and traffic experiences.

2. Acronyms

Term/Acronym	Definition
AG	Auditor General
*A*SX *(e.g.)*	*Australian (e.g.)* Stock Exchange
AU	Australia
BOO	Build-Operate-Own
BOT	Build-Operate-Transfer
CA	Canada
CBA	Cost-Benefit Analysis
CBD	Central Business District
DB	Design-Build
DBFO	Design-Build-Finance-Operate
DBO/DBOM	Design-Build-Operate/Maintain
DoT/DfT/MoT	Department/Ministry of/for Transportation
ECMT	European Council of Minister of Transport
EIB	European Investment Bank
EOI	Expression of Interest
EU	European Union
FHWA	Federal Highway Administration (US)
FR	France
FX	Foreign Exchange
GAO	Government Accounting Office (US)
GE/DE	Germany
Go*GE (e.g.)*	Government of *Germany (e.g.)*
GVZ	Güterverkehrszentren/freight village/dry port
HSR	High-Speed Rail
IFI	International Financial Institution (e.g. World Bank)
IL	Israel
IPO	Initial Public Offering
IT	Italy

Acronyms

Term/Acronym	**Definition**
IW	Inland Water
JA	Japan
LTD	Long-Term Debt
$M	Millions of Dollars *(usually US)*
M6/A1 *(e.g)*	Motorway *No.6*/Arterial Road *No.1 (e.g.)*
NL	Netherlands (Holland)
NO	Norway
NPV	Net Present Value
OECD	Organization for Economic Cooperation and Development
O&M	Operations-Maintenance
PFI	Private Finance Initiative (UK)
P&FM	Property-Facility Management
PPP	Public-Private Partnership
PT	Portugal
RFP	Request For Proposal
ROC	Railway Operating Company
SE	Sweden
SOA	Special Operating Agency
SPV	Special Purpose Vehicle
SX	Stock Exchange
TEN-T	Trans-European Network - Transport
TEU	Twenty-Foot Equivalent Unit
UK	United Kingdom
UK-HA	UK-Highways Agency
UN	United Nations
US/USA	United States of America
VFM	Value For Money

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4. Introduction

4.1 Background

There is a tendency to view Public-Private Partnerships (PPP) as a new, untested phenomenon worthy of critical skepticism. While it is factually incorrect to see PPP as "new", there is every reason to be skeptical of some of the loftier claims of private financing as a panacea for the chronic shortfall of public capital for transportation infrastructure. Transport infrastructure has been normally financed in the latter half of the 20th century by the public sector. This was not always the case, as many notable historical examples show the important role played by private sector involvement in infrastructure funding during the 19th century (e.g. Suez Canal, Trans-Continental Railway in Canada).

In order to better historically situate PPP within an appropriate historical context, we commence this study with a review of two 19th century case studies which demonstrate all of the 21st century challenges of private financing of transportation infrastructure including: grand politics, long gestation periods, corruption and scandal, cost-overruns, imminent private bankruptcy averted by injection of public funds, threats to national security, contract disputes, long-term concession arrangements, temptations by governments to renege on commitments etc. etc.

They are included in some detail to remind readers of the enduring nature of transportation infrastructure challenges, their importance, and the long-term benefits of their "successful" realization in terms of nation-hood, international trade-benefits, and major reconfiguration of traffic movements.

The two case studies demonstrate examples in the rail, and water modes (although it is debatable whether the Suez Canal is an example of an "inland water" infrastructure). They also demonstrate an early (and rare) example of a BOO (Build-Operate-Own) project (which when applied to a network is the establishment of a privatized transport regime), and a BOT (Build-Own-Transfer) project. In our assessment of the 14 modern PPP case studies, we also make use of these two historical examples for comparison/similarity.

Recent public capital budget constraints, combined with globalization of major project tendering, technological innovation in construction equipment, materials and techniques, enhanced risk management, and innovation in financial/contractual instruments have allowed greater experimentation, innovation and scope for private sector involvement in infrastructure development.

The range of project types, nature of private sector involvement, and project contexts (e.g. national, economic, socio-political) have been broad, and there has been a mixed overall set of results from failure (e.g. Chunnel Rail, Thailand – Bangkok Urban Rail Transit) to success (e.g. Cross-Israel Highway).

Table 1: Initial History of the Egyptian Suez Canal	
Date	**Event**
610BC – 120AD	Various canal portions built at tremendous loss of life by: - Necho II (610-595 BC) canal built between the Pelusian branch of the Nile and the northern end of the Bitter Lakes at a cost of ~100,000 lives. - Darius I (522-486 BC) built canal along the Wadi Tumilat. - Ptolemy II Philadelphus (285-246 BC) extended canal to Red Sea. - Trajan (98-117 AD) rebuilt after Roman abandonment
	Amr Ibn el-As (xx AD) rebuilt the canal after the Islamic takeover of Egypt - Abbasid caliph El-Mansur (767 AD) closed canal to cut off supplies to insurgents.
1799	First modern attempt under the Egypt Expedition of Napoleon Bonaparte. - Project begun by Le Pere, but miscalculation that levels between the Mediterranean Sea and the Red Sea were too great resulted in work suspension.
1833	Group of French intellectuals (Saint-Simoniens) arrived in Cairo to investigate project. - Mohammed Ali had little interest, and Saint-Simoniens were devastated by a plague epidemic. Ferdinand de Lesseps was French vice-consul in Alexandria.
1846	Saint-Simoniens create an association to study the possibility of the Suez Canal. - Bourdaloue confirmed no real difference in the levels of the Mediterranean and Red Seas.
1854-1869	Ferdinand De Lesseps founded the ***Universal Company of the Suez***, and granted concession in 1854 to build the canal. - Concession (BOT) granted operating rights for 99 years, when ownership returns to Egypt. Private Egyptian company with stock owned by French-Egyptian interests. - Work began on the canal in 1859 near Port Said. - Pasha Said purchased 44% of the company to keep it in operation. - Between 1860 and 1862, the first part of the canal was completed. - Ismail suspended work in 1863. De Lesseps appealed to Napoleon III and an international commission was formed in March of 1864 to resolve issues. - On November 17, 1869 the barrage of the Suez plains reservoir was breached and waters of the Mediterranean flowed into the Red Sea. - Cost was £19 M/US$100 M (likely excludes much of labour costs), at least double initial estimates. About 125,000 workers lost their lives.
1875	The British government purchased Egypt's shares in the Canal Company. - An international convention (1888) established that the canal was open to the vessels of all nations without discrimination, in peace and in war.
1936	Provisions of the Anglo-Egyptian Treaty of 1936 provide Britain the right to maintain defense forces in the Suez Canal Zone.
1954-1956	Anglo-Egyptian agreement (1954) provides for the withdrawal of all British troops. - By June 1956 Egypt took over the British installations.
1956-1958	Following US-UK withdrawal of assistance to finance the construction of the Aswān High Dam, the Egyptian government seized the Suez Canal under Nasser (1956), after 86 years as a private concession, and 13 years short of its concession period termination.. - Egypt planned to use proceeds from the operation of the canal to finance the dam. - October 29, 1956, Israel invaded Egypt. British and French military units attacked Egypt for the announced purpose of ensuring free passage through the canal. In retaliation, Egypt sank 40 ships in the canal to block its passage. - United Nations intervention results in truce, and by the end of 1956 Israeli, French, and British forces were withdrawn. Egyptian government reopened the canal in March 1957. - Egypt's nationalized canal company (Suez Canal Authority) reaches agreement (1958) on financial settlement. By 1962 final payments had been made to the original shareholders.
Sources: *The Suez Canal* (http://www.touregypt.net/suezcanal.htm) *The Story of the Suez Canal* (http://www.fordham.edu/halsall/islam/1876suezcanal.html) *Suez Canal* (http://encarta.msn.com/encyclopedia_761578705/Suez_Canal.html) *Suez Canal History* (http://www.nnc.egnet.net/suezhistory.htm)	

Table 2: Initial History Canadian Trans-Continental Railway	
Date	**Event**
1857	British Columbia Gold-Rush - Subsequent mining boom in Kootenay (BC) region (silver, copper)
1861-1865	American Civil War rages. - Absorption of the British colonies advocated by US supporters of "manifest destiny".
1864	10-Year Canada-US Tariff Treaty expires - Increased intercolonial trade within Canadian provinces seen as desirable. - Act of Union established. Quebec Conference leads to agreement on dominion status.
1866-1867	Dominion of Canada (confederation achieved in 1867 through British North America Act - Fenian Raids (Irish Independent movement) from US were repulsed (1866). - First Parliament of Dominion of Canada (1867) under Prime Minister Macdonald.
1869	Deed of Surrender of 1869, whereby Canada purchases Northwest Territories from Hudson's Bay Co. - (Manitoba) Rebellion (1869) suppressed, although forces traveled overland via US.
1871	British Columbia joins Canada Confederation. - Macdonald pledges Dominion government to build transcontinental railway within ten years. - C$30 M and 50 M acres of land pledged as support to private consortium.
1872-1873	Macdonald government (Conservative) wins 1872 election with tainted financial contribution. - Homestead Act (1872) opens West to immigration. Settlers pay $10 for 160 acres of land, provided they build a residence and cultivate land within three years. - Pacific Scandal, leads to defeat of Macdonald government in 1873. Cabinet members accused of accepting bribes to influence the award of railway contracts. - Mackenzie government (Liberal) assumes power (1873)
1878	Macdonald government (Conservative) re-elected. - Project seriously behind schedule and over-budget. - National (Tariff) Policy favours east-west trade (within Canada) over north-south trade (with US)
1880-1881	Canadian Pacific Railway formed. - Scots-Canadian businessmen establish syndicate to build the transcontinental railway. - Canadian Pacific Railway Company incorporated 1881. Canadian government underwrites project (BOO) with mixture of C$25 M in cash, 25 M acres of land, C$37 M in surveying costs, and a property tax exemption for twenty years. - CPR changes original route to bypass speculators and gain more fertile land (1883)
1881-1885	CPR advances project as “vertically-integrated” concern - land settlement and land sales from 1881. - first commercial telegram in 1882, on telegraph lines alongside transcontinental line. - express shipment business as of 1882, acquiring the Dominion Express Company. - builds own railway steam locomotives as of 1883. - steamships on the Great Lakes as of 1883; chartered ships on the Pacific Ocean as of 1886 - in hotel and tourist trade as of 1886. - CPR cost estimated at C$100-120M ($1880) with death toll in hundreds.
1885-1886	Completion and ceremonial (last spike) opening of the CPR in November 1885 - Riel Rebellion suppressed (1885) by police dispatched over completed CPR railway. - CPR dividends on preferred shares suspended; government secures CPR outstanding loans. - Thousands of Chinese workers dies in hazardous construction through Rocky Mountains. - First train operates June 1886 from Montreal to Port Moody (Vancouver) - Completion is “late” as it is now 14 years after BC entry into confederation, but “early” as CPR expected construction for additional 6 years.
1890-1910	More than a million settlers arrive in the Canadian West via the CPR.
Sources: *The Confederation Idea* (http://www.cyber-north.com/canada/history.html) *History* (http://www.cprheritage.com/) *History* (http://www8.cpr.ca/cms/English/General+Public/Heritage/A+Brief+History.htm), *The Age of Steam and Iron* (http://www2.marianopolis.edu/quebechistory/encyclopedia/Econhistcan.htm) B. Ross, *Spike by Spike: The Building of the Canadian-Pacific Railway* (http://www.kudzumonthly.com/kudzu/jul03/SpikeBySpike.html) P. Burton *The Last Spike*	

Ambitious supra-national undertakings, perhaps best exemplified by the European Union (EU) – TENs program, appear beyond the short-term fiscal capacity of public funding sources. Consequently, providers of infrastructures in advanced Organisation for Economic Cooperation and Development (OECD) countries have looked for innovative ways of financing in the attempt to reduce traditional reliance on publicly-funded debt, including stimulating further engagement of the private sector in the provision of infrastructure[2].

There are many different models or structures whereby governments transfer management and funding responsibility in the provision of infrastructure to the private sector through deregulation, concessions, franchises and contracting, joint public-private partnerships or ventures, and various forms of BOT-type schemes (BOT is an abbreviation of Build-Operate-Transfer).

4.2 Study Goal

Document and synthesize findings from case studies of successful private sector involvement in transportation infrastructure funding (i.e. public-private partnerships) in order to assist national officials develop policies and project design and execution approaches most likely to lead to success for different types of projects.

4.3 Study Tasks

Task A: *Identify successful examples of off-budget government funding and private sector involvement in transportation infrastructure funding.*

The projects should encompass following categories/types of funding mechanisms, focusing on inland transport infrastructure:

1. Off budget, public sector mechanisms (*i.e.* specialized agencies with borrowing power, state run enterprises, etc.).

2. Mixed-funding mechanisms (*i.e*. involving the participation of both public and private capital).

3. Concessions (*i.e*. infrastructure is leased for a fixed period to a private organization, which manages it on a commercial basis).

4. Build, Own, Operate (BOO) mechanisms (*i.e*. a private organization finances and builds infrastructure, which is owned, tolled and operated for an unlimited time).

5. Build, Operate, Transfer (BOT) mechanisms (*i.e*. a concession is awarded to a private organization to finance, build and operate tolled infrastructure during a limited period).

[2] OECD (2002) p.14

At least two examples should be provided from each category and the examples of successful models identified should encompass the range of infrastructure under consideration: network infrastructure (*i.e*. road or rail systems); single inland waterway, rail and major road links, as well as intermodal connections.

Task B: *Provide a brief description of the infrastructure development process for each example, including conceptualization, development, tendering/contracting, building, and management.*

There should also be a detailed explanation of why the projects are considered to be an overall success including a comparison of final results with initial objectives. Please note that projects that experience large cost over-runs will not be admissible as "success-stories", even if they resulted in important or impressive examples of infrastructure engineering.

Task C: *Analyze the major factors that contributed to the project success for each example.*

In other words, what were the key elements of the project design and execution processes that facilitated success? This should include a discussion of any problems encountered and how they were overcome. Brief comparisons to similar, unsuccessful projects should be provided. The conclusion should summarize overall lessons that can be drawn from the examples regarding what aspects of project design and execution and the approaches most likely to lead to success for different types of projects.

4.4 Definitions

4.4.1 Public-Private Partnership (PPP)

A well-known definition of PPP given by the UK Commission on PPP is that[3]:

> "*a PPP is a risk-sharing relationship between the public and private sectors based upon a shared aspiration to bring about a desired public policy outcome*".

The focus of PPP on risk transfer, value-for-money and cost-efficiencies suggests that their primary focus for transportation infrastructure is on *procurement* – and only secondarily on *private sector financing*[4].

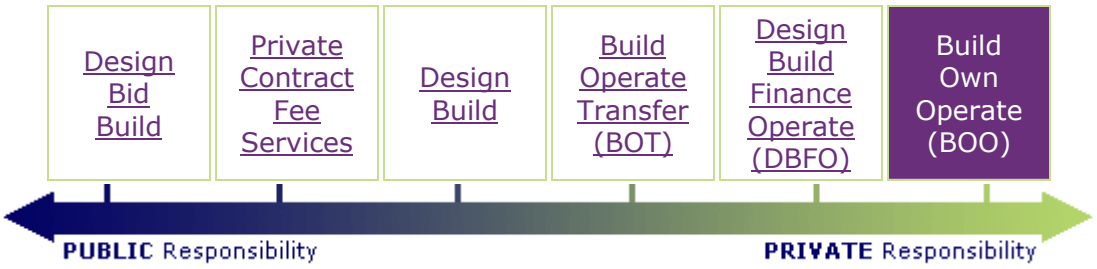
4.4.2 Private Sector Involvement

There are several bases of defining and characterizing private sector involvement in transportation infrastructure (See *Annex C – Definitions* for further material). Some of these focus on the financial, legal, functional aspects of the public-private relationship. These may be portrayed along a continuum that ranges from "public sector ownership" of infrastructure acquired through traditional or conventional procurement (i.e. design-bid-build under a cost-plus contract, with a high degree of process interaction between the public client and private contractor resulting in frequent design amendments/changes that necessitate contract price

[3] P. Boeuf (2003) p.1
[4] Canada F-P-T Working Group (1999) finding.

increases) to "private sector ownership" of infrastructure through privatization (perhaps with economic regulation of rates of return or capital base).

These typically show the PPP (e.g. DB-BOT-DBFO) models in the middle of the continuum[5]:



Most of the successful examples in this study will be BOT/DBFO, with various shades of colour depending on the specific nature of the contract process, concession agreement, financing, and risk assumption undertakings. Appropriately, this study should focus on identifying the differences between various successful projects, rather than on attempting to draw unnecessary classification differences.

The major sources of PPP-project differentiation will be:

Table 3
Basis for Project Differentiation of DBFO/BOT PPPs

Bases	Continuum-End A	Continuum-End B
1. Contract Process:		
1.1 Degree of Competitiveness	Sole-Source	Competitive*
1.2 Degree of Transparency	Non-Transparent	Transparent*
1.3 Degree of Structure	Ad-Hoc	Programmatic
2. Concession Agreement:		
2.1 Legal Underpinning	Policy	Legislative
2.2 Length of Term	Short (<5-Years)	Long (99-Years)
2.3 Degree of Transparency	Little - Private Domain	Full – Public Domain*
2.4 Degree of Stability	Never Re-Negotiated*	Often Re-Negotiated
2.5 Regulation/Oversight	None-Fixed Terms	Some (e.g. Toll-Rate)
3. Financing:		
3.1 Payment-Type	Fixed-Input	Variable-Output (e.g. toll)
3.2 Scope of Project	Build Asset Only	Existing Assets Included
3.3 Degree of Public Subsidy	None (full user-pay)	Full (no user-pay)
3.4 Issue of Public Project Debt	None (all private)	None (all Sovereign Debt)
3.5 Public Debt Treatment	Off-Book	On-Book
3.6 Private Equity	None	Major (>10% project cost)
4. Risk Assumption:		
4.1 Construction Cost	All Private*	All Public
4.2 Project Completion	All Private*	All Public
4.3 Demand/Traffic	All Private	All Public

[5] US-DOT website: http://www.fhwa.dot.gov/ppp/options.htm

Table 3 Basis for Project Differentiation of DBFO/BOT PPPs		
Bases	**Continuum-End A**	**Continuum-End B**
4.4 Foreign Exchange	All Private	All Public
4.5 Inflation	All Private	All Public

These characteristics provide a solid initial basis on which to draw out major differences between PPP-projects. In many cases, the basis of differentiation is related to the degree of "success" (the definition of which be discussed below) – these are marked in the table above by an asterisk – whereas in other cases there may be no relationship between the basis of differentiation and "success", and simply reflect a public/political preference, perhaps reflecting national/cultural/ideological contexts.

4.4.3 Success in the Context of PPP

The fundamental rationale for private sector involvement in the provision of transportation infrastructure is the betterment of society:

- in the form of ***reduced costs*** from allocative[6] and productive efficiencies[7]; and

- in the form of ***increased benefits*** from the accelerated provision of cost-beneficial infrastructure services.

In making these statements, it is important to bear in mind the broader social costs (e.g. including external costs) and broader social benefits (e.g. enhanced accessibility) arising from any particular transportation network or project. There is really no other economic or social basis for defining success. Other factors (e.g. politics, financing) should be reducible to one or other of these "end" factors upon deeper analysis. For instance, the generation of additional funds for infrastructure is a "means" factor which has no inherent value unless it can be supported by either reducing costs or increasing benefits. It is important to analyze the "means" factors – as they form much of the public preconception and misunderstanding surrounding PPP – and are the normal basis for public discourse on this topic.

[6] Allocative efficiency refers to the appropriate allocation of resources across potential uses i.e. investment decision, and whether the project is a) cost-beneficial; b) highly cost-beneficial relative to other transport investment alternatives; and c) highly cost-beneficial relative to other social/economic investment alternatives. In the context of transport infrastructure projects, this usually involves whether the project was highly cost-beneficial and/or provides incentives in moving toward an overall more cost-beneficial transportation system (including mode-choice and travel behaviour).

[7] Productive efficiency refers to the appropriate application of resources for a particular use i.e. infrastructure construction and operation, and whether the project structure and its execution are cost-efficient relative to alternative approaches. In the context of transport infrastructure projects, this usually involves whether the PPP-approach was more cost-efficient than conventional procurement (using a "public-sector comparator"), taking into account tender costs, contract costs, oversight costs, and financing costs. Also associated with "value-for-money".

Two other aspects of the fundamental cost and benefit "end" factors need to be highlighted. The assessment of "success" must be grounded in:

- the relative, temporal, imperfect and disequilibrium context of current reality, and not be made against some (likely unattainable) absolute, universal, perfect equilibrium in theory[8]; and

- a realistic "counterfactual" alternative consistent within the current reality, which need not be the *status quo* persisting in perpetuity.

The second point has given rise to the valuable (but hotly debated) use of an *ex ante* Public Sector Comparator to measure the counterfactual expected cost of traditional public sector procurement.

[8] i.e. Second-Best (or Third-Best) principles rather than First-Best (Optimal) principles.

5. Performance Measures of Successful PPP

Several studies have identified the following success factors for PPP or infrastructure provision:

EU (2003):

- acceleration of infrastructure provision (e.g. removal of binding public capital constraint)
- faster implementation (e.g. sooner project completion)
- reduced whole-life costs
- better risk allocation (e.g. reduce overall risk)
- better incentives to perform (e.g. payment/reward for output/quality)
- improved quality of service (e.g. better asset and services)
- generation of additional revenues (e.g. more commercial development, leveraging of private funds)
- enhanced public management (e.g. focus on results/outcomes not project/inputs)

These measures only indicate success to the degree that they advance cost or benefit "ends", and none of them (e.g. "generation of additional revenues") is an independent measure in its own right. For instance, "acceleration of infrastructure provision" is not a success measure if the resulting infrastructure is not highly cost-beneficial (e.g. Sydney Airport Rail Link) or is motivated by "rent-seeking" or corruption.

US-GAO (2000):

- integration of organizational goals into the capital decision-making process
- evaluation and selection of capital assets using an investment approach
- balancing of budgetary control and managerial flexibility in funding projects
- project management techniques to optimize project success
- evaluation of results and incorporation of lessons-learned into future decision-making

The emphasis of these principles was not specific to PPPs but the overall public decision-making process around infrastructure investments.

UK-PFI (2001): (PriceWaterhouseCoopers)

- construction on-plan, on-time and on-budget
- better quality of design and construction relative to traditional procurement
- whole-life cycle approaches to delivery of value and reducing cost
- early delivery of quality infrastructure providing wider social benefits

Of these, the first three relate to achievement of productive efficiency, cost "ends", while the fourth relates to benefit "ends", which may also involve allocative efficiency, cost "ends". The UK-PFI has as its overall objective the attainment of "value-for-money" (VFM). While VFM is a broad concept that goes beyond productive cost-efficiency, it does not fully capture all of the aspects of allocative efficiency.

This study will assess the "success" of against the following success factors, which build upon some of the bases of project differentiation, and deal with both "ends" and "means", but only to the extent which they advance a legitimate cost or benefit "end".

Table 4
Basis for Project Success of DBFO/BOT PPPs

Bases	Failure/Bad Practice	Success/Good Practice
0. Project Conception		
0.1 Project Portfolio Choice	Project was Stand Alone	Alternatives Considered*
0.2 Procurement Choice	PPP Form was Ordained	Alternatives Considered*
0.3 Political Imperative	Dictated Decision/Partisan	None/Non-Partisan*
0.4 Overcome Binding Constraint	No Constraint Existed	Yes*
1. Contract Process:		
1.1 Degree of Competitiveness	Sole-Source	Competitive*
1.2 Degree of Transparency	Non-Transparent	Transparent*
2. Concession Agreement:		
2.1 Whole-of-Life Concession	Too Short / Too Long	Optimal Length*
2.2 Degree of Openness	Fully Confidential	Fully Public Domain*
2.4 Degree of Stability	Often Re-Negotiated	Never Re-Negotiated*
2.5 Conflict Resolution Process	Absence/Inflexible/Unfair	Flexible/Fair*
3. Financing:		
3.1 Payment Related to Risks	No/Minor	Yes/Major*
3.2 Scope for Innovation	None	Some*
3.3 Private Equity from Operator	None	Some*
3.4 Financing Close as Planned	No/Delays	Yes/On-Time*
3.5 Appropriate Public Subsidy	No/Too-Low or Too-High	Yes/Optimal Balance
4. Risk Management:		
4.1 Construction On-Budget	No/Major Overrun	Yes/No Overrun*
4.2 Project Completion On-Time	No/Delays	None/On-Time*
4.3 Demand/Traffic As-Forecast	No/Low or High Traffic	Yes/As Forecast*
4.4 Operating Costs On-Budget	No/Major Overrun	Yes/No Overrun*
4.5 Whole-of-Life Efficiencies	No (re: Comparator)	Yes (re: Comparator)*

It is important to view PPP as a "procurement" method for transportation infrastructure – rather than as a "financing" mechanism. This places the emphasis on risk transfer, "value-for-money", innovation and procurement efficiencies/benefits and leaves open the appropriate form of project financing (e.g. private capital, public funds, real or shadow tolls etc.) – which is effectively a separate decision.

Generally, PPP cases have been more successful when they have been pursued as a procurement method, than when there main rationale has been to secure private, innovation or off-book financing. This point does not deny that there may be important incentive effects from the marriage of procurement and financing approaches, but that the former should take precedence over the latter.

6. Typology of PPPs for Transport Infrastructure

As mentioned above with regard to the definition of "private involvement", most of the case study subjects of PPP transport infrastructure projects will be some form of BOT/DBFO. While there are good examples of DB and O&M arrangements in transport, these will not generally be reviewed except in the absence of BOT/DBFO subjects. There will be an attempt to identify successful BOO examples, although these are rare and must demonstrate superiority to their having been executed as a BOT/DBFO (i.e. with public ownership retained after some concession period). A general bias (i.e. *ex ante* judgment) of the author is that any standalone (non-network) BOO could equally (and likely preferably) have been a BOT[9].

Bearing in mind the desire to capture a range of "private involvement" in "successful" transport infrastructure projects, the following types of arrangements have been investigated.

Table 5
Study Typology of PPPs

Special Purpose Vehicle	Mixed Public-Private	Private Concession (O&M)	Build Operate Transfer (BOT)	Build Own Operate (BOO)

Special Public

Involves transferring responsibility for O&M services and/or capital procurement typically performed in-house by the public sector, to a "commercialized" (possibly incorporated) special purpose vehicle under public ownership/control. The intention is to achieve some degree of commercial efficiencies. This may be a transitional mode towards privatization or other form of partnership involving private sector equity. This form of PPP-model will only be investigated in modes where BOT/DBFO examples are lacking.

Mixed Public-Private

Involves transferring responsibility for O&M services and/or capital procurement typically performed in-house by the public sector, to a "commercialized" (possibly incorporated) special purpose vehicle under mixed public-private ownership/control. This may be a transitional mode towards full privatization. This form of PPP-model will only be investigated in modes where BOT/DBFO examples are lacking.

[9] As BOT/DBFO can involve concession periods of 35+ years, and in some cases 99-years, and as the net present value of any positive revenue stream past years 35+, and certainly past years 99+, using any reasonable positive social discount rate is not significantly different from zero. The only legitimate basis for BOO verses BOT/DBFO is to effect network privatization of infrastructure, based on a regulated public-good argument.
It is beyond the scope of this paper to assess the relative arguments for/against privatization of transportation infrastructure in each mode. The only transport mode for which infrastructure is predominantly private in nature is rail, which characterizes the North American (Canada-US) ***freight*** history and experience, and has been undertaken in many developed and developing countries over the past two decades, sometimes focused on ***freight*** and sometimes on ***passengers***. However, in most cases, this has involved assumption of O&M responsibility for existing assets, rather than new construction, and therefore has not really been characteristic of a BOO. Where significant new rail investment has occurred it has been for High-Speed-Rail, usually through a Special Purpose Vehicle (Public entity) or Public Corporation.

Private Concession (O&M)

Involves transferring responsibility for O&M services typically performed in-house by the public sector under a fee-for-services contract, following a competitive process where the winning private sector proposal is based on best value, reflecting both price and technical qualifications.

Build-Operate-Transfer (BOT)

Involves an integrated partnership combining the design and construction responsibilities of design-build procurements with O&M of a single facility or group of assets to a private sector partner. This arrangement involves private financing as the up-front" capital costs are paid over time as a "lease", which may or may not involve payment for outcomes. The asset remains in public ownership.

Build-Own-Operate (BOO)

Involves the granting of ownership rights in perpetuity to develop, finance, design, build, own, operate, and maintain a transport asset. The private sector owns the asset outright and retains the operating revenue risk and any surplus operating revenue.

7. Selected PPP Subjects for Case Study

While two examples are desired from each category of PPP and across the range of infrastructure (i.e. network or links for road/rail/inland waterway, and intermodal connection), this has been modified as there appear to be:

- Few modern examples of BOO in any mode (our historical case of the CPR is one example), although the Alameda (Rail) Corridor is a BOO – but owned by a Public-SPV; and the Bremen-GVZ (intermodal hub) is a BOO but mixed public-private in nature.

    - As discussed elsewhere, it is difficult to see why a BOO could not be structured as a BOT, so as to retain infrastructure asset ownership in the public sector – unless there is separate policy to effect transport infrastructure privatization (as in North America rail freight sector).

- Few modern examples of Mixed Public-Private, our Bremen-GVZ (intermodal hub) being the best example, and two other cases having been initiated in this mode were subsequently converted (Autostrade (road) to a private BOT/O&M model; and RFI/TAV (rail) to a Public-SPV model).

- Few modern examples of intermodal that are not Sea-Port related (e.g. Rotterdam), our Bremen-GVZ example being a notable exception, with other examples in Germany/France under comparable mixed public-private (possibly BOO) models.

The study therefore depicts 2 historical and 14 modern case studies which were either:

- Extensively cited in the PPP literature (e.g. Perez, Huijbregts, UK-PFI reports);
- Cited in various OECD/ECMT/EU/UN PPP literature;
- Personally known to the investigator; or
- Brought to the investigator's attention during extensive literature search.

Some investigator bias (i.e. *ex ante* judgment) entered into the selection of the case studies, including:

- Desire to avoid well-known UK-PFI shadow-toll road examples
- Skepticism of Developing Country PPP models, as stability of macroeconomic and FX environments can make these of dubious value to OECD context (with the possible exception of the N4 Maputo Corridor (South Africa-Mozambique)).

A larger list of possible PPP subjects was initially explored, with case studies selected on the basis of availability of literature and "completeness" of the construction phase.

Selected PPP Subjects for Case Study

Table 6 - Case Studies of Infrastructure Funding Arrangement Categorization of Subjects						
Type:	**Examples:**	**Special Purpose Vehicle**	**Mixed Public-Private**	**Private Concession (O&M)**	**Build Operate Transfer (BOT)**	**Build Own Operate (BOO)**
1. Network-Road	#1 Autostrade (Italy)		x (initial)	x (existing)	x (new)	
2. Network-Rail	#9 RFI/TAV (Italy)	x	x (initial)			
	#10 ARTC (Australia)	x				
	(Hist.) Trans-Continental Railway (Canada)					x
3. Network-Inland Water	#14 Canada-St. Lawrence Seaway Management Corp. (Canada)			x		
4-A. Link-Road	#2 M6-Toll Birmingham (UK)				x	
	#3 Cross-Israel Highway (Israel)				x	
	#4 Melbourne City Link (Australia)				x	
4-B. Link-Bridge	#5 Confederation Bridge (Canada)				x	
	#6 Vasco da Gama Bridge (Portugal)				x	
4-C. Link-Tunnel	#7 Wijkertunnel (Holland)				x	
	#8 Sydney Harbour Tunnel (Australia)			x (DB/O&M)		
5. Link-Rail	#11 Arlanda Express Stockholm (Sweden)				x	
	#12 Alameda Corridor (USA)	x				x
6. Intermodal Hub	#13 Bremen-GVZ (Germany)		x			x
7. Link-Inland Water	(Hist.) Suez Canal (Eqypt)				x	

8. Road PPP Case Studies

There is considerable variety in the experience among the various road PPP case studies, varying according to:

- Broader context (e.g. ad-hoc vs programmed; whether alternative procurement was considered during project initiation);
- Competitive nature of procurement process;
- Degree to which Contract terms are transparent and in the public domain;
- Degree to which the PPP approach was well defined and stable during project procurement and completion;

8.1 Road Project – Success Factors

- Political/public debate regarding project/procurement design is critical at an early stage, as the greater the degree of uncertainty regarding project/contract details that are allowed to remain into the procurement/financing phases, the lower is the likelihood of project success:

    - This finding is clear for the "partial successes" (e.g. Vasco da Gama Bridge, Wijkertunnel, M6-Toll) where the process was delayed/changed etc. due to unresolved problems (e.g. toll levels, tolls at all, environmental/planning approval)

    - By contrast, lengthy planning removed much uncertainty (Confederation Bridge, Melbourne City Link and Cross-Israel Highway). It may be that project-specific legislative approaches provide an appropriate forum for political consideration to remove uncertainty, although legislation is not a "sufficient" condition.

- Adequate competition during procurement is important to optimizing the public subsidy and generating cost efficiencies:

    - This finding is clear for the "partial successes" (e.g. Sydney Harbour Tunnel, Wijkertunnel) where there was a notable absence of competition (NB: for latter stage of procurement in case of Wijkertunnel).

- Transparency of procurement process and contract conditions appears important to ensure optimal public subsidy and achievement of cost efficiencies:

    - This finding is clear for the "successes" (e.g. Cross-Israel Highway, Melbourne City Link, M6-Toll (NB: following planning approval for M6-Toll).

    - By contrast, the lack of transparency appeared to be related to the instability of the procurement process and contracts for the "partial successes" (e.g. Sydney Harbour Tunnel, Wijkertunnel).

- Establishment of a public Special Purpose Vehicle or dedicated unit within the MoT/Public Works for representing the Government owner/concession granting authority is beneficial, but not a guarantee of success:

    - This finding is clear for some "partial successes" where this was lacking (e.g. Wijkertunnel, Sydney Harbour Tunnel) where there appeared to be an absence of public expertise, and for which the process was driven poorly be political processes;

    - One "successes" had a clear SPV (e.g. Cross-Israel Highway), while for several others there was (perhaps) an informal unit within the bureaucracy dedicated to the project (e.g. Confederation Bridge, Melbourne City Link). However, the "partial success" of the Vasco da Gama Bridge shows that a SPV may be insufficient in the case of greater uncertainties and political challenges (e.g. toll level decision).

- Concession length would appear to be optimal in the 30-35-year range (beyond this is likely to be sub-optimal for taxpayers):

    - It is unclear what benefit is obtained to the public sector/taxpayer from the 51-year concession for the M6-Toll road.

- Concession provisions to allow for government oversight/regulation over many aspects of the contractual arrangement have been successfully concluded, provided that these are negotiated clearly in the initial agreement, and not subject to arbitrary change late in the process:

    - This finding is clear for the Cross-Israel Highway (where the GoIL has toll rate approval, ownership regulation, supernormal traffic "clawback", option to "buy" etc.), Confederation Bridge (fixed toll rate regime with allowance only for partial inflation increase); although a relative absence of government regulation can also be effective (e.g. Melbourne City Link). Presumably, the economic "cost" of regulation is built into private sector risk/reward calculations;

- If the PPP project is "bankable" with real tolls alone, the only form of public subsidy should be in the form of "in-kind" public works ancillary to the project, along with approvals process management and land acquisition:

    - This finding is clear for the Melbourne City Link and Cross-Israel Highway. The M6-Toll project shows a poor example of a PPP project up until planning approval, and then an exemplary PP project thereafter.
    - It is only in the case of real-toll "bankable" projects that it is realistic for the public sector to expect substantial private "at risk" equity advanced to the project.

  - It is only in the case of real-toll "bankable" projects that it is realistic for the public sector to expect substantial private risk assumption for traffic volume, and full exposure to inflation/FX risk.

- If the PPP project is not "bankable" with real tolls alone, the form of public subsidy should be carefully considered, in terms of the legitimate basis for its defence and establishment of amount:

  - The Confederation Bridge linked amount to ongoing ferry subsidy levels, and was justified in light of substantial capital works avoided by bridge). This is a good example of public subsidy planning.

  - The Vasco da Gama Bridge public subsidy was initially premised on obtaining EU-Cohesion Grant funding (perhaps national "rent-seeking" behaviour), in providing capital grant to make private financing possible, and then later to compensate for toll level decision impact on operator. This is a poor example of public subsidy planning.

  - The Wijkertunnel public subsidy was expanded by the political decision to change from tolls to shadow tolls. These was little relationship between the financial concession and the fixed price construction contract (awarded by a public authority), and the tunnel operation was contracted to public authority. This is a poor example of public subsidy planning, and a poor model of a Concession structure.

  - The Sydney Harbour Tunnel public subsidy appeared to change with contract amendment and involved little traffic risk borne by the concession holder. Under the circumstances (i.e. little traffic/operational risk borne by the private sector), this may have been better bid as a Design-Build (DB) contract.

  - In the case of publicly subsidized or shadow-toll projects it is only realistic for the public sector to expect minimal private "at risk" equity advanced to the project, with a greater share of private capital in the form of subordinated loans.

  - In the case of publicly subsidized or shadow-toll projects it is only realistic for the public sector to expect partial private risk assumption for traffic volume, inflation/FX risk. The risk "insurance cost" to the private sector is likely too expensive (and inefficient) relative to the public sharing of these risks.

- If the public sector is expected to bear the full traffic risk for a project, this is a bad sign and indicates: the project may not be cost-beneficial, the public sector is not getting full cost-efficiency from a concession, and that the PPP would be better structured as a Design-Build (DB) contract.

    - This finding is clear for the "partial successes" (e.g. Sydney Harbour Tunnel, Wijkertunnel) where there was little risk assumption (beyond construction completion/cost risks).

- Currently (mid-2000s), these are well defined public sector accounting rules (e.g. EU) for whether sufficient risk transfer to the private sector (more than 50% of revenue at risk?) to justify off-book treatment of debt (and to avoid fully showing future payments as a finance lease liability).

    - The Sydney Harbour Tunnel payments (of tolls collected on the publicly owned Sydney Harbour Bridge) would today almost certainly have to be reflected as a government loan, and some amount of the concession holder's debt as a government finance lease for the tunnel (i.e. on-book).

In this discussion, we have been silent about the Autostrade case study, as this was more a "privatization" than a true PPP project. To the extent it involves private assumption of ongoing O&M of the existing assets and new construction projects (as it certainly does), it involves a broad portfolio of various implicit BOO/BOT/O&M sub-contracts. It is somewhat unclear as to whether the GoIT can terminate the "concession" of Autostrade and transfer assets to the State, in the absence of re-purchasing the assets (i.e. is it an implicit BOO or BOT?). Furthermore, it is unclear as to the contractual obligation of Autostrade to meet performance requirements to entitle it to retain the concession assets. As the issue of privatization is outside the scope of this paper, it is difficult to ascertain the "success" of the Autostrade example – except to note that significant private equity has been secured for motorway operation and expansion, and that it is highly likely that efficiency gains have been achieved in terms of construction and operation/maintenance.

8.1 Network Road

There are few BOO or BOT examples for networks as a whole, given the "natural monopoly" aspects of roads, the absence of justifiable reasons to operate a road-network under these arrangement, and the likely political opposition they would entail.

There are examples (e.g. Alberta-Canada, Tasmania-Australia, UK-Highways Agency) where extensive parts of the network have been placed for Private Concession (O&M) under short-period (e.g. 5-year) agreements covering portions of the network. These are not typically motivated by a desire to access private financing, but to capture commercial efficiencies in service delivery, and greater focus by the public sector manager on network planning and performance-based management of the asset.

Probably the closest form of "private sector" road-network involvement is through the French Road Companies (e.g. Cofiroute, owned by Vinci (FR) is arguably a success; whereas many of the others have a mixed financial history, so that the French example and has not been selected as a "success"), and more recently the Italian Road Company Autostrade.

Autostrade started as a mixed public-private commercial concern, and was fully privatized in 1999. Any attempt to comprehensively assess this model's success would have to benchmark construction and operations costs against comparable private (e.g. Cofiroute) road network operators, and large private link operators (CHIC for 407-ETR, Cross-Israel, Transurban for Melbourne City Link etc.). This has not been attempted in this paper.

8.2 Link Road

We have investigated three BOT subjects widely considered to be successful around the world. These examples are not without their (largely environmental) detractors and critics. The three case studies (e.g. M6-Toll, Cross-Israel Highway, Melbourne City Link) all feature real tolls, although the UK-PFI provided numerous other examples of shadow-toll arrangements, as does the experience of Portugal.

Of significance is that all examples involve urban by-pass, regional traffic distribution and freight corridors of national importance, with substantial expected traffic volumes. All involved substantial "greenfield" construction, as well as connections/upgrading of existing assets.

Judged against our "success" factors, all of these examples were successful in terms of construction efficiencies, financial closing, use of e-tag technologies, and resulting motorist use. All of them had long gestation periods, but the M6-Toll experience of having a private sector sponsor on-board and financially "at risk" during the approvals/environmental/land acquisition processes should not be soon repeated.

In contrast to other known "successes" (e.g. UK-PFI), the use of real-tolls versus shadow-tolls has two different dimensions: a) a public policy one – of moving to fuller user pay through road tolls; and b) a risk-sharing one for traffic levels. If there is a separate movement to support fuller user-pay, than real-tolls make sense and are realistic for high-volume urban by-pass/regional distributor motorways. If there is a need to share risk (due to uncertain or low traffic volumes on regional routes) this argues more for shadow tolling. If there is a desire to regulate supernormal profits (and share downside traffic risk), this can be accomplished in a real toll environment (e.g. Cross-Israel revenue sharing with GoIL).

In contrast to known "failures" for tolled roads, the best example of which is the Dulles Greenway (USA) which forged ahead (on-time and on-budget) with private backing but without realistic traffic forecasts for a regional route (from Washington DC to western Virginia) which likely needed revenue capture for suburban housing development to be economical. Our 3 examples, by contrast, had clear demand potential from their urban/regional traffic roles, and a clear public proponent with a long history of project initiation and planning.

8.3 Link Bridge

We have investigated two BOT bridge subjects widely considered to be successful around the world. These examples were generally accepted as being required or beneficial, although they had significant environmental issues. The two case studies (e.g. Confederation and Vasco da Gama bridges) feature real tolls, although in both cases there was substantial downward pressure on tolls for political acceptability reasons. A big difference between the two cases was that the "lower" toll rate was always planned and a part of the project procurement/financing process of the Confederation bridge, but was a political issue resulting in a late change for the Vasco da Gama bridge.

Perhaps reflecting early GoCA acceptance of substantial ongoing subsidy stream, the Confederation bridge case was more stable and did not require an up-front public grant or lump sum subsidy, as was the case for the Vasco da Gama bridge. Furthermore, there was not reliance on external public grants (from EU-Cohesion Fund for GoPT for Vasco da Gama bridge). In terms of concession contract and traffic, the two are comparable, with success in terms of on-time opening and shared traffic risk arrangements. Construction costs may have over-run for the Confederation bridge, but this was not to the account of the taxpayer.

The Confederation Bridge example is (possibly) unique in that the largest constraint overcome was one of public expertise (of construction/design/management techniques) for the bridge to overcome in the harsh environment of the Northumberland Straights, which was at least equally as important as the public fund constraint (in the context of the 1990s).

There are other successful bridge BOT examples: Rion-Antirion Bridge (GR) featuring real tolls, Dartford Crossing (UK) with shadow-tolls. There are generally few "failures", in part given the enormous expense of bridge projects, and the low likelihood of building an "unnecessary" bridge (with low CBA). Our two examples feature cost/km of US$75M, which is more than twice that for roads. It is much more likely to see a road "failure" if the motivation for the project is job creation, lavish public works or other political calculus.

8.4 Link Tunnel

We have investigated two BOT tunnel subjects widely considered to be successful around the world. These examples were generally accepted as being required or beneficial, although neither was particularly successful as a PPP example, due to specific problems in procurement, concession structure and risk allocation. The two case studies (e.g. Wijkertunnel and Sydney Harbour Tunnel) feature both real and shadow tolls. Neither example had strong competitive aspects in procurement, and lacked concession stability with many contract renegotiations. Both were highly political in origination and/or procurement process, much to the detraction of attainment of PPP objectives for cost-efficiency and risk allocation. Access to off-book (at the time) finance appeared to be the major policy objective to the detriment of procurement efficiencies.

There are other BOT tunnel subjects, but it is not known how these differ from our two examples. The earlier Cross-Harbour Tunnel (Hong Kong) shared a similarity with the Sydney Harbour Tunnel in that it was privately originated and proposed without competition (in a previous decade). Our two examples feature cost/km of US$225M, which is vastly more expensive that a bridge. It may be that there is a tendency for tunnels to be more likely to be privately promoted. As urban areas becomes increasing dense and congested (as in Sydney, Melbourne, Boston) there will likely be more tunnel projects pursued as PPP.

Road PPP Case Studies

Table 7-A: Basic Facts for Road PPP Case Studies						
Type:	**Examples:**	**Description**	**Country**	**Period of Gestation / Procurement**	**Period of Construction**	**US$-Value**
8.1 Network-Road	#1 Autostrade	3,400km in Italy - Privatized system of 50% of Italian motorway network - Tolls	Italy	11-years (1987-1998) To Full privatization	Ongoing	$14,600M Market Capitalization
8.2 Link-Road	#2 M6-Toll Birmingham	43km 6-lane toll road around Birmingham to north - Concession (51yr)-BOT-Toll	UK	18-years (1980-1998)	4-years (1999-2003)	$1,700M
	#3 Cross-Israel Highway 6 - part of north-south highway corridor	86km new project - Concession (27yr)-BOT-Toll	Israel	8-years (1990-1998)	4-years (1999-2003)	$1,300M
	#4 Melbourne City Link	24km new/upgrade project - Concession (34yr)-BOT-Toll	Australia	8-years (1987-1995)	4-years (1996-2000)	$1,800M
8.3 Link-Bridge	#5 Confederation Bridge - fixed link PEI-New Brunswick replacing ferry	13km bridge over Northumberland Straits - Concession (35yr)-BOT-Toll/Subsidy	Canada	9-years (1984-1993)	4-years (1994-1997)	$800M
	#6 Vasco da Gama Bridge (Lisbon)	12.3km bridge over Tagus River - Concession (30yr)-BOT-Toll/Subsidy	Portugal	9-years (1985-1994)	3-years (1995-1998)	$1,000M
8.4 Link-Tunnel	#7 Wijkertunnel - under North Sea Channel	1.4km dual-tunnel under North Sea - Concession (33yr)-BOT-Shadow Toll	Netherlands	9-years (1983-1992)	3-years (1993-1996)	$300M
	#8 Sydney Harbour Tunnel - linking south-north shores	2.3km-lane tunnel under Harbour - Concession (30yr)-"quasi-BOT" better referred to as DB/O&M	Australia	4-years (1983-1987)	4-years (1988-1992)	$600M
SUMMARY		182km on new/upgraded works (excluding Autostrade) - Road (ave=50km) - Bridge (ave=12km) - Tunnel (ave=2km)		From 4-18 yr Mode=9 yr	From 3-4 yr Mode=4 yr	$7,5000M (exc. Autostrade) - Road ($32M/km) - Bridge ($75M/km) - Tunnel ($225M/km)

Table 7-B: Project Differentiation of Road PPP Case Studies										
Bases	Continuum -End A	Autostrade	M6-Toll	Cross-Israel	Melb City Link	Confed Bridge	VdG Bridge	Wijker Tunnel	Sydney Tunnel	Continuum -End B
1. Contract Process:										
1.1 Degree of Competitiveness	Sole-Source	None	High	High	High	High	High	Low	None	Competitive
1.2 Degree of Transparency	Non-Transparent	Moderate	High	High	High	Moderate	Moderate	Moderate	Low	Transparent
1.3 Degree of Structure	Ad-Hoc	Program	Ad Hoc	Ad Hoc	Ad Hoc	Ad Hoc	Ad Hoc	Ad Hoc	Ad Hoc	Program
2. Concession Agreement:										
2.1 Legal Underpinning	Policy	Policy	Authority	Law	Law	Law	Law	Program	Law	Legislative
2.2 Length of Term	Short (<5-Years)	Long	51-yr	27-yr	34-yr	35-yr	30-yr	30-yr	30-yr	Long (99-Years)
2.3 Degree of Transparency	Low Private Domain	Moderate	High	High	High	Moderate	Moderate	Low	Low	Fully Public
2.4 Degree of Stability	Never Re-Negotiated*	High	Low	High	High	High	Low	Low	Low	Often Re-Negotiated
2.5 Regulation/Oversight	None-Fixed Terms	Yes	Limited	Extensive	Yes	Yes	Yes	Yes	Yes	Some (e.g. Toll-Rate)
3. Financing:										
3.1 Payment-Type	Fixed-Input	Tolls	Tolls	Tolls (guarantee)	Tolls	Tolls / Subsidy	Tolls / Subsidy	Shadow Toll / Subsidy	Tolls / Subsidy	Variable-Output (toll)
3.2 Scope of Project	Build Asset Only	Broad New & Existing	Build Asset	Build Asset	Build Asset Upgrade Existing	Build Asset	Build Asset	Build Asset	Build Asset	Existing Assets Included
3.3 Degree of Public Subsidy	None (full user-pay)	Some	In-Kind Works	In-Kind Works	In-Kind Works	Annual Subsidy	Lump Subsidy	Grant / Shadow Toll	Grant / Loan / Subsidy	Full (no user-pay)
3.4 Issue of Public Project Debt	None (all private)	Some (EIB, Grant)	None	None	Concession fee loan	None	Not specifically	Not specifically	Not specifically	None (Sovereign)
3.5 Public Debt Treatment	Off-Book	Off-Book	N/A	N/A	N/A	N/A	NK	NK	NK	On-Book
3.6 Private Equity	None	Major	Major	Major	Major	Limited	Limited	Limited	Limited	Major (>10%)
4. Risk Assumption:		New Works								
4.1 Construction Cost	All Private*	Private	Private	Private	Private	Private	Shared	Shared	Private	All Public
4.2 Project Completion	All Private*	Private	Private	Private	Private	Private	Private	Shared	Private	All Public
4.3 Demand/Traffic	All Private	Private	Private	Shared	Private	Shared	Shared	Public	Public	All Public
4.4 Foreign Exchange	All Private	Private	Private	Private	Private	Private	Private	Private	Private	All Public
4.5 Inflation	All Private	Private	Private	Private	Private	Shared	Shared	Shared	Shared	All Public

Table 7-C: Project Success Factors for Road PPP Case Studies										
Bases	**Failure Factor**	Autostrade	M6-Toll	Cross-Israel	Melb City Link	Confed Bridge	VdG Bridge	Wijker Tunnel	Sydney Tunnel	**Success Factor**
0. Project Conception										
0.1 Project Portfolio Choice	Stand Alone	Privatize Program	Yes - PFI Program	Stand Alone	Stand Alone	Stand Alone	Stand Alone	Stand Alone	Stand Alone	Alternates Considered
0.2 Procurement Choice	PPP Form Ordained	Ordained	Alternates Consider	Ordained	Ordained	Alternates Consider	Alternates Consider	Alternates Consider	Ordained	Alternates Considered
0.3 Political Imperative	Dictated Decision	Dictated	Dictated (Toll)	Dictated (Toll)	Dictated (Toll)	Dictated (Costs)	Dictated (Toll)	Dictated (Funds)	Dictated (Toll)	Non-Partisan
0.4 Overcome Binding Constraint	None	Funds	Approvals	Funds	Funds	Expertise	Funds	Funds	Funds	Yes
1. Contract Process:										
1.1 Degree of Competitiveness	None	None	High	High	High	High	High	Low	None	Compete
1.2 Degree of Transparency	None	Moderate	High	High	High	Moderate	Moderate	Low	Low	Full
2. Concession Agreement:										
2.1 Whole-of-Life Concession	Too Short / Long	Indefinite	Perhaps Too Long	Optimal	Optimal	Optimal	Optimal	Unclear	Unclear	Optimal Length
2.2 Degree of Openness	Little / Confident.	Partial	Partial	Mostly	Partial	Partial	Partial	Partial	Partial	Full / Public
2.4 Degree of Stability	Little / Re-Negotiated	High	Low	High	High	High	Low	Low	Low	Never Re-Negotiated
2.5 Conflict Resolution Process	Inflexible / Unfair	NK	Flexible	Flexible	Flexible	Flexible	Flexible	Flexible	Unfair (to taxpayers)	Flexible / Fair
3. Financing:										
3.1 Payment Related to Risks	No/Minor	Yes	Yes	Yes	Yes	Partial	Partial	Partial	Some	Yes/Major
3.2 Scope for Innovation	None	Some	Some	Some	Some	Much	Some	NK	Some	Some
3.3 Private Equity from Operator	None	Yes	Yes	Yes	Yes	Yes	Yes	Little	Little	Some
3.4 Financing Close as Planned	Delay	Yes	Delay	Yes	Yes	Yes	Delay	Yes	Yes	On-Time
3.5 Appropriate Public Subsidy	Low/High	Yes-None	Yes-None	Yes-None	Yes-Small	High	High	High	High	Yes
4. Risk Management:		Existing								
4.1 Construction On-Budget	No/Over	N/A	Yes	Yes	Yes	Over (?)	Yes	Yes	Yes	Yes
4.2 Project Completion On-Time	Delays	N/A	On-Time	On-Time	On-Time	On-Time	Yes	Yes	Yes	On-Time
4.3 Demand/Traffic As-Forecast	Low/High	NK	Higher	Higher	Higher	Lower (?)	Higher	Forecast	Forecast	Forecast
4.4 Operating Costs On-Budget	Overrun	Yes	NK	NK	NK	NK	NK	Yes	NK	Yes
4.5 Whole-of-Life Efficiencies	No	Yes	Yes	Yes	Yes	Yes	Yes	NK	NK	Yes

9. Rail/Intermodal PPP Case Studies

There is considerable variety in the experience among the various rail/intermodal PPP case studies, varying according to:

- Competitive nature (if any) of procurement process;
- Public ownership of Special Purpose Vehicle verses Private Concession/BOO; and extent (if any) of private equity;
- Degree of Government Subsidy (all rail/intermodal examples feature substantial capital grants/loans etc.);
- Degree of transparency for concession agreement;
- Degree to which there is any amount of risk transfer to the private sector;

There is a great deal of heterogeneity between the various rail/intermodal PPP cases, making it difficult to draw out the same kind of "similarities" as was found for road PPP cases.

The sole successful example of an intermodal PPP case (e.g. Bremen-GVZ) is included with the rail PPP, as it (and most other intermodal) involve linkages between rail and another mode(s) such as water or road.

A distinction should be drawn in rail transport between:

- Private, vertically-integrated freight railways (which characterize the North American sector);
- Mixed, vertically-segmented structures in which public SPV-ownership of infrastructure is coupled with private-operation of freight rail carriers (which characterizes the Australian experience);
- Mixed, vertically-segmented structures in which public SPV-ownership of infrastructure is coupled with private-operation of passenger rail carriers (which characterizes the UK experience); and
- Public, vertically-integrated passenger railways (which characterizes much of the Continental-EU experience).

Obviously, private finance drives all investment in the first case – with only rare examples of PPP projects (e.g. Alameda Corrdior). Private finance also dictates most of the equipment investment for private rail carriers in the second and third cases (although the UK-experience of private passenger franchises involve "minimum" public subsidies). Generally, the public sector shoulders the bulk of the financial burden for rail infrastructure investment (with the Channel Tunnel a notable exception and failure), with only a few examples of PPP – mostly involving public-SPV models in Australia and Italy.

9.1 Rail/Intermodal Project – Success Factors

- All rail/intermodal PPP projects require substantial public capital, either in the form of capital grants, loans or (less often in the modern context) land grants:

  - This finding indicates that rail (and intermodal) transport is not as "bankable" as toll-roads in urban surrounds/regional distributors.

- Generally, with the rare exception of a BOT model, there has been little/no competitive procurement:

  - Only one BOT example (e.g. Arlanda Express) involved a fully competitive bid process for a Concession.

- All but one of the rail/intermodal case studies achieved "success", in terms of completed infrastructure and/or attainment of cost-efficiencies and/or access to private equity (NB: rarely all three together:

  - The RFI/TAV case is a "work in progress" that must be judged a failure in terms of accessing private equity, but which may (in future) be partially successful (as a PPP) in completing HSR network construction with a degree of cost efficiency and/or risk transfer (under DB contracts).

  - The ARTC and Bremen-GVZ cases show "success" in terms of building/upgrading assets which are being well utilized by private operators, and in bringing together governments/businesses in partnerships.

  - The Arlanda Express achieved "success" in terms of a competitive BOT bid process, completion of construction on-time/on-budget and substantial risk transfer to the private sector. This case was something of a private sector failure judging by its sale at depressed price. Generally, airport-CBD rail links have not proved "bankable" on traffic alone (e.g. Arlanda, Sydney, Brisbane), with the possible exception of Heathrow. The Portland-Oregon case was largely premised on land development adjacent to the airport, and the proposed Toronto link is associated with land development at the intermediate Woodbine Raceway site.

  - The Alameda Corridor was primarily a public SPV venture, premised on obtaining US federal grants and tax-exempt bond status. While its "success" is the construction on-time/on-budget of a useful asset (for Port container traffic) with remedial values to adjacent communities (e.g. elimination of at-grade crossings), it did not feature much private risk assumption, particularly by the two freight railways involved.

  - The CPR Trans-Continental Railway was a "success" – more for the emerging country of Canada than for the company – which numerous times faced bankruptcy during construction due to cash-flow problems, which were resolved through GoCA loan guarantees. It is a debatable question as to whether this project could have equally proceeded as a (long-term) BOT, rather than a BOO – although government policy of the day was for private railways.

- Establishment of a public Special Purpose Vehicle is prevalent in these cases:

- As all rail/intermodal PPP cases require public subsidy, a major challenge is to optimize the amount of this subsidy so as to achieve value-for-money for the taxpayer and some appropriate risk transfer to the private sector:

    - Public subsidies are "high" for the RFI/TAV case, reflecting the absence of private equity – largely due to the facts that HSR is very expensive and generally not "bankable". and also because the GoIT does not contemplate a private BOT franchise for HSR operation (which might have funded some infrastructure e.g. stations)

    - Public subsides are "high" for the Alameda Corridor case, reflecting that its ownership is by the public ports, and the private railway (operators over the corridor) are not equity participants. While rail utilization of the corridor is on-forecast, there appears to be some dispute between the SPV-railways about container fee payments through the ports which do not use the rail corridor.

    - Public subsides were (perhaps" "optimal" for Arlanda Express, Bremen-GVZ and CPR, the latter in part due to sizable land-grant involved, which provided a huge incentive to expand population and land cultivation.

- Regardless of the PPP form (including Public-SPV), greater attention needs to be paid to risk transfer to the private sector. In many of our cases, there is virtually none (e.g. RFI/TAV, ARTC, Alameda Corridor).

    - At the very least, there should be more use by Public-SPV of Design-Build contracts for construction (e.g. Alameda Corridor used on for part of project), in terms of both risk-transfer and access to private expertise (in design/construction).

    - More consideration should be made of "shadow-toll" arrangements for rail/intermodal facilities – which might allow greater access to private capital (mostly debt), more private sector risk transfer, and greater application of private sector expertise to achieving whole-of-life cost efficiencies.

As this discussion demonstrates, the rail/intermodal PPP cases are very different from most road PPP (especially those involving real-tolls), although they perhaps share much more in common with shadow-toll road PPP. There is a much greater reliance on public capital, and greater traffic diversion risk to other competing modes of transport (or facilities within the same mode).

9.2 Network Rail

There are no recent BOO or BOT examples for networks as a whole[10], given the "natural monopoly" aspects of rail. The CPR Trans-Continental Railway case shows that a major premise of the BOO rail model was in opening up new land for settlement. There have been

[10] The building of the Canadian Trans-Continental Railway in the 1870-80s was discussed above as a BOO.

several cases of rail system privatization, the case of the UK (Railtrack, ROCs) has shown some of the pitfalls of this approach.

We have looked at two cases involving Public-SPV: one in Italy with RFI/TAV involving High-Speed Rail-Passenger, including major new project construction. The other in Australia with ARTC, focuses on rail freight and the upgrading of the (state owned) interstate (national) standard-gauge rail network. The ARTC is principally a concession (O&M) along with the mandate to manage a public capital program (P&FM). There is no private equity in railway (e.g. track) infrastructure in either case.

9.3 Link Rail

We have looked at two cases rail-links: one in Sweden involving a BOT-Concession for rail passenger travel between an International Airport and City-CBD; and one in the US involving a Public-SPV for rail freight access to major port facilities.

The traffic realization for airport-CBD links has not generally been good, as seen in the case of Arlanda and Sydney. Another example, in Portland-Oregon (US), was largely underwritten by land redevelopment for non-transport purposes.

The possibility of additional rail freight corridors serving international ports is likely, so the lessons (pro/con) from Alameda Corridor are instructive, in terms of securing private equity from the railways, and a greater degree of private risk transfer.

9.4 Intermodal Hub

We have examined on intermodal hub case, the Bremen-GVZ case. This example, and other potential ones from France/Netherlands, indicate that the intermodal hub concept is most likely to be realized in the context of proximity to an international ports (e.g. Bremerhaven, Rotterdam), but their application will be complicated by comparable intermodal facilities operated directly by private or state-owned railways. The Alameda Corridor case would have been more interesting had it involved an intermodal hub, but each of the respective railways had already invested in these. As port traffic congestion grows, there may well be a growing interest in combined PPP projects involving rail-links into ports and intermodal hubs.

Table 8A: Basic Facts for Rail/Intermodal PPP Case Studies						
Type:	**Examples:**	**Description**	**Country**	**Period of Gestation / Procurement**	**Period of Construction**	**US$-Value**
9.1 Network-Rail	#9 Treno Alta Velocità	1,100 km (under construction) in Italy - Public SPV to build HSR Italian (passenger) rail network-Access Fees	Italy	11-years (1991-2001)	Ongoing Works completion of 2012 11-years (2001-2012)	$13,800M Assets $32,000M Construction Program
	#10 Australian Rail Track Corporation	3,626 km in Australia - Public SPV to upgrade/manage standard Australian (mostly freight) rail network-Access Fees	Australia	4-years (1995-1998)	Ongoing Works completion of 2009 10-years (1999-2009)	$1,700M Construction Program
	(Hist) Trans-Continental Railway (CPR)	2,900km (new) in Canada (East-Pacific) - Private Company-BOO-tolls/land-grant/existing 1,100km of track	Canada	11-years (1871-1881)	5-years (1881-1885)	$120M (in $1880)
9.2 Link-Rail	#11 Arlanda Express (Stockholm)	42km rail link (Stockholm-Arlanda Airport) - Concession (40yr)-BOT-toll	Sweden	7-years (1987-1994)	4-years (1995-1999)	$650M
	#12 Alameda Corridor (Ports of Long Beach/Los Angeles)	32km rail corridor (Port to Rail Intermodal facilities) - Public SPV-BOO-toll	USA	11-years (1985-1996)	5-years (1997-2002)	$2,430M
9.3 Intermodal Hub	#13 Bremen-GVZ	203ha site (Intermodal facility) - Private Company-BOO-rental fees	Germany	4-years (1984-1988)	13-years (1988-2001) Periodic expansions	$500M
SUMMARY		1,174km on new works (excluding CPR, ARTC) - Rail Link (ave=35km)		From 4-11 yr Ave=8 yr Mode=11yr	From 4-13yr Mode=5 yr (Link) Mode=11yr (Network-Hub)	$37,280M (exc. CPR) - HSR ($30M/km) - P-Rail ($15M/km) - F-Rail ($75M/km) - Hub ($2.5M/ha)

Table 8-B: Project Differentiation of Rail/Intermodal PPP Case Studies								
Bases	**Continuum-End A**	RFI/TAV	ARTC	CPR	Arlanda Express	Alameda Corridor	Bremen-GVZ	**Continuum-End B**
1. Contract Process:								
1.1 Degree of Competitiveness	Sole-Source	None	None	Moderate	High	None	Low	Competitive
1.2 Degree of Transparency	Non-Transparent	Moderate	High	Moderate	High	High	Moderate	Transparent
1.3 Degree of Structure	Ad-Hoc	Program	Program	Ad Hoc	Ad Hoc	Program	Program	Program
2. Concession Agreement:								
2.1 Legal Underpinning	Policy	Law	Agreement	Law	Policy	Policy	Law	Legislative
2.2 Length of Term	Short (<5-Years)	70-yr	Varies 15-60-yr	Indefinite (BOO)	40-yr	Indefinite (BOO)	Indefinite (BOO)	Long (99-Years)
2.3 Degree of Transparency	Low Private Domain	Moderate	High	Moderate	High	High	Moderate	Fully Public
2.4 Degree of Stability	Never Re-Negotiated*	Moderate	High	Low	High	High	High	Often Re-Negotiated
2.5 Regulation/Oversight	None-Fixed Terms	Yes	Yes	Yes	Yes	Yes	Little	Some (e.g. Toll-Rate)
3. Financing:								
3.1 Payment-Type	Fixed-Input	Access Fees	Access Fees	Tolls Land-Sales	Tolls	Tolls	Facility Rents	Variable-Output (toll)
3.2 Scope of Project	Build Asset Only	Build Asset	Upgrade Existing Assets	Build Asset	Build Asset Upgrade Existing	Build Asset	Build Asset	Existing Assets Included
3.3 Degree of Public Subsidy	None (full user-pay)	50% public equity	All Capital Works	Substantial Grants	Works / Grants / Loan	Substantial Grants	Substantial Grants	Full (no user-pay)
3.4 Issue of Public Project Debt	None (all private)	Some (EIB, CDeP)	None	None	Conditional Loan	Substantial	NK	None (Sovereign)
3.5 Public Debt Treatment	Off-Book	On-Book	N/A	N/A	On-Book	On-Book	NK	On-Book
3.6 Private Equity	None	None	None	Major	Major	None	Limited	Major (>10%)
4. Risk Assumption:			New Works					
4.1 Construction Cost	All Private*	Public	Public	Private	Private	Shared (DB)	Shared	All Public
4.2 Project Completion	All Private*	Public	Public	Shared	Private	Private (DB)	Private	All Public
4.3 Demand/Traffic	All Private	Public	Public	Private	Private	Public	Private	All Public
4.4 Foreign Exchange	All Private	Public	Public	Private	Private	Public	Private	All Public
4.5 Inflation	All Private	Public	Public	Private	Private	Public	Private	All Public

Table 8-C: Project Success Factors for Rail/Intermodal PPP Case Studies								
Bases	**Failure Factor**	RFI/TAV	ARTC	CPR	Arlanda Express	Alameda Corridor	Bremen-GVZ	**Success Factor**
0. Project Conception								
0.1 Project Portfolio Choice	Stand Alone	Commercial Program	Commercial Program	Stand Alone	Stand Alone	Alternates Consider	Alternates Consider	Alternates Considered
0.2 Procurement Choice	PPP Form Ordained	Ordained	Ordained	Ordained	Alternates Consider	Alternates Consider	Alternates Consider	Alternates Considered
0.3 Political Imperative	Dictated Decision	Dictated	Non-Partisan	Dictated Confederation	Dictated	Non-Partisan	Non-Partisan	Non-Partisan
0.4 Overcome Binding Constraint	None	Funds	States Agreement	Funds / Expertise	Funds / Expertise	Funds	Business Interest	Yes
1. Contract Process:								
1.1 Degree of Competitiveness	None	None	None	Moderate	High	None	Low	Compete
1.2 Degree of Transparency	None	Moderate	High	Moderate	High	High	Moderate	Full
2. Concession Agreement:								
2.1 Whole-of-Life Concession	Too Short / Long	Perhaps Too Long	NK	Debatable	Optimal	Optimal	Optimal	Optimal Length
2.2 Degree of Openness	Little / Confident.	Partial	Full	Mostly	Partial	Full	Partial	Full / Public
2.4 Degree of Stability	Little / Re-Negotiated	Moderate	High	Low	High	High	High	Never Re-Negotiated
2.5 Conflict Resolution Process	Inflexible / Unfair	Flexible	Flexible / Fair	Inflexible	Flexible	Flexible / Fair	Flexible	Flexible / Fair
3. Financing:								
3.1 Payment Related to Risks	No/Minor	Partial	Yes	Yes	Yes	Yes	Yes	Yes/Major
3.2 Scope for Innovation	None	Some	Some	Much	Some	Some	Some	Some
3.3 Private Equity from Operator	None	None	None	Yes	Yes	None	Yes	Some
3.4 Financing Close as Planned	Delay	Delay	N/A	Delays	Yes	Yes	NK	On-Time
3.5 Appropriate Public Subsidy	Low/High	High	High Capital	Yes	Yes	High	Yes	Yes
4. Risk Management:								
4.1 Construction On-Budget	No/Over	NK	NK	Over	Yes	Yes	NK	Yes
4.2 Project Completion On-Time	Delays	Delays	NK	Delays	On-Time	On-Time	Yes	On-Time
4.3 Demand/Traffic As-Forecast	Low/High	N/A	Forecast	NK	Lower (?)	Forecast	Forecast	Forecast
4.4 Operating Costs On-Budget	Overrun	N/A	Yes	NK	NK	Yes	NK	Yes
4.5 Whole-of-Life Efficiencies	No	NK	Yes	Yes	Yes	Yes	Yes	Yes

10. Inland Water Case Studies

There have been very few examples of inland PPP case studies. Beyond historical examples of the building of the Suez and Panama Canals (which by linking oceans may not truly be "inland water"), and more recent examples which involve major port facilities at river estuaries (SE Asia, S. America), we have only reviewed the O&M concession for the St. Lawrence Seaway (CA).

Generally, inland waterways have been publicly owned/managed, in part due to the "public good" aspect of fresh water, recreational public amenities of inland waterways, habitat protection, and potential hydro-electrical generation possibilities, which all result in a broader mandate for inland water authorities relative to road/rail freight/passenger movement.

10.1 Inland Water Project – Success Factors

- The major construction works for the Suez Canal and (initial building) of the St. Lawrence Seaway were awarded under concessions (BOT/DB) to access needed international technical expertise above all.

- The construction of the Suez Canal (BOT) involved private equity, whereas the building of the Seaway involved public capital.

- The "success" of the SLSMC (as O&M concession) has been its achievement of cost-efficiencies in operation, and (some) greater willingness to accept higher toll rates (i.e. more user pay).

- The degree to which the private sector has assumed risk transfer for inland water is minimal.

    - This finding is true for SLSMC, but also (partly) for the Suez Canal, for which public equity was injected to maintain the construction program.

- The two case studies exhibit no competitive procurement.

As this discussion demonstrates, the inland water PPP cases are similar to rail/intermodal in differing from road PPP: with greater reliance on public capital, and greater traffic diversion risk to other competing modes of transport (e.g. SLSMC vis-à-vis rail), or facilities within the same mode (e.g. Suez Canal vis-à-vis alternate sea-routes)

10.2 Network & Link Inland Water

Besides our SLSMC case, the UK-SPV British Waterways has a mandate to balance competing waterway claims to the public asset, and as a result is not a "commercial" transport entity as with other infrastructure providers. The Austria-SPV *viadonnau* is responsible for maintenance of the Danube (i.e. Donnau) waterway, but it has a broad mandate beyond transport (e.g. flood control), and is subject to the Mannheim Treaty

(prohibiting tolls on river traffic) so that there is no immediate prospect for raising user fees for financing infrastructure.

The SLSMC is very much a “hybrid entity” with a private O&M concession to manage the Canadian assets of the Seaway, but without private equity involvement, and with guaranteed public funding for (most) capital works and any operating deficit (up to a limit). The PPP objective is to achieve cost efficiencies in operations and greater user pay through tolls.

There are no BOO/BOT examples for inland water links. There are examples of DB contracts for certain canal works, but these are not considered against the network example above.

Table 9A: Inland Water PPP Case Studies						
Type:	**Examples:**	**Description**	**Country**	**Period of Gestation / Procurement**	**Period of Construction**	**US$-Value**
10.1 Network-Inland Water	#14 St. Lawrence Seaway Management Corporation	3,700km of navigable inland waterway (15 locks – connecting Lakes Superior, Michigan, Huron, Erie, Ontario to Atlantic Ocean) - Private Corporation with public quasi-equity - 10-20yr O&M management contract	Canada	4-years (1995-1998) (to commercialize)	5-years (1954-1959)	$3,000M (initial cost)
10.2 Link-Inland Water	(Hist) Suez Canal	160km canal (connecting Mediterranean to Red Sea) - Concession (99yr)-BOT-Toll	Egypt	13-years (1846-1858)	11-years (1859-1869)	$100M (in $1860)
SUMMARY		3,860km navigable waterway		From 4-13 yr	From 5-11yr	-

Table 9-B: Project Differentiation of Inland Water PPP Case Studies				
Bases	**Continuum-End A**	SLSMC	Suez Canal	**Continuum-End B**
1. Contract Process:				
1.1 Degree of Competitiveness	Sole-Source	None	None	Competitive
1.2 Degree of Transparency	Non-Transparent	Moderate	NK	Transparent
1.3 Degree of Structure	Ad-Hoc	Program	Ad-Hoc	Program
2. Concession Agreement:				
2.1 Legal Underpinning	Policy	Policy	Agreement	Legislative
2.2 Length of Term	Short (<5-Years)	20-yr	99-yr	Long (99-Years)
2.3 Degree of Transparency	Low Private Domain	Moderate	Moderate	Fully Public
2.4 Degree of Stability	Never Re-Negotiated*	High	Low	Often Re-Negotiated
2.5 Regulation/Oversight	None-Fixed Terms	Yes	Yes	Some (e.g. Toll-Rate)
3. Financing:				
3.1 Payment-Type	Fixed-Input	Tolls / Subsidy	Tolls	Variable-Output (toll)
3.2 Scope of Project	Build Asset Only	O&M with some asset upgrading	Build Asset	Existing Assets Included
3.3 Degree of Public Subsidy	None (full user-pay)	Most Capital Works	Public Equity	Full (no user-pay)
3.4 Issue of Public Project Debt	None (all private)	None	None	None (Sovereign)
3.5 Public Debt Treatment	Off-Book	N/A	N/A	On-Book
3.6 Private Equity	None	None	Major	Major (>10%)
4. Risk Assumption:		New Works		
4.1 Construction Cost	All Private*	Shared	Shared	All Public
4.2 Project Completion	All Private*	Public	Shared	All Public
4.3 Demand/Traffic	All Private	Public	Private	All Public
4.4 Foreign Exchange	All Private	N/A	Private	All Public
4.5 Inflation	All Private	Public	Private	All Public

Table 9-C: Project Success Factors for Inland Water PPP Case Studies				
Bases	**Failure Factor**	SLSMC	Suez Canal	**Success Factor**
0. Project Conception				
0.1 Project Portfolio Choice	Stand Alone	Commercial Program	Stand Alone	Alternates Considered
0.2 Procurement Choice	PPP Form Ordained	Ordained	Ordained	Alternates Considered
0.3 Political Imperative	Dictated Decision	Dictated	Dictated	Non-Partisan
0.4 Overcome Binding Constraint	None	Stakeholder Agreement	Funds / Expertise	Yes
1. Contract Process:				
1.1 Degree of Competitiveness	None	None	None	Compete
1.2 Degree of Transparency	None	Moderate	Moderate	Full
2. Concession Agreement:				
2.1 Whole-of-Life Concession	Too Short / Long	Optimal	Too Long	Optimal Length
2.2 Degree of Openness	Little / Confident.	Mostly	Parial	Full / Public
2.4 Degree of Stability	Little / Re-Negotiated	High	Low	Never Re-Negotiated
2.5 Conflict Resolution Process	Inflexible / Unfair	Flexible	Flexible	Flexible / Fair
3. Financing:				
3.1 Payment Related to Risks	No/Minor	Partial	Yes	Yes/Major
3.2 Scope for Innovation	None	Some	Some	Some
3.3 Private Equity from Operator	None	None	Some	Some
3.4 Financing Close as Planned	Delay	N/A	NK	On-Time
3.5 Appropriate Public Subsidy	Low/High	Yes	Yes	Yes
4. Risk Management:				
4.1 Construction On-Budget	No/Over	NK	NK	Yes
4.2 Project Completion On-Time	Delays	NK	Delays	On-Time
4.3 Demand/Traffic As-Forecast	Low/High	Low	NK	Forecast
4.4 Operating Costs On-Budget	Overrun	Yes	NK	Yes
4.5 Whole-of-Life Efficiencies	No	NK	Yes	Yes

11. Lessons Learned from Selected Case Studies

The key "lessons learned" from the success factors of our PPP case studies include:

- The importance during PPP gestation and procurement (which typically lasts 4-8 years) of broadly-based political/public debate regarding project/procurement design, so as to narrow the degree of uncertainty regarding project/contract details that remain into the procurement/financing phases, which can lower is the likelihood of project success.

- Desirability of procurement/concession/financing stability during the process of selection and award of a PPP concession. Major changes will be costly, damaging to "success" and reflective of failure to address above point.

- Desirability of public sector obtaining major approvals/environmental assessment/land acquisition prior to PPP contract award to prevent unnecessary cost/delays/uncertainty and risks (unless these demonstratively are better managed by the private sector).

- Desirability of the public sector to need/seek private sector expertise/experience/solutions under the PPP – and for "off-book" access to private capital to be a secondary consideration. There are now well defined public sector accounting rules for whether sufficient risk transfer to the private sector to justify off-book treatment of debt.

- The importance of adequate competition during procurement, and transparency of the procurement approach, to optimizing the public subsidy and generating cost efficiencies.

- Use of a Public-Special Purpose Vehicle (or dedicated unit within bureaucracy), with appropriate PPP procurement/financial skills and political direction, to represent the Government owner/concession granting authority. It is desirable (for efficiency, transparency) if this SPV reports on a fully commercial basis (i.e. full financial statements with balance sheet).

- BOT-Concession length would of 30-35-year range (beyond this is likely to be sub-optimal for taxpayers)[11].

- Concession provisions are required which allow for government oversight/regulation over various aspects of the contractual arrangement (which are of vital importance for protecting the public interest), recognizing that these will have a "cost" in terms of private sector risk/reward.

- If the PPP project is "bankable" with real tolls alone, the only form of public subsidy should be in the form of "in-kind" public works ancillary to the project, along with approvals process management and land acquisition.

[11] One reviewer criticized this finding as not being supported by the evidence. The evidence, apart from the rareness of PPP concessions beyond 35-years, can be found in footnote 36 below.

Lessons Learned

- If the PPP project is not "bankable" with real tolls alone, the form of public subsidy should be carefully considered, in terms of the legitimate basis for its defence and establishment of amount.

- If the public sector is expected to bear the full revenue risk for a project, this may be a bad sign and may indicate that: the project may not be cost-beneficial, the public sector is not getting full cost-efficiency from a concession, and/or the PPP would be better structured as a Design-Build (DB) contract. Despite this point, the full assumption by the private sector of demand/traffic risk should be carefully assessed in light of the PPP risk allocation principle that risks should be assigned to the party best able to manage/mitigate the risk.

- Generally speaking, rail/intermodal/inland water PPP projects will require substantial public capital, either in the form of capital grants, loans or (less often in the modern context) land grants. For these, it will be critical that there be: extensive prior political/public debate, procurement competition, and transparency to optimize the amount of the public subsidy so as to achieve value-for-money for the taxpayer and some appropriate risk transfer to the private sector. In particular, the temptation to underestimate the required public subsidy (so as to achieve greater political/public acceptance) should be strongly resisted, as this will give rise to instability, uncertainty and likely higher costs.

- Generally speaking, rail/intermodal/inland water PPP projects will involve only limited amounts of private equity (as opposed to private debt), and greater attention needs to be paid to risk transfer to the private sector. In particular, consideration of "shadow-toll" models to encourage DB and O&M efficiency have still to be widely tried (the UK ROC experience being of some interest here in terms of "partial success").

12. Contextual Discussion

How do our findings from the 2 historical and 14 modern case studies undertaken for this study compare to findings from other studies with similar research interests? This chapter reviews a broad literature from governmental organizations and some academic/industry sources, including papers identified by the client in the statement of work.

We start this section with several quotes from a UN-ESC Working Party on Transport Trends and Economics which noted the following[12]:

- ***"It is not straightforward to measure success and failure as transport policy is required to meet multiple objectives, whose relative importance differs over time and place."***

- ***"What to do is more or less known but doing it is often very difficult."***

- ***"Countries will benefit from more open review of the successes and failures in their policies."***

The broader literature on PPP and private financing of transportation infrastructure can inform these case studies – and summary – by focusing on ten particular topics of interest to the present study:

1. PPP Scope & Market
2. PPP Competition
3. PPP Institutional Structure
4. PPP Risks
5. PPP Regulation/Contract
6. PPP Transparency/Accountability
7. PPP Benefits from Private Involvement
8. PPP Challenges
9. PPP Financing
10. PPP Public Accounting Issues

Each of these will be discussed below with reference made to our case study findings and the degree of congruence between our findings and those of the broader literature.

12.1 PPP Scope & Market

12.1.1 How big is the realistic scope and market for PPP procurement of transportation infrastructure?

Between 1990 and 2000, 2,500 infrastructure projects involved private participation in "developing" and "transition" economies, generating project investment commitments of

[12] UN-ESC (2003) pp.3,10,13

US$750 billion. Out of these, transport had an 18% share of funding and accounted for 27% of the number of projects. Within transport infrastructure, toll roads were most attractive to private capital, followed by the ports and airports[13].

It is widely recognized that the high transaction costs of PPPs limit their potential application to larger scale projects (e.g. minimum of US$50M) for which the potential cost efficiencies are of sufficient size to offset these higher transaction costs.

12.1.2 Does the mid-1990s slowdown in the pace of private infrastructure funding indicate that PPPs are a "passing fad"?

One commentator notes that the evolution of PPPs is very similar to the historical development of railways (i.e. rapid private expansion/boom/bust/nationalization phase, subsequent public regulation/deregulation/mixed/hybrid phase, and partnership/redefinition/policy phase) [14]:

- ***Firstly:*** private initiatives work for some things for a while, then some internal but often major shock external to the sector takes place and the public sector comes into the picture first as a regulator, then as an owner or at least financier;

- ***Secondly:*** after some time the public sector runs itself into problems and tries to get the private sector back and eventually hybrid solutions are found to ensure the survival of a sector for which the demand is strong, the economic impact brutal, but for which the financing structure needs to better account not only for the financial cost of the business but also for the major economic, social and political dimensions.

- ***Thirdly:*** after a decade of increased private sector participation, the cycle is now at the stage of its evolution at which governments need to define how hybrid they want their transport systems to be and the specific actual responsibility they want to assign to themselves.

12.1.3 What lessons can be learned from the mid-1990s slowdown in the pace of private infrastructure funding?

The PPP slowdown (1997+, i.e. end of the First Phase above) was highlighted by shortcomings in the PPP arrangements and calls for careful analysis of the lessons[15]:

(i) private funding is not available free, there is a risk element that needs to be shared and paid for;

(ii) sector reforms should precede the issue of a concession or any other PPP arrangement, that includes policy, regulatory and institutional changes;

[13] E. Molnar (2003) p.4 based on the World Bank PPI Project Database.
[14] Estache-Serebrisky (2004) p.3
[15] E. Molnar (2003) p.13

(iii) the willingness to pay the transport infrastructure users is lower than originally assumed.

Exclusive (i.e. 100%) private funding of transport infrastructure is not the best option for bringing large-scale projects to fruition[16]. Because of the nature of the constraints involved, investment in major transport infrastructure does not lend itself to funding by the private sector alone. The operating risks plus those inherent in the construction phase, the long payback period on the infrastructure, the uncertainty surrounding both the returns and the long term all militate against fully private funding of such infrastructure.

12.1.4 Are there inherent characteristics of transportation networks which preclude a universal PPP approach to procurement?

Transport networks are characterized by a wide range of projects with long service life, and various financial, technical, environmental and political risks that result in relatively high and uncertain rates of return. There is no single answer to the question of infrastructure funding. Solutions must be sought through a variety of instruments which must be used in combination and which need to be adapted to each category of project. Consequently, the public authorities should increasingly look for mixed (public-private) financing solutions (i.e. PPP with (partial) public funding).

Where overall transport sectoral reform (and privatization of operators) cannot generate a sufficient degree of competition, the market will not be able to discipline the actors involved in service provision. In many areas of infrastructure, especially in network operations, local monopolies tend to be unavoidable. To ensure that these companies do not abuse their market dominance to the detriment of consumers, strong regulation clearly is essential[17].

12.2 PPP Competition

12.2.1 What are the implications of growing concentration of the PPP infrastructure sector?

There is some evidence of possible reduced future competition in PPP procurement arising from greater global concentration of the construction sector (which is at the core of all new infrastructure projects)[18]. Some 6 infrastructure companies have won 50% of the market, and 16 companies with about 90% of the market:

- Spanish companies (Dragados, Ferrovial, Abertis, OHL, FCC, Acciona and Sacyr), accounted for 52% of all new concessions and PPP projects over US$50 million under construction and signed between 1985 and 2003;

[16] ECMT (2003b) p.14
[17] F. Sader (2000) p.83
[18] Estache-Serebrisky (2004) p.24 based on data from Public Works Financing.

- British companies (John Laing, AMEC, Balfour Beatty and Alfred McALpine) accounted for 14%;
- French Companies (Vinci-Cofiroute, EGIS, Bouygues, Alstom) accounted for 14%;
- Australia (Macquarie, Transfield) accounted for 9%.

This list should also include major Japanese (e.g. Kumagai), Norwegian (e.g. Kvaerner), Italian (e.g. Autostrada) and US (e.g. Kiewit) contractors/operators who have major PPP experience, but the point remains valid about growing concentration. As there is an extensive knowledge and technology basis for PPP project management it should come as no surprise that large scale PPP projects require (and attract) a limited number of highly specialized and experienced firms. Most countries eager to expand their national companies' expertise in the PP sector have encouraged (successfully) the involvement of local construction/engineering firms as the local partners for the major international actors.

The concentration is quite impressive since many of these companies have a certain degree of regional specialization. Effective *ex-ante* competition tends to be modest even in some of the best organized auctions/concession and opening of trade in services is not changing this picture. It is interesting to look into the specific nature of the bidding companies, which typically involve consortia of "smaller" local and "larger" foreign companies. There are of course gains in terms of transfer of know how and reductions of overall risks associated with these strategies. But the gains may some time have to be weighted against the cost induced by lesser competition.

It is unrealistic for large PPP transport projects to expect to have more than 3-4 qualifying, quality bids, as the concentration of major PPP players involves a relatively small cast of potential international bidders.

Increased risk (to the public sector) can arise in PPP from sector consolidation, if large, strong operators in joint venture with local construction companies feel confident that they will be able to take on the regulators in case of conflict, and force contract renegotiation on more favorable terms[19].

12.3 PPP Institutional Structure

12.3.1 What are necessary macroeconomic/governance foundations for successful PPPs?

The financial structure of a PPP is underpinned by the legal and regulatory structure of the country and reflect the confidence in its policy/macroeconomic/monetary stability. This underlines the need for legal, regulatory and institutional reforms before Governments can successfully tap capital markets for transport development[20]:

[19] UN-ESC (2003) p.22
[20] E. Molnar (2003) p.4

Some of the lessons for a successful PPP legal framework are[21]:

– stability and consistency adapted to the project, based on analysis of directly-applicable legal aspects (which may demand an ad hoc legal approach) and the indirect regulatory environment;

– public authority decisions under straightforward, transparent and unambiguous procedures, with independent jurisdictional control;

– formal PPP contract built around an equilibrium between the contracting party (government), the investor-operator (private) and the user (the "public") – especially with regard to sensitive clauses: financing, private obligations, background/meeting/reporting, property ownership, and accounting/taxation;

– public authority PPP regulatory mechanisms to guarantee neutrality/fairness for the private party, and to enable the public authority to ensure that public policy objectives and conditions are met by the private operator.

12.3.2 How has the absence of these foundations resulted in unsuccessful PPPs?

Notable PPP failures highlight the importance of institutional structure and treatment of risk[22]:

- Mexico-toll motorway program ran into difficulties because of inadequate traffic and revenue forecasts, underestimation of costs, and debt maturities that were ill adapted to project needs;

- US-Dulles Greenway and France-Orly VAL faced problems because of lower than expected revenues;

- UK-Channel Tunnel experienced poor initial project evaluation, resulting in cost overruns, delays and lower than expected revenues necessitated financial restructuring of the project;

- Thailand-Second Stage Expressway in Bangkok faced difficulties due to government intervention and late access to land;

- several projects were stalled (e.g. Hungary-Szekszard Bridge), cancelled (e.g. Czech Republic-D5 Motorway, Hungary-M3 Motorway) or had private financing rejected in favour of other options for various financial and legal reasons (e.g. Czech Republic-Prague Ruzyne Airport, Hungary-Budapest Ferihegy Airport).

The reasons vary from project to project, but the most important factors seem to be:

[21] J-M. Aoust et al p.102, in J-Y. Perrot, G. Chatelus (ed) (2000)
[22] EBRD (1996) pp.21-23

- ***poor project planning and selection processes***, resulting in weak project financial viability (particularly for motorway projects); or lack of political acceptability;

- ***weak project finance capacity***, resulting from lack of public affordability, lack of private equity; and/or lack of local funding;

- ***poor institutional structure and contract***, resulting from weak/inconsistent/unclear regulatory and legal frameworks, too high level and/or inequitable allocation of risks, and lack of convincing examples in developed countries.

Discussion on the perspective for wider use of PPPs for the EU-accession and neighbouring countries resulted in the conclusion that institutional conditions were not favourable for this form of financing of transport infrastructure due to: unsatisfactory legal framework, a lack of experience and problems of risk management are reducing interest of the private sector for international projects[23].

12.3.3 What are necessary transportation policy foundations for successful PPPs?

Transportation infrastructure development/management requires a stable policy framework that will ensure the optimum use of existing assets and of future investments. Transport policy as a basis for infrastructure initiatives must aim to[24]:

- develop systems which are economically, socially and environmentally sustainable;

- liberalize transport to improve trade efficiency, a pre-condition for economic growth and social development;

- promote harmonization, interoperability and intermodality along trade-corridors, so as to reduce transport costs and to improve efficiency (e.g. technical aspects of transport, administrative and legal provisions, border crossings and traffic management);

- provide incentives to promote more use of non-road transport alternatives;

- encourage railway reform to make this mode competitive and to increase rail profitability through more intensive infrastructure use;

- base infrastructure investment on economic evaluation (e.g. cost-benefit analysis, fully accounting for the impact of transport on economic/social development/environmental effects) supporting a sustainable transport system;

[23] ECMT (2003c) p.9
[24] ECMT (2004c) p.3

- ensure that transport services and infrastructure are accessibility to people with mobility handicaps;

- ensure co-ordination between transport infrastructure investments and operating conditions (i.e. focused on maintenance/rehabilitation of existing assets);

- develop relevant statistical databases so that investment projects can be monitored and evaluated accurately.

Usually, transport infrastructure policies aim to pursue a number of policy objectives simultaneously aimed at various objectives:

- economic development of regions that currently have no all-weather road connections to the rest of the country (as in large parts of Russia);

- promoting investment in particular types of infrastructure by increasing cost recovery and earmarking revenues (as with tolled motorways in some countries); and

- managing congestion.

However, to ensure a coherent result, infrastructure (and pricing) policies need to be based on a common economic efficiency objective — i.e. price/charging system that maximize socio-economic welfare[25].

12.3.4 What are conditions for an effective PPP institutional structure?

An effective PPP institutional structure, based on the following three conditions, can demonstrate that, in spite of its higher direct financial and transaction costs, it will most likely perform better than traditional public solutions and that benefits will be equitably shared between all stakeholders[26]:

- ***1st Condition:*** show that procurement procedures are **efficient**.

    - PPP procedures are complex, not easy to standardize and negotiations are long and expensive.
    - Competition is often limited to a small number of bidders, which in the case of repeated deals may facilitate collusion.
    - A PPP rational is to give private companies enough flexibility to elaborate innovative technical and financial solutions to achieve a specified output.
    - Even when competition is strong enough and appropriate selection criteria are used, there is no guarantee that the winner is the best one from a value-for-money point of view. Transparency of procurement

[25] ECMT (2003e) p.5
[26] P. Boeuf (2003) pp.8-9

procedures is essential to avoid public skepticism about the benefits of PPP procurement.

- ***2nd Condition:*** ensure that the concession contract or the regulatory framework gives enough **incentives** to the concessionaire or private operator to operate efficiently **without abusing** a potential monopolistic position.

    - Avoid private capture of an excessive share of overall benefits (either by increasing margins on construction and operating costs or by increasing tariffs and direct operating profits).

- ***3rd Condition:*** give evidence that the PPP will **not negatively impinge** on other important issues (such as the wider benefits that transport infrastructures may provide to society, their distributive effects or the internalization of negative environmental externalities).

    - This may be the case if regulatory frameworks or contractual agreements are not adequately conceived and/or implemented. Very often, for example, the most profitable tariff (e.g. toll rate) for the private partner is not the most efficient for society at large.

12.3.5 How "complete" must a PPP contract be?

Ideally, PPP contracts should be complete, i.e. foresee all possible events and specify what each party has to do in any contingent event[27]. In practice this is not feasible, and the "optimal" level of incompleteness of contracts is difficult to find.

The trade-off is between the costs linked to frequent renegotiations when contracts are very incomplete and the risk of being lost in highly sophisticated contractual arrangements, when contracts try to foresee as many events as possible. In the latter case, the legal hypertrophy may create excessive and costly complexity, making it much more difficult to get an overall picture. The trade-off is also between the advantages of flexibility in case of incomplete contracts and the advantages of incorporating future events into the competitive tending process for "complete" contracts, knowing that "complete" contracts can generate perverse effects and lead to inextricable conflicts between public and private partners in case of unforeseen events. The questions of *arbitrage* and *dispute resolution* are in this case essential and needs to be tackled at an early stage, before problems arise.

12.4 PPP Risk

12.4.1 To whom should the main forms of PPP project risk be allocated?

A concise statement of PPP risk and the possible assignment to either the public or private sectors (or shared) is provided below[28]:

[27] P. Boeuf (2003) p.12

Typical Infrastructure Project Risks & Hypothetical Allocation		
Risk Category	**Example**	**Partner Best Suited to Manage Risk**
Design/Technical Risk	Engineering or design failures	Private
Construction Risk	Cost escalation due to delay or faulty techniques	Private
Operating Risk	Costly operation and life-cycle maintenance	Private
Revenue/Demand Risk	Deficient revenue due to low traffic volume or lower price due to demand elasticity	Mostly Public – Some Private
Financial Risk	Costs of inadequate revenue hedging and debt management	Mostly Private – Some Public
Force Majeure	Loss from war and Acts of God	Public
Regulatory / Political Risk	Delay in project approvals, land acquisition, changes in law/policy affecting revenue.	Public
Environmental Risk	Damage and liability/mitigation costs from adverse environmental events	Private
Project Default Risk	Project bankruptcy from any/all of the factors above.	Shared Public/Private

The clear result is that:

- the private sector should bear the full risk of: design-technical-construction-finance-environmental mitigation-operating (although only a share of demand/traffic volume) activities/phases/events;

- the public sector should bear the full risk of: regulatory approval and political change (and the bulk of force majeure) phases/events;

- the public and private sectors should share the risk of: demand/traffic/revenue-project default activities/events.

Once the general "project" risks have been identified and allocated, the inherent residual project risks must be allocated. Two basic principles serve to guide this division of risks.

– ***First Principle*** stipulates that risk assumption must be remunerated, with the quantity of risk borne by a partner being made proportional to the level of profit earned (financial, socioeconomic, etc.) from the project.

– ***Second Principle*** states that each risk be assigned to the actor most capable of managing it, given the nature of the risk; such an approach must be applied with the first principle keenly in mind.

12.4.2 What risk management process should be used to reduce/mitigate PPP risks?

Project risk management involves a four-stage process[29]:

[28] Adapted from F. Poschmann (2003) p.7, based on study by Grimsey-Lewis (2002)
[29] J-M. Aoust et al p.57, in J-Y. Perrot, G. Chatelus (ed) (2000)

1. risk identification,
2. risk assessment – of the potential impact in the event of risk occurrence,
3. risk-by-risk management/limitation, and
4. allocation of residual risks.

A number of measures can be taken in a coordinated manner by private operator and public authority in order to limit overall project risks, namely by means of:

- establishing a sound project basis,
- determining the most appropriate choice of financing, and
- adopting a well-targeted marketing approach with respect to the end user.

12.4.3 What has been the financial (credit-rating agency) perspective on PPP risk management experience?

One study of UK-PFI experience reported that major credit ratings agencies find that private companies "carry little effective risk"[30]. The credit ratings agencies, Fitch Ratings and Standard and Poor's provide an important source of information about PPP road projects[31]. Standard and Poor's makes the point that while experience as yet is limited, the private sector is being required to assume more risk in the most recent PPP projects than in the earlier projects. The clear implication is that the early PPP projects were a safe investment for bondholders.

Generally, there has been 'significant government support' to offset additional PPP risk. Fitch Ratings cites the example of insurance risk: whereas the early UK-PFI projects required the private sector to shoulder the full cost, now the Government shares the risk by taking the 'insurer of last resort' role. Fitch Ratings concluded its report by stating that it expects the PPP sector to remain as investment grade and to 'continue to offer a comparatively safe haven in times of economic downturn'.

Standard and Poor's notes that the construction phase represents the largest single risk to a PFI project, although once the building phase has been completed, it is possible for the consortium to take advantage of lower interest rates and a reduction in project risk to refinance its debt (e.g. Autolink Concessionaires (M6)'s contract for the M6–A74(M)/M74 link). The UK-DBFO road projects have a number of strong credit features, including a contract signed and payments guaranteed by the department head, contractually stable income stream, little or no volume risk to debt holders and relatively low operational risk.

12.4.4 What has been the public auditing perspective on PPP risk management experience?

[30] P. Edwards et all (2004) p.7 – which focused on the UK-PFI experience, including DBFO-road projects.
[31] P. Edwards et all (2004) pp.89-91, based on Fitch Ratings (2003) and Standard and Poor's (2002, 2003).

The UK-NAO assessment of the first DBFO-road projects also found that that the majority of risk transfer relates to the construction phase of the projects[32]. The construction phases of the UK projects were built to time and budget, in contrast to conventional procurement, which had a history of cost and time overruns. One industry study estimated that the UK-Highways Agency paid a premium of 25% of "forecast" (median?) construction cost to ensure the projects are built on time and to budget[33].

The UK-NAO reported favorably on a number of newer features of PPP-contracts relating to the allocation of risks between the Highways Agency and other parties to the contract.

- Firstly, there are now specific clauses built into each contract to prevent roads being handed back in a poor condition and to ensure that the NPV of net cash flow remained unaltered should changes be required that would lead to adjustment of toll levels;

- Secondly, there is now a system of penalty points so that, if contract performance fell below that specified, an accumulation of such penalty points could lead to the banks stepping in and replacing the contractor, subject to the approval of the Highways Agency. Failure to appoint a satisfactory replacement could lead to the Highways Agency terminating the contract; and

- Thirdly, should the private sector default on its loans for whatever reason, the banks would have to take operational control and appoint a replacement contractor, subject to the approval of the Highways Agency. It is unclear, however, how this and any subsequent renegotiation of the contractual terms would affect the Agency's costs and risk allocation.

The NSW-Auditor was highly critical of the Sydney Harbour Tunnel contract as only (partial) design and construction risk had been transferred to the private sector. The Canadian-Auditor General found that the package of financial guarantees negotiated between the GoC and the private consortia had fully transferred design and construction risks (including operation warranty) to the private sector.

Of particular concern for policy discussion – given the PPP principle of assigning risk to the party best able to manage the uncertainty/events giving rise to the specific risk – is whether the transfer of project demand/traffic risk is appropriate in a PPP contract, since demand/traffic volume is determined by external factors over which private operators have little or no control[34].

[32] P. Edwards et all (2004) pp.83-84
[33] P. Edwards et all (2004) p.218. While the authors of this study are critical of this "price" of risk transfer, a more detailed analysis of historical cost overruns and cost forecast error are needed to make a fair assessment.
[34] P. Edwards et all (2004) p.82

12.4.5 Is there any evidence of excessive returns to the private sector from PPPs?

Australian academic accountants, Walker and Con Walker (2000), compiled evidence from a range of secondary sources on the use of private finance in infrastructure projects[35]. They note that evidence of the private sector's profits from such schemes – and hence some indication of the financing costs to government of 'privatizing' operational responsibility for infrastructure development – was hard to come by. Such evidence as existed was typically 'snippets' in the financial press, which included:

- 1998 Australian press reports that the private sector acknowledged a net return of 11–13% on BOOT projects, which the authors think could be conservative;

- the Melbourne City Link project's prospectus, which anticipated that initial investors would get a real post-tax return over the life of the project of 17.5%; and

- NSW-Auditor-General reported that investors in Sydney's M2 motorway were being advised they would get a pre-tax return of 24.4% per annum if traffic forecasts were valid.

Some of the problems of assessing private rates of return have to do with:

- Comparing *ex post* returns (i.e. after uncertainties have been managed and/or risk events have been mitigated) without factoring in the "price" of risk transfer (i.e. to obtain an *ex ante* expected rate of return);

- Comparing private equity returns to public "benchmark" discount rates (e.g. sovereign debt rate of interest, social discount rate) without taking into account the lower cost of private debt and the overall private weighted cost of capital; and

- Failing to make adjustments to the public "benchmark" discount rates for: the "price" of risk transferred to the private sector; the over-time public debt service costs; and the "deadweight loss" of taxation for marginal public tax yields – which result from economic distortions from taxation, tax-avoidance behaviour, and tax administration costs.

There are known examples where PPP procurement/contract failures have likely resulted in excessive private returns: initial UK-Railtrack private returns; Sydney Harbour Tunnel risk assumption by the public sector; "privatization" of the Toronto-Highway 407 Electronic Toll Road for 99-years without toll-rate regulation/oversight[36].

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[35] P. Edwards et all (2004) pp.80-81

[36] The initial PPP procurement of the Toronto-Highway 407 ETR was a notable success. The author has personally questioned (without an answer) the Ontario advisor of the subsequent privatisation as to what "value" the public sector realized from the 99-year lease which was over-and-above the price which would have been realized from a 35-year lease. It should be noted that (at a 10% real discount rate) the incremental annual $1.00 of future private sector expected revenue (in year 35) is only worth $0.035 in net present value.
The "sale price" of the Highway 407 ETR was CA$3.1B, which represents the NPV of future toll payments as calculated by the private bidder. This can be "simulated" with the following parameters: Base Year Net Revenue of CA$300M and Traffic/Revenue Growth of 4%p.a. The shortening of the lease from 99-years to 35-years reduces the

There is considerable evidence that – apart from the initial design/technical/construction risks involved in the PPP project; and possibly the initial demand/traffic volumes (if these are borne by the private sector) – transportation infrastructure is a very low-risk capital investment sector. Inherent (sector-systemic) risk (as measured by asset beta) is low for roads (beta = 0.25) and for rail (beta = 0.36) – and these are significantly below the all economy level of systemic risk (beta = 1.00)[37].

12.4.6 What is an appropriate role for the public sector in sharing PPP risks?

Generally, the public sector should only assume PPP risks for which it (rather than the private sector) is best placed to mitigate specific events or manage uncertainty. There are many ways in which overall project risk can be reduced, including: public management of regulatory approvals and land acquisition phases, public capital grants, provision of in-kind services or transfer of assets, (partial) loan guarantees, some guarantee of future revenue (e.g. a floor) etc.

As the private sector may have valid reasons for doubting the ability of a particular sovereign state to live up to its specific PPP contractual obligations, the World Bank (and other IFIs) provide partial risk guarantees to cover specified risks arising from non-performance of sovereign contractual obligations or certain political force majeure events. These involve the guaranty of payment in the case of debt service default resulting from the non-performance of sovereign contractual obligations[38]. It is important to note that the involvement of an IFI is most appropriate to mitigate PPP risks arising out of uncertainty about the inherent stability of the PPP institutional structure.

Partial risk guarantees cover specific government obligations spelled out in a support agreement (e.g., concession agreement, implementation agreement, BOT contract). They are appropriate for enhancing a project's limited recourse project financing, the most common method of financing concessions for transport infrastructure.

Sovereign contractual obligations vary depending on project, sector, and country circumstances, and are embedded in a support agreement negotiated between the Government and the project sponsors. Typical government contractual obligations include:

(i) maintaining the agreed regulatory framework, including toll rates;
(ii) construction assistance, such as permitting and rights-of-way, land, ancillary services;
(iii) operations assistance, such as maintaining access roads to a toll road;
(iv) financial assistance, such as minimum revenue guarantee, if any;

NPV (i.e. "sale price") by only CA$122M. This figure represents the private "valuation" of 64-years of future toll payments, whose arithmetic sum is approximately CA$23B !!!! From a public policy perspective, I do not believe that the public "value" of CA$23B of future toll payments is as low as CA$122M. This is truly "mortgaging the future" !!

[37] UN-ESC (2003) p.18

[38] ECMT (2003a) p.10

(v) assistance with currency issues, such as foreign currency convertibility and availability, and banking permits; and
(vi) payment of damages in the event of breach of the support agreement by the Government or its agencies.

A partial risk guarantee is triggered by debt service default resulting from Government non-compliance with one or more of its obligations as stipulated in the support agreement with the project company.

The June 1994 commuter revolt related to the Portugal-Tagus Crossing resulted in a revision to the contract to avoid significant toll increases, and compensation to the consortium for the revenue shortfall. Political turnarounds can generate distrust among international investor community of government failure to recognize the sanctity of contract. A risk premium will be priced into the project to reflect the perceived risk that the government can renege at will on contractual agreements reached with previous administrations. Political sovereignty does not imply the right to breach of contract, and compensation will typically result following international arbitration[39].

12.5 PPP Regulation/Contract

12.5.1 Why is it important to provide a clear "regulatory" basis for PPPs?

A mistaken assumption is that regulation is not desired by private investors. Investors certainly do not favor an excessively rigid and intrusive regulatory structure that limits their ability to operate infrastructure assets in an efficient manner. However, they do want-and in fact need-a regulatory framework that provides transparency regarding the future operating environment and minimizes the risk of undue interference by the government during the operating phase. Investors will require a clear set of rules and regulations that provide the basic guidelines under which a specific infrastructure service can be provided[40].

In a PPP the contract is the effective instrument of regulation. In cases of PPP failure due to renegotiation, the experience is that weak regulators have been left with too much discretion without guidance to take the decisions on matters left out of contracts. An alternative approach is for "rules-based" contracts where uncertainty is accommodated by fair and transparent rules which have minimal information requirements[41].

Governments, as a rule, find it difficult to establish an effective regulatory framework that gives investors sufficient confidence. Investors tend to be most concerned with the lack of political independence of regulatory agencies. In developing countries, successful implementation of private infrastructure investment requires a careful review of the business environment for such investments and, if necessary, reform of the policy framework underlying it. New institutional structures often need to be designed, laws

[39] F. Sader (2000) p.49
[40] F. Sader (2000) p.83
[41] UN-ESC (2003) p.20

must be amended or new legislation created and adopted, and regulatory oversight functions must be established and strengthened. Most important, the organization of the existing service provision should be restructured to allow for effective participation and competition by private sector operators[42].

12.5.2 Who ultimately bears the risk from PPP project failure/bankruptcy?

Private infrastructure projects mix regulation (involving private risk, a public regulator reluctant to see project-bankrupt) and high private leverage. If all goes well, equity holders make a profit, debtholders are repaid, customers pay no more than they expected, and the government is not called upon to bail the company out. If all goes badly enough, the prospect of bankruptcy will loom. Too often the public authority/regulator will attempt to stave off project-bankruptcy through contract-renegotiation, perhaps by an unscheduled price increase, or government injection of taxpayer money into the firm. In other words, the combination means customers and taxpayers bear more risk than would appear from the regulations governing the private infrastructure project[43].

Solving the problem requires governments/regulators to do one or more of the following things[44]:

- increase their willingness to allow private infrastructure providers to go bankrupt;
- reduce company leverage by mandating minimum equity levels or taking similar actions;
- reduce explicit risk bearing by the private infrastructure company—by allocating more risk to taxpayers or customers; and
- do nothing—to accept the problem and live with it.

If governments are not be able to make bankruptcy risk transfer "stick" to the private sector, then it would be better to recognize this up front, and write the risk-sharing mechanism into the PPP contract. Examples of bankruptcy risk sharing mechanisms include[45]:

- rate-of-return bands and profit-sharing;
- trigger-point resets;
- cost pass-throughs; and
- shipwreck clauses.

Often in the past, the focus has been on providing efficiency incentives by transferring as much risk as possible to the private sector. However, if we believe that governments will continue to intervene to stop private infrastructure providers going bankrupt, then the amount of risk that can be effectively transferred is limited. It would be better to recognize this by designing risk-allocation arrangements that limit risk transfer to realistic levels. By realistic levels, we mean that the probability that losses would exceed

[42] F. Sader (2000) pp97-98
[43] D. Ehrhardt, T. Irwin1 (2004) p.4
[44] D. Ehrhardt, T. Irwin1 (2004) p.46
[45] D. Ehrhardt, T. Irwin1 (2004) p.55

the total equity value of the company should be low. This reduction in risk transfer to private companies might need to be combined with controls on the company's capital structure. Otherwise, companies could respond to reductions in risk transfer by increasing leverage.

12.6 PPP Transparency/Accountability

12.6.1 What is the experience of transparency and accountability of PPP projects?

The experience of conducting this study indicates that it is extremely difficult to access reliable, objective information regarding PPP experiences, both in terms of: procurement process and contract terms; and *ex post* financial/cost/traffic experiences.

One study of the UK-PFI experience with DBFO-road projects found concern regarding the financial reporting by all parties and whether it sufficiently provided accountability to the public[46]. The study concluded that[47]:

> ***"…road projects appear to be costing more than expected as reflected in net present costs that are higher than those identified by the Highways Agency, owing to rising traffic and contract changes".***
>
> ***"It is, however, impossible to know now whether or not VFM has been or is likely to be achieved, because the expensive element of the service contract relates generally to maintenance that will not be required for many years."***

The study found problems in three interrelated headings: partnership and managing the contract; value-for-money and risk transfer; and financial reporting and accountability

1. ***Partnership and managing the contract***

   - Planning of the performance monitoring systems is poor and leads to an increased workload in the management of the projects.

   - While contingency plans should be prepared at least in outline for all major UK-PFIs against the possibility of default by the private sector, none are evident.

2. ***VFM and risk transfer***

   - It is impossible to compare the actual costs of PFI and thus VFM (one of the justifications for PFI) against the original public sector comparator (PSC) as the PSC quickly becomes obsolete (i.e. the comparison is valid only *ex ante*).

[46] P. Edwards et all (2004) pp.8-12
[47] P. Edwards et all (2004) pp.217-218

- Additional monitoring costs have increased the public sector's costs and thus reduced VFM compared with the original expectations.

- Where risk is shared between partners its allocation may be unclear and therefore its transfer – so central to the UK-PFI – is uncertain.

- Demand risk is held by the private sector but this may create a new source of risk because the private sector cannot manage this demand.

- The UK-Highways Agency paid a premium of some 25% of construction cost on the first four DBFO roads to ensure the project was built on time and to budget.

- Because the full business cases are not in the public domain, there has been little external financial scrutiny of the deals and post implementation it is unclear how the actual cost of DBFO compares with the expected costs. Evidence suggests that DBFO projects have turned out to be more expensive than expected. How this affects the UK-Highways Agency's ability to fund other maintenance projects is unclear.

- The private-SPV interest rate of 11% in 2001 and 9% in 2002 and the high level of debt, which is greater than the construction costs, means that the DBFO contracts are considerably more expensive than the cost of conventional procurement using Treasury gilts at the current rate of 4.5%.

- The seven SPVs' total effective cost of capital was about 11% in 2002. While the NAO believes that this additional cost of private finance (six percentage points above Treasury stock) represents the cost of risk transfer (about £56 m), it is difficult to see what risks the companies actually bore since their payments were guaranteed by the Government and based on shadow tolls.

- In conclusion, the road projects appear to be costing more than expected as reflected in net present costs that are higher than those identified by the UK-Highways Agency, owing to rising traffic and contract changes. It is, however, impossible to know at this point whether or not VFM has been or is indeed likely to be achieved because the expensive element of the service contract relates to maintenance that generally will not be required for many years.

3. Financial reporting and accountability

- Despite annual costs in the DBFO-road sector of about £210M for just these initial projects, there is little information available to the public as taxpayers and users.

- For the first three years of UK-PFI payments, the Highways Agency did not report its DBFO payments and could not make such information available to the research team[48].

- Private sector organizations use complex structures that involve "close company" status. The SPV normally lets the operational contracts to the companies that own it, and so transactions and transfer prices need not be at arm's length. Consequently it is difficult to measure the total returns on capital and to assess the cost to the public of paying for that return.

- Financial reporting within the private sector is opaque, from a public accountability perspective, because of the complexity of the web of companies that make up the SPV and the contracting organizations. Related party transactions are not (fully) disclosed, with the result that private returns on PFI projects are spread between these various entities and thus are disguised.

- The concept of accountability in the context of public expenditure on essential public services implies: firstly that citizens, or at least their political representatives, the media, trade unions, academics, etc, can see how society's resources are being used and, secondly, that no members of that society are seen to have an explicitly sanctioned unfair advantage over others in relation to how those resources are used.

12.6.2 What is the experience of transparency and accountability of ongoing public payments for PPP projects?

The NSW Auditor-General raised concerns about the lack of 'auditable controls and guidelines' for PPP schemes[49]. The lack of transparency and accountability as "off budget" financing means that the scale of public liabilities – 20% of NSW's gross liabilities in 1993 – is hidden from public view.

It is difficult to measure what governments do not wish to disclose.

There is very little in the way of detailed evidence about either *ex ante* financial appraisal or *ex post* financial evaluation in the literature, or about the operation of the post-implementation phase of PPP projects. Such evidence as exists shows that it is not unproblematic in areas that are of interest to this study: cost, accountability and transparency.

For the UK-PFI experience, there is little information about how DBFO-road contracts are working in practice[50]:

[48] P. Edwards et all (2004) pp.217-218
[49] P. Edwards et all (2004) p.81
[50] P. Edwards et all (2004) p.85

- there is almost no information in the public domain about either the business cases or the contracts;

- more information appears to be made available to the capital markets than to the public at large, despite their interests as taxpayers and users;

- such financial information as is available suggests that the risk transfer on construction costs and delays provides much of the financial justification for DBFOs;

- the UK-Highways Agency financial reporting of its DBFO contracts is limited and opaque; and

- current regulation permits a lack of disclosure of related party transactions.

12.7 PPP Benefits from Private Involvement

12.7.1 What are the expected benefits from PPP procurement?

The main potential benefit of PPP procurement of transportation infrastructure is the optimization of life cycle costs through innovation and adapted design. Other PPP benefits are expected from reduction in construction delays (usually payments start when the asset is operational), improved commercial management (marketing, quality of service, tariff policy) and financial engineering.

12.7.2 What have been the actual, realized benefits from PPP procurement?

Based on PPP experiences in New Zealand, Australia and the UK, one study found the following types of benefits[51]:

- Savings in the order of: 25% to the public client (NZ-road maintenance); 10-35% (Australia-road maintenance)
- Improved quality of service and road condition quality
- Satisfactory reporting and auditing
- Improved knowledge of the network data and conditions
- Innovation (e.g. equipment, materials, techniques) with longer maintenance contracts
- Better network management and targeted cost effective interventions
- Risk transfer to private contractors
- Project completion not otherwise possible due to a lack of public funds (UK-PFI)
- Whole life costing of projects
- Integrated project planning/construction/operation process (design, construction & maintenance)
- Faster delivery of major road projects
- Increased value for money

[51] P. Pakkala (2002) from appendices for New Zealand, Australia and the UK.

- Opportunity for developing national competence and experience to compete in the international PPP sector

An audit of the UK-PFI early experiences across a range of sectors showed cost improvements of 5-10% for construction and subsequent operations/facilities management[52]. Life-cycle costing has played a major role in encouraging good quality design and construction, because the consortium has to manage and maintain the project which it has constructed for the life of the contract[53]. Evidence suggests that construction price increases have been common in UK-PFI projects, with the costs generally borne by contractors, on some occasions to the considerable detriment of their financial health (29 of 37 projects surveyed reported no additional price increases after contract award). Where there had been increases they were almost always the result of significant changes to the project.

12.7.3 Does private infrastructure procurement have smaller cost overruns?

A study of 258 rail, bridge, tunnel and road projects worth US$90B looked at the relationship between project cost escalation and the length of the project-implementation phase; the size of the project; and the type of project ownership[54]. The overall findings were:

1. Cost escalation is strongly dependent on the length of the implementation phase; and transport decision-makers and planners should be highly concerned about delays and long implementation phases because they translate into risks of substantial cost escalations.

2. Project-size has grown larger over time, and large bridges-tunnel projects have larger percentage cost escalations.

3. Private projects have lower cost escalation (34% average), compared to public projects (47%), although the study authors segregate this further and find that state-owned enterprises have the poorest performance with an average cost escalation of 110%; while other public ownership shows the best performance with an average cost escalation of 'only' 23%.

More specifically, the findings of cost escalation (overruns) were that:

- 90% of transport infrastructure projects fall victim to cost escalation.
- For rail, average cost escalation is 45%.
- For fixed links (bridges and tunnels), average cost escalation is 34%.
- For roads, average cost escalation is 20%.
- Cost escalation exists across 20 nations/5 continents; and is global.
- Cost escalation appears to be more pronounced in developing nations.

[52] P. Grout (2005) p.32
[53] P. Grout (2005) p.32-33
[54] B. Flyvbjerg et al (2004)

- Cost escalation has not decreased over time, indicating little learning seems to take place.
- An additional year of project implementation adds roughly 5% to project-cost.

12.7.4 What about innovation and private sector incentives/knowledge/expertise?

The harnessing of private sector incentives/knowledge/experience is a sometimes neglected aspect of PPP procurement. PPP should attract expertise with broad international experience: builders, operators, along with specialists and consultants in the engineering, finance and legal fields. The resultant transfer in technology or know-how can be significant from several points of view[55]:

- construction and operating systems (i.e. modern techniques can be proposed in a way that has been adapted to meet local conditions);
- project and operations management;
- financial engineering; and
- institutional engineering.

This transfer in technology and know-how exerts an impact not only on local firms, whether directly involved in the project or not (by means of benchmarking for industry-wide standards), but also on the administrative agencies responsible for monitoring the project, local financial institutions and other context-specific actors. Another important factor pertains to the training of local personnel.

12.7.5 What are some of the overall assessments of PPP performance?

PPPs are not a magical recipe for the creation of resources and markets[56]. They are a means of achieving an optimal balance between competition and co-operation, and by providing for not only construction but also maintenance and operation. Lack of funding for maintenance (a widespread phenomenon) results in poor resource allocation (through the desire to secure new infrastructure at the expense of preservation of existing infrastructure) and damage to existing assets. Lack of funding for infrastructure operation hinders efforts to improve its use (by improving the management of traffic and the efficiency of the service suppliers using such infrastructure).

There is a consensus that PPPs provide the public sector a flexible approach to the ownership, organization, risk-sharing and regulation of projects while offering the private sector the prospects of a commercially viable EU wide infrastructure utility and service industry[57]. PPPs are capable of being adjusted to the specific circumstances of a project and of the country as well. While such inherent flexibility offers valuable advantages, the diversity of approaches (particularly the use of international law) was in some ways, initially, a discouragement to public authorities to initiate more PPP programs.

[55] C. Namblard p.26, in J-Y. Perrot, G. Chatelus (ed) (2000)
[56] A. Fayard (1999) p.20
[57] T. Barrett (1999) p.7

PPP are complex structures which require careful development to be successful and which need the full commitment of both the public and the private sector. The need for care in the procurement and structuring of PPPs has been underlined by the financial difficulties that can be encountered when projects fail to meet their revenue and cost targets (e.g. Lyon Ring Road; CTRL) and the difficulties encountered by the cancellation of the concession for legal procedural reasons (e.g. Paris Ring Road).

A successful PPP requires a number of conditions[58]:

- motivation to improve public service delivery by using incentives to draw on private-market skills and innovation;
- a clearly defined set of measurable goals;
- properly assign risks and rewards and create incentives that are aligned with those risks;
- risks associated with design/input choices accrue in direct proportion to the partners' abilities to benefit from them.
- relinquishment of control by the public sector over design/input choices, and a different approach to standards for accountability, which traditionally demand that public managers retain control over project details; and
- finding the political will to loosen bureaucratic/political control is a matter of political risk-taking; doing it successfully depends on sound contract design and institutional structure.

12.8 PPP Challenges

12.8.1 What are some of the PPP challenges which limit their applicability?

As the body of experience with PPP develops, the volume of privately financed transport infrastructure projects is constrained by a number of factors[59]:

- *Public resistance to fuller user pay.* This is often linked to the perception that infrastructure is "already paid for" through general tax revenues, and has historically been made available for free/low access cost. Of particular concern has been the perceived inequity of charging (especially low-income passengers and commuters) for access to vital public facilities.

- *Complexity of the concession process.* The time and cost required to establish the complex legal and policy framework required for a PPP concession, implement project approvals and close financing is an inhibiting factor. In some cases these costs may outweigh the benefits of PPP procurement, although increased experience and sophistication among public and private partners may reduce these costs in the future.

[58] F. Poschmann (2003) p.26
[59] G. Fisher, S. Babbar, (2000) pp29-31. These points were made in relation to private toll roads but are more generally applicable to PPP transport projects.

- *Unsupportive legal and policy frameworks.* The difficulty of developing PPP projects can be compounded by government failure to integrate concessions within a broader national transportation policy. In some developing countries, the legal system may not provide adequate assurance to investors that they can obtain an objective settlement of contract disputes.

- *PPP project failures.* Notable PPP project failures have made investors and governments cautious about pursuing such projects. For example, Thailand-Bangkok Second Stage Expressway project failed when the government reneged on an agreement to increase toll rates, causing losses for project investors. The US-Virginia Dulles Greenway experienced traffic levels substantially below the levels required to service debt.

- *Competition for financing.* Alternative investment opportunities, including other infrastructure projects (e.g. private infrastructure or more clearly regulated sectors) compete with PPP projects for capital. PPP projects for transport infrastructure will attract capital to the extent that they generate competitive risk-adjusted returns relative to alternatives.

- *Limited number of "stand-alone" projects.* PPP project fully reliant on private financing are unlikely to be a substantial portion of total transport infrastructure funding simply because there are a limited number of projects with strong enough economic fundamentals (e.g. traffic volumes, willingness to pay) to attract private financing without substantial government contributions.

12.9 PPP Financing

12.9.1 What are the ultimate sources of PPP financing?

There are only two economic agents who can bear the ultimate cost of transportation infrastructure[60]:

1. ***taxpayers***, either through general or specific taxes (which are not to be confused with true user charges) and

2. ***beneficiaries***. direct users who can afford to pay tolls or specific user charges on usage or vehicle ownership, and indirect beneficiaries (communities whose economic development is accelerated by new infrastructure, enterprises whose labour catchment area, customer base or procurement and distribution network are similarly expanded). The use of tolls consists in drawing users into a customer/supplier relationship.

There are only three channels through which these resources are put in place:

1. public funding (i.e. current taxpayers),

[60] A. Fayard (1999) p.5

2. private capital and private sector borrowing (i.e. current and future users), or
3. public sector borrowing (i.e. future taxpayers).

12.9.2 What are some of the public means of funding PPPs?

Public support can be in the form of capital grants and/or loan guarantees, or annual subsidies. Other forms of public support use toll-revenue from an existing infrastructure to contribute to the financing of a new structure. This system has been used to build bridge links (for example the Second Severn Crossing, the Dartford Bridge, the second bridge over the Tagus). It has also been used on a larger scale to develop the highway networks in Italy and France by using cross-subsidies between former and new infrastructure within the same concession holder company[61].

PPP financing packages must meet the following requirements[62]:

a) Financing based on feasibility studies

Proper planning, prioritisation, and project definition resulting from a pre-feasibility study involving various alternatives should precede a comprehensive feasibility study incorporating economic, social and environmental analysis. Only economically viable projects (perhaps with approved public funding) should proceed to PPP procurement and financing.

b) Appropriate financing

Projects may require specific financial structure, adequately blending funds from the national budgets, various international assistance funds and the IFIs. For financing packages to be effective, there must be transparency and sound co-ordination between the various sources of financing.

c) Assessment of financing options

The choice of PPP financing should be based on pre-defined assessment system (i.e. benchmarking). PPP financing is complex and requires quality projects as well as good governance, and continuity in their policy, administrative, and legal frameworks.

d) Sustainable financing

A substantial part of financing may have to be provided by national public funds. Stabilization of national sources of financing, against political changes or budgetary constraints is required, perhaps through dedicated funds or some type of "off-budget" financing.

[61] A. Fayard (1999) p.13
[62] ECMT (2004c) pp.8-9

e) Financing linked to infrastructure use

Transport infrastructure should be financed (at least in part) by dedicated tolls, charges or other user taxes. Co-ordination and harmonization of pricing systems should be ensured in order to simplify payment operations.

12.9.3 What are some of the transport policy considerations regarding PPP financing?

Financing transport infrastructure development and maintenance is a challenge to all countries. Public funds are and will maintain to be a main source of funds. But there are various ways of collecting resources and increasing effectiveness and efficiency of their use. In particular, at the country level[63]:

- National multi-year investment plans are needed;
- Various means of collecting funds should be looked at (fuel tax, tolling, road funds, vignettes, etc.)
- A portfolio of projects for external funders has to be prepared, taking into account requirements of a given funder;
- The possibilities of developing PPPs in implementing projects should be examined;
- In allocating of resources a proper balance has to be kept between new investment and maintenance and rehabilitation/upgrading of existing infrastructure; in many cases maintenance and rehabilitation is the most efficient ways of using scarce resources.

12.9.4 How important are the IFIs in PPP financing?

The World Bank committed US$2.1B to 22 transport projects in 14 countries in eastern Europe, the Baltics and the former Soviet Union countries (as of 1996); while the EIB provided €1,685M for 35 transport infrastructure projects in 12 Eastern European countries; and the EBRD another €1,291M for 38 transport infrastructure projects in its countries of operations[64]. Additional funds were mobilized by other financiers such as the Asian Development Bank (ADB), Kreditanstalt für Wiederaufbau (KfW), the Overseas Economic Cooperation Fund (OECF) and commercial banks.

International funding can play an important developmental and dynamic role by complementing other sources of funding within an overall "financing package", which may include[65]:

- loans from consortium of banks;
- international capital markets (shares, bonds, etc);
- assistance and (soft) loans from other governments;

[63] ECMT (2003c) p.11
[64] ECMT (2003b) pp.2-4
[65] ECMT (2003b) p.7

- (soft) loans, grants and guarantees from international institutions (WB, EIB, EBRD, etc.);
- assistance provided by international organizations (various UN and EU funds);

There has been a concern that the availability of external (e.g. IFI, EU) financing and grants can result in the perception of "free" money[66]. This can lead to less scrutiny in project selection and implementation, as well as to a dependence on the external funding for transport development. An aspect of this appears to have resulted in too much focus in the Portugal-Second Tagus Crossing PPP on securing EU-funds (EIB and EU-Cohesion Fund) and a lack of focus on the local political acceptability of toll rate increases.

More than usual supervision and continued rigor in investment planning is therefore in the interest of the beneficiary/sponsoring countries. In addition to the structural issues with regard to the quality of spending, there are also macro economic issues to be born in mind. Increased external funding may lead to exchange rate appreciation and that can reduce international competitiveness (i.e. "dutch disease"). Over the medium to longer term, infrastructure cost recovery requires the application of users pay principle (e.g. rail access charges, road pricing etc.), regardless of the availability of front-end capital subsidies.

12.10 PPP Public Accounting Issues

12.10.1 What is the current public accounting perspective on PPPs?

While the overall rules for public accounting are slowly being sorted out – and currently vary from country/region to country/region, an illustration of the evolving EU-perspective is useful. The European System of Accounts (ESA basis for the EU-Maastricht criteria) sets out statistical rules governing how to classify different types of expenditure within the National Accounts and how government commitments should be considered in terms of impact on government deficit and debt[67].

The ESA established that economic ownership of an asset depends on which party bears the risks and rewards associated with the asset. Implementing this principle involves the technical question of establishing ***economic ownership of the underlying asset in the PPP***, either as government's asset or as partner's asset, regardless of the legal nature of the Contract or Concession Agreement.

Two distinct types of PPP have been identified:

a. those where the contractor raises revenue direct from users of the asset (e.g. tolled road) – for which any asset is assumed to be fully owned by the contractor; and

[66] E. Molnar (2003) p.16
[67] P. Boeuf (2003) p.21

b. those where the contractor charges the government – for which full ownership is attributed to the party most exposed to risks and rewards of asset ownership during the period.

PPP assets should not be classified as a government asset where the private will bear, in any case, construction risks and one of the two following risks:

a. availability risk (depending on the performance of the partner); and/or

b. demand risk (relating to the behaviour of final users of the assets).

Other aspects to take into account are: the effect of the call of some guarantees granted by government; the classification of the unit in charge of the project as regards its autonomy of decision in respect of government; and the final allocation of the assets in some specific cases.

- if the PPP asset is considered a ***government asset***, capital expenditure (for new asset or for significant refurbishment) will be recorded as government expenditure, with a negative impact on government deficit/surplus. As a counterpart, government will incur as new debt recorded at the same time of the expenditure.

- if the PPP asset is considered a ***private asset***, capital expenditure has no impact on government deficit/surplus nor on government debt. Regular purchase by the public partners of services from the private one will qualify as government expenditure all along the life of the contract.

12.10.2 What has been the effect of these public accounting rules on PPPs?

In the 1999/00 UK-Highways Agency accounts, seven of the eight first-tranche PFI-projects were off-balance sheet, although intangible assets representing the reversionary interests were recognized. Subsequently, the Agency had to change its accounting policy and in 2000/01 all eight projects were on-balance sheet for construction costs together with associated long-term and short-term creditors[68].

The Agency has indicated that it will continue to look for risk transfer to ensure that future DBFO contract liabilities are off-balance sheet, and that it has developed a strategy for taking a view on the accounting treatment before contract award. Although the Highways Agency's payments of about £210M per year are set to rise because of the payment profile and rising traffic volumes, future payments are not disclosed in ways that identify these factors.

[68] P. Edwards et all (2004) pp.217-218

13. Conclusions

At the start of the study we made the case that the fundamental rationale for private sector involvement in the provision of transportation infrastructure is the betterment of society in terms of:

- ***reduced costs*** from allocative and productive efficiencies; and

- ***increased benefits*** from the accelerated provision of cost-beneficial infrastructure services.

Generally, the success of the PPP case studies has been more completely achieved with respect to the second factor than from clear evidence as to the first. This finding is fully supported by the broader literature, which – while containing evidence that certain PPP examples have likely resulted in allocative and productive efficiencies – is more notably for the general lack of evidence on this score.

Where PPPs have almost universally succeeded (provided they built needed infrastructure, and resulted in project completion) is in overcoming existing public capital constraints, political financial paranoia, and taxpayer reluctance to accrue higher taxes and/or greater public debt.

The focus of PPP for transportation infrastructure *procurement* – rather than *financing* – has been shown to be an important success factor which (partially) distinguishes between outright PPP project "success" (e.g. Confederation Bridge, Cross-Israel Highway, Melbourne City Link, Arlanda Express) and project "qualified success/partial failure" (e.g. Wijkertunnel, Vasco da Gama bridge, Sydney Harbour Tunnel, M-6 Toll).

The generally poor degree of PPP project transparency and *ex post* evaluation of financial/traffic/cost performance are (perhaps) the main reasons why – despite clear examples of PPP success – there remains public skepticism of PPP arrangements.

There are clear limits to the degree to which the PPP model can be broadly applied across countries, transport modes, and network components within a mode.

There are transparency and accountability concerns from pursuing "off-book" public accounting treatment of project debt unless:

1. the asset classification as "privately-owned" due to assumption of construction risks and one of either a) availability risk (depending on the performance of the partner); and/or b) demand risk (relating to the behaviour of final users of the assets) is fully justified on the basis of the PPP risk allocation principle that risks should be assigned to the party best able to manage/mitigate the risk; and

2. there is more fulsome reporting of public liabilities from future risks and payments under the PPP contract, and monitoring of the private sector financial and traffic experiences.

14. References

A. General-Governmental Organizations

EU/OECD/ECMT Related:

T. Barrett (1999) *Public-Private Partnerships in the Financing of European Transport Infrastructure* (ECMT Conference)

T. Barrett (2003) *The Trans-European Networks Investment Facility (TIF)* (ECMT Conference)

P. Boeuf (2003) *"Public-Private Partnerships For Transport Infrastructure Projects* (ECMT Conference)

ECMT (2003a) *"A Review Of Alternative Road Financing Methods"* (C. Queirez)

ECMT (2003b) *"Financing of Transport Infrastructure"* (UNECE Inland Transport Committee)

ECMT (2003c) *"Transport Infrastructure Development For A Wider Europe"* (Seminar Final Report)

ECMT (2003d) *"Framework for Transport Infrastructure Development in the UNECE Region"* (CEMT Conference)

ECMT (2003e) *"Reforming Transport Taxes and Charges"* (CEMT/CM(2003)3/FINAL)

ECMT (2004a) *"Charging For The Use Of Infrastructure"* (CEMT/CM(2004)19)

ECMT (2004b) *"National Systems of Transport Infrastructure Planning"* (Round Table 128)

ECMT (2004c) *"Transport Infrastructure Planning In A Wider Europe"* (CEMT/CM(2004)1/FINAL)

EU-Regional (2003) *Guidelines for Successful Public-Private Partnerships*

A. Fayard (1999) *Overview of the Scope and Limitations of Public-Private Partnerships* (ECMT Conference)

O. Hieronymi, *"Decision-making for Infrastructure: Environmental and Planning Issues"* in OECD (nd) *"Infrastructure Policies For The 1990s"*

E. Molnar (2003) *"Trends In Transport Investment Funding: Past, Present And Future*" (UNESC, and CEMT/CS/(2003)12)

References

J. Noulton (1999) *Lessons from the Channel Tunnel Experience* (ECMT Conference)

OECD (2002) *Territorial Development Policy: The Role of Infrastructures* (Conference Issues Paper, May)

S. Perkins (2002) *Recent Developments In Road Pricing Policies In Western Europe* (ECMT Conference)

World Bank/IFI/EBRD Related:

EBRD (1996) *Transport Operations Policy*

D. Ehrhardt, T. Irwin (2004) *"Avoiding Customer and Taxpayer Bailouts in Private Infrastructure Projects"* (World Bank Paper No. 3274)

A. Estache, T. Serebrisky (2004) *"Where Do We Stand on Transport Infrastructure Deregulation and Public-Private Partnership?"* (World Bank Paper No. 3356)

G. Fisher, S. Babbar, (2000) "*Private Financing of Toll Roads"* (World Bank RMC Paper No. 117)

Padeco (1999) *"Review of Recent Toll Road Experience in Selected Countries and Preliminary Tool Kit for Toll Road Development"* (World Bank-Asian Toll Road Development Program)

F. Sader (2000) *"Attracting Foreign Direct Investment into Infrastructure"* (IFC-FIAS No. 12)

UN Related:

UN-ESC (2003) *"Financing Schemes of Transport Infrastructure"* (Working Party on Transport Trends and Economics)

Individual Countries:

Federal-Provincial-Territorial Working Group (1999) *Public-Private Partnerships and Their Role in a Possible National Highway Program* (Report to the Canada-Council of Deputy Ministers Responsible for Transportation and Highway Safety)

P. Pakkala (2002) *"Innovative Project Delivery Methods for Infrastructure"* (Finnish Road Enterprise)

J-Y. Perrot, G. Chatelus (ed) (2000) *Financing of Major Infrastructure Projects and Public Service Projects: Public-Private Partnership* (FR-Ministry of Public Works, Transport & Housing)

References

SG Hambros (1999) *Public Private Partnerships for Highways: Experience, Structure, Financing, Applicability and Comparative Assessment* (Final Report for Canada-Council of Deputy Ministers Responsible for Transportation and Highway Safety)

US-GAO (2000) *US Infrastructure – Funding Trends and Opportunities to Improve Investment Decisions* (GAO/RCED/AIMD-00-35)

B. General-Academic/Industry Studies

P. Edwards et al (2004) *"Evaluating the operation of PFI in roads and hospitals"* (ACCA)

B. Flyvbjerg et al (2004) *"What Causes Cost Overrun in Transport Infrastructure Projects?"* (Transport Reviews Vol. 24, No. 1, pp3-18)

P. Grout (2005) *"Value for Money Measurement in Public-Private Partnerships"* (Mimeo)

F. Poschmann (2003) *Private Means to Public Ends: The Future of Public-Private Partnerships* (CD Howe, No.183)

PriceWaterhouseCoopers (2001) *Public-Private Partnerships: A Clearer View*

J. Stiles, P. Williams (199x) *The Impact of Intent on Public/Private Sector Partnership* (pp 400-409)

C. Multiple Case Study Sources

Canadian Council on Public-Private Partnerships (2002) *Successful Transportation Public-Private Partnerships in Canada and the USA*

R. Huijbregts (ed) (1996) *Case Studies on Build Operate Transfer* (Delft University)

B. Perez (2004) *Achieving Public-Private Partnership in the Transport Sector* (iUniverse)

D. Individual Case Study Sources

These sources are found in *Annex 1: Case Studies* at the end of each write-up.

Annex 1: Case Studies

A. Road

A-1 Network Road

1. Autostrade (Italy)

A-2 Link Road

2. M6-Toll Birmingham (UK)
3. Cross-Israel Highway 6 (Israel)
4. Melbourne City Link (Australia)

A-3 Link Bridge

5. Confederation Bridge (Canada)
6. Vasco da Gama Bridge (Portugal)

A-4 Link Tunnel

7. Wijkertunnel (Netherlands)
8. Sydney Harbour Tunnel (Australia)

B. Rail

B-1 Network Rail

9. RFI/TAV (Italy)
10. ARTC (Australia)

B-2 Link Rail

11. Arlanda Express (Sweden)
12. Alameda Corridor (USA)

B-3 Intermodal Hub

13. Bremen-GVZ (Germany)

C. Inland Water

C-1 Network Inland Water

14. SLSMC (Canada)

Case Study #1 – Road: Network – *Autostrade (Italy)*

#1 Autostrade (Italy)

Country: **Italy**	***Year of Operation:*** **1999** **(Privatized)**
Market (USD): **$14.60 B** **(EU€1.00 = US$1.29)**	***Length:*** **3,408km**

Basic Facts

A. Corporate (Network) Initiation:

- Autostrade was incorporated in 1950 by the GoItaly business conglomerate Institute for Industrial Reconstruction (IRI). It began operating motorways in 1956 under agreement with the IT-Ministry of Public Works company Ente Nazionale per le Strade (ANAS) to construct and manage the main North-South A1 (Milan-Naples). Construction of the A1 was completed in 1964.
- In 1987, Autostrade Concessioni was partially floated on the ISX. By 1993, the GoItaly embarked on privatization of IRI businesses, which led in 1999 to the full privatization of Autostrade – which became the largest private motorway operator in Europe (2,855km). The motivating factors for Autostrade privatization were many: long history of political corruption and financial losses through IRI; government discontinuance of funding for IRI (1991) and of motorways (1998); the need to reform the Italian economy; and the need to adhere to EU procurement rules (as well as monetary/budget guidelines).
- During 2003, the Autostrade Group was restructured, with a parent holding company with a majority shareholder (currently Schema28 – part of the Benetton Group) and several operating companies for the main Italian road concession, smaller Italian concessions, foreign concessions and related businesses. The total Italian road network managed by Autostrade is 3,408km.
- Period of gestation 1987-1999 (12-years to privatization)

Sponsoring Govt:

- Government of Italy

Special Legislation:

- Not known. Various Concession Agreements and GoItaly Directives required for privatization.

B. Corporate Procurement:

- Privatization was in accordance with the plan established by the shareholder IRI, commencing in June 1998 with the publication of an invitation to express interest in creating a core group of shareholders. An Information Memorandum was prepared with Advisors, and a data room made available. In October 1998 Analyst Presentations and Management Due Diligence were performed for core shareholder candidates. In November 1998, IRI selected a consortium lead by Edizione Holding with 30% of the share capital. In December 2001, public sales offer of 50% of the share capital began, along with the road show to 120 investors in five European countries and the US. Public sales concluded on 3 December 1998 with the number of share capital subscription requests doubling the availability.
- Initial shareholder equity (1999) was US$2.6B along with Long-Term Debt of US$1.7B for total invested capital of US$4.3B. (IT₤1,818 = US$1.00)

Public Agent:

- Institute for Industrial Reconstruction (IRI) (privatization);
- Ente Nazionale per le Strade (ANAS) (concessions)

Investors:

- (As of July 2004) Schema28 (Benetton Group) 52%; foreign institutional investors (36%); Italian institutional and individual investors (12%).

Construction Period:

- From 1956+ (99-years) with ongoing investments in the Italian motorway system.
- The Italian motorway system (6,490km in 2002) is mainly based on tolls paid to concessionaires. Autostrade represents about 50% of the Italian motorway network.
- Autostrade shows tangible asset value on its balance sheet with depreciated cost of US$8.8B (2004); along with US$5.7B of intangible assets (e.g. goodwill and value of concessions).

C. Corporate Financing:

Payment Stream:

Case Study #1 – Road: Network – *Autostrade (Italy)*

Country: **Italy**	***Year of Operation:*** **1999** **(Privatized)**
Market (USD): **$14.60 B** **(EU€1.00 = US$1.29)**	***Length:*** **3,408km**

Basic Facts

- Autostrade net toll revenues of US$3.15B (2004), with additional revenues of US$565M. This includes main Italian network, and foreign operations (M6-Birmingham; Dulles-Greenway; Austria-Europpass, Italian part of Mt. Blanc tunnel).

Debt Structure (as of 2004):

- Long-Term Debt: US$12.33B of Autostrade LTD (2004) in the form of (based on 2003 accounts):
  - US$5.93M Capital Market Facility (term of 10-years) issued by Austrade Group;
  - US$2.46B Banking Facility (term of 8-years) issued by Autostrade Group;
  - US$1.37B debt issued by subsidiary Autostrade per L'Italia, including US$673M "Grant under laws", US$570M from EIB, and US$122M other banks;
  - US$972M debt issued by subsidiary Strada dei Parchi, including US$950M due to ANAS; and
  - various other debt (bank loans, Central Guarantee Fund, Grants under law) issued by other subsidiaries totaling US$503M.
- Private Equity: US$2.4B from shareholders and retained earnings.
- Market Capitalization: market valuation of US$14.6B, with shares trading at €21.00 (April 2005)

D. Corporate Operations:

Traffic:

- In 2003, 51.6B vehicle-km traveled – including 45.9B vehicle-km on the main Italian network managed by Autostrade per l'Italia. This latter figure included: 76% light vehicles (including auto), and 24% heavy vehicles.

Toll Revenue:

- Net toll revenues of US$3.15B (2004), with additional revenues of US$565M.
- Autostrade has agreement with ANAS on toll "price cap" (since 1997) which builds in productivity gains of almost 1.0%/pa over 2005-2009 for smaller concessions, and 1.2%/pa over 2003-2012 for main concession.
- Concession agreements provide for new investment of US$5.80B between 2003-2012, in addition to the US$6.45B envisioned by the original 1997 concession agreement.

Operating Costs:

- US$1.37B (2004) including labour costs.
- Net Operating Cash Flow of US$1.53B (2004) with consolidated net profit of US$553M after financing costs and capital expenditure (US$823M), non-cash depreciation cost, and sale of one subsidiary.

Public Acceptance:

- High level of motorist support, well-received stock in the investment community.

Conclusions:

- Privatization of Autostrade was critical to generate efficiency in the Italian road network management, and to access private equity for major roadway network development required to meet EU TEN-T requirements.
- Company is also involved in telecommunications (Blu) and in foreign BOT-ventures as a road operator and technology leader (e-tags).

Sources:

Autostrade website: http://www5.autostrade.it
Autostrade (2004) *Board Approves 2004 Financial Results*
Autostrade (2003) *Financial Statements 2003*
Autostrade (1999) *Financial Statements 1999*
Borsa Italiana (2005) *Autostrade spa Company Highlights*
P. Beria et al (2004) *The Italian Experience in Transport Infrastructure: A Survey*
Material on IRI from website: http://www.uwgb.edu/galta/BIOS98/PRODI.htm

#2 M6-Toll Birmingham (UK)

Country: **UK**	***Year of Operation:*** **2003**
Cost (USD): **$1.70 B (GBP£1.00 = US$1.88)**	***Length:*** **43km**

Basic Facts

A. Project Initiation:

- Proposals for Northern Relief Road across the north-east of Birmingham (UK's 2nd largest city) envisioned since 1980, and included in UK-*Roads to Prosperity* report. In 1985 the UK-DoT proposed the Birmingham Northern Relief Road (BNRR) as a traditional publicly-funded roadway. In 1988 an Order gave permission for a public motorway to be built.
- Designed to ease congestion on the congested M6 (160,000 vehicles/day) through the West Midlands region, to act as a regional distributor to surrounding towns, and as part of the TEN-T road network. The M6-T would allow a 40% traffic increase.
- Criticized by local/national opponents for not having a CBA to support its requirement, and its impact on local greenbelts, local school air quality, and sites of scientific/archeological/ecological interest.
- Period of gestation 1980-1988 (9-years)

Sponsoring Govt:

- Government of UK

Special Legislation:

- Statutory Instrument (1998)

B. Project Procurement:

- Unclear on history of procurement, assumed to have occurred over 1989-1991.
- Under Conservative government *New Roads by New Means* put out for tender (presumably as "shadow toll" under UK-PPI). A shortlist of 3 firms asked to submit bids (1990). In 1992, the UK-DoT signed an agreement with MEL to: firstly obtain planning approvals (e.g. design, environmental etc); and then to design-finance-build-operate the BNRR. Initially awarded in 1992 as a shadow-toll concession, with consortium responsible for lengthy (and risky) approvals processes.
- In 1997, under the Labour government, the BNRR proposed as a fully-tolled facility, the UK's first tolled road facility.
- Private company to build toll road facility north-east of Birmingham with 6-lanes of dual motorway (3-lanes each direction) between M6 Junctions 4/11. The Company (MEL) to receive revenue from road tolls until 2054 (51-year concession), based on mixed cash (manual or automatic) toll booths and e-tags permitting free-flow of traffic. GoUK contribution via widening of M42, with MEL responsible for repayment for land costs incurred by UK-HA.
- Period of planning (including approvals) from 1990-1998 (6-years) including land acquisition, environmental etc., with MEL spending a reported US$50M to support the GoUK/UK-HA. Public Inquiry (1994-95), substantial local/national opposition (1996-1998) culminating in UK-High Court ruling (1999).

Public Agent:

- UK-Highways Agency (UK-HA, an executive agency of UK-Department for Transport DfT)

Contractor:

- Midland Expressway Ltd (MEL) a consortium of 50% Kvaerner (NO) (following its 1996 purchase of UK-Trafalgar House) and 50% Autostrada (IT). In 1999, Macquarie Infrastructure Group (MIG, AU) purchased the 50% Kvaernar interest (and other road assets) for US$170M, and half (25%) of the Autostrada interest, with a further option (to 2005) to purchase the remaining Autostrada interest. MIG expects to earn 21% IRR on investment.
- The M6-T construction was subcontracted by MEL (2000) to CAMBBA, a consortium of Carillion, Alfred McAlpine, Balfour Beatty and AMEC (UK) for US$0.92B.

Construction Period:

- From 1999-2003 (4-years) for actual construction. MEL (and likely CAMBBA as their fixed-price subcontractor) bore construction completion risk. Project completed in December 2003.

Case Study #2 – Road: Link – *M6-Toll Birmingham (UK)*

Country: **UK**	***Year of Operation:*** **2003**
Cost (USD): **$1.70 B** **(GBP£1.00 = US$1.88)**	***Length:*** **43km**

Basic Facts

- Autostrada (2004) shows its 25% interest in share capital at book (par?) value of US$680M, implying project book value of US$2.72B.

C. Project Financing:

Payment Stream:

- M6-T toll revenues are the only form of payment for the project. Toll rates (2004) were US$5.65/auto and US$20.70/heavy vehicle – with a US$1.90 discount for the first 10M vehicles. In 2004, the heavy vehicle discount was continued indefinitely, and after VAT-rebate costs US$16.00. M6-T tolls collected on South-North traffic only. MEL has exclusive authority to establish tolls levels.

Debt Structure (as of 2000):

- Long-Term Debt: US$1.13B of MEL LTD (initial financing)
  - Lead banks were Bank of America (US) with US$915M and Abbey National (UK, now Groupo Santander ES) with US$215M, and syndicate of 20+ other banks (estimated, based on partial info)
  - Likely subsequent financing with LTD (i.e. US$250M unaccounted for relative to project cost)
- Govt. Debt Guarantee: None.
- Private Equity: Between 2000-2003 the equity partners injected US$275M into the project. MIG reported that its 75% equity stake was valued at US$240M, implying project equity value of US$320M.

D. Project Operations:

Traffic:

- March 2004, 37,500 veh/day with significant monthly growth (10%/month). December 2004 traffic 50,000 veh/day, with 2004 average of 44,000 veh/day.

Project Revenue:

- US$50M/annually (2004) based on 16M vehicles using M6-T (2004) and estimated average toll of US$3.00/vehicle (i.e. partial tolls paid for shorter M6-T trips, estimated from MIG data).

Operating Costs:

- Not Known
- MIG reports that project debt can be repaid within 25-years even with 60% of expected revenues.

Public Acceptance:

- High level of opposition to project over many years. Since opening, a high level of motorist support, and by road haulage sector.

Conclusions:

- Unique for UK as real-toll road. Protracted planning period following contract award, with substantial costs borne by MEL prior to construction. Unclear whether project would have proceeded against opposition had road been promoted solely by public sector (i.e. untendered prior to planning approvals). Significant private expense in securing planning approvals, fighting opposition litigation etc. Unclear what the non-construction (DB Contract) expenses of US$780M were spent on.

Sources:

Midland Expressway Ltd (2004) *Public Backs the M6 Toll 16M Vehicles in First Year* (Press)
MEL Website: http://www.m6toll.co.uk
Autostrada (2004) *Annual Report 2004*
Macquarrie Website: http://www.macquarie.com.au
Macqurrie (2000) *MIG Occasional* (No.7)
UK-HA website: http://www.highways.gov.uk *M6 Toll Background*
Friends of the Earth (2003) *Birmingham Briefing in Advance of M6 Toll Opening*
B. Perez (2004) *Achieving Public-Private Partnership in the Transport Sector* (iUniverse)

#3 Cross-Israel Highway 6 (Israel)

Country: **Israel**	***Year of Operation:*** **2003** **(partially in 2002)**
Cost (USD): **$1.30 B** **(ILS 1.00 = US$0.23)**	***Length:*** **86km**

Basic Facts

A. Project Initiation:

- Motorway through (North-South) Israel to the east of metropolitan areas was envisioned since the 1970s. In 1990 a comprehensive study by IL-Public Works recommended the project as viable and strategy to ease traffic congestion around Tel Aviv and form an eastern bypass, direct regional traffic to the central Israel region (from the coastal Highway 2), and to improve connections to Israel's north and southern regions.
- In 1992, project was designated a national priority and public agency (CIHL) establish for project. Traffic study suggested traffic of 140,000 vehicles/day by 2010.
- The concession is for the 86km central portion of what is to become a 300km national Highway 6.
- Criticized by local/national opponents as promoting additional auto traffic, impact on sites of historic/archeological/ecological interest.
- GoIL decision in 1996 to finance "off-budget" with private debt/equity.
- Period of gestation 1990-1994 (4-years)

Sponsoring Govt:

- Government of Israel

Special Legislation:

- IS-Toll Road (Israel National Highway) Law (1995)

B. Project Procurement:

- Period of procurement 1995-1998 (3-years).
- Tender process initiated (1995) with 4 consortia pre-qualified. Contracted awarded to DEC (1998) with financial close in 1999.
- Private company (DEC) to build toll road facility north-south through Israel with 4-lanes of dual motorway (2-lanes each direction) between Hadera-Gedera, with 13 interchanges, 88 bridges, fully electronic tolling, and 400m tunnel. The Company to receive revenue from road tolls until 2029 (effective 27-year concession), based on e-tags and license-plate cameras permitting free-flow of traffic. GoIL contribution via construction of two major interchanges, and traffic guarantee below about 75% of forecasted traffic/revenue forecasts (NB: GoIL to receive 57% of toll revenues above forcast levels).
- As part of 1997 concession agreement, the GoIL has option to buy 49% of DEC with the exercise price determined in the Contract, and exercisable between project opening and concession period end (e.g. perhaps as one way to "regulate" super-normal profits).

Public Agent:

- Cross-Israel Highway Ltd (CIHL) established as special-purpose state company responsible for planning, contracting and coordination of GoIL ministries.

Contractor:

- Derech-Eretz Consortium (1997) Ltd (DEC) of: Societe General (FR), Hughes (later Raytheon) and GM (US), CHIC (CA), Africa-Israel and Alon (IL), led by Africa-Israel.
- (as of 2005) DEC now comprised of: 33% Africa-Israel (5.5% of which is held for Alon Israel Oil Co), 33% Housing & Construction Holding Co (IL) and 33% Canadian Highway International Corp. (CHIC, CA). Two Joint Venture companies created:
    - Derech Eretz Construction: with all DEC partners and additional entities for US$790M estimated "fixed-price" subcontract;
    - Derech Eretz Highways Management Corp. for highway operation. GoIL stipulated that no single controlling shareholder could own more than 25% of this company.

Construction Period:

- From 1999-2003 (4-years) for actual construction. Various DEC guarantees provided to GoIL for concession (US$10M), construction performance (US$50M) etc.

Case Study #3 – Road: Link – *Cross-Israel Highway 6 (Israel)*

Country: **Israel**	***Year of Operation:*** **2003** **(partially in 2002)**
Cost (USD): **$1.30 B** **(ILS 1.00 = US$0.23)**	***Length:*** **86km**

Basic Facts

C. Project Financing:

Payment Stream:

- Highway 6 toll revenues are the only form of payment for the project. Toll rates (2004) were US$10.35/auto (with lower rates for partial distance traveled). GoIL guarantee to pay DEC for traffic shortfalls more than about 25% below forecast.

Debt Structure (as of 2003):

- Long-Term Debt: US$1.2B of DEC LTD (US$1.2B initially)
  - US$850M denominated in New Israeli Shekels (ILS) inflation-indexed bonds issued by Bank Hapoalimn (IL) (term of 28-years). In 2004, 11% of this (US$90M) was sold onto pension/insurance companies as "securitization" – rated AA by Israel Rating Service (Maalot). Local IL banks have option to convert debt to equity up to 18% within 18-months of project completion;
  - US$250M denominated in USD issued by Newcourt Capital (CA), later bought by CIT Group, part of Tyco (US).
  - (possibly) an additional US$100M facility (based on reported overall project cost)
- Govt. Debt Guarantee: None (except for traffic shortfall guarantee).
- Private Equity: US$100M initially (based on 90%Debt:10%Equity). It is reported that the actual private equity composition was US$2M equity and US$98M in subordinated shareholder loans.

D. Project Operations:

Traffic:

- November 2004, 70,000 veh/day with significant monthly growth (>10%/month). Toll evasion less than 5%, following higher initial rates (30-40%). News report that in 2nd year of operation, traffic is generating "super-normal" traffic which will incur marginal 57% fee payable to GoIL (for traffic exceeding forecast "upper-band"(?).

Project Revenue:

- US$60M/annually (2004) based on (estimated) 20M vehicles using Highway 6 (2004) and (estimated) average toll of US$3.00/vehicle.

Operating Costs:

- Not Known

Public Acceptance:

- High level of traffic usage, exceeding forecasts.

Conclusions:

- Unique for Israel due to magnitude of project size, expansion of domestic financial market, use of real-tolls. Substantial local/national opposition to project based on environmental/traffic concerns. Involvement of private sector likely provided momentum for project to come to fruition.
- Unique set of GoIL regulations on DEC concessionaire: toll rate, ownership, option to purchase, risk/reward band for traffic (i.e. guarantee for -25% below forecast; sharing 57% for traffic above forecast).

Sources:

Derech Eretz website: http://www.derech-eretz.com
CHIC website: http://www.chichwys.com
Housing & Construction Holding Co. Ltd (2004) *Financial Statements (31 December 2003)*
Africa-Israel website: http://www.africa-israel.com
GoIL-Ministry of Finance *Highway No. 6 – The Cross Israel Highway*
Yehuda Raveh (2002) *Cross-Israel Highway Leads the Way to PPP* (19 November 2002)
Globes website: http://www.globes.co.il *Hapoalim to sell part of Cross-Israel Hwy loan to institutions* (12 August 2004); *Hapoalim sells NIS 400n of Derech Eretz loan* (19 September 2004); *Cross-Israel Highway – 30 Year Contract and Electronic Toll Collection* (9 September 1996)
Y. Garb (2004) *Constructing the Trans-Israel Highway's Inevitability* (Israel Studies Spring)

Case Study #4 – Road: Link – *Melbourne City Link (Australia)*

#4 Melbourne City Link (Australia)

Country:	**Australia**	***Year of Operation:***	**2000**
Cost (USD):	**$1.80 B** **(AU$1.00 = US$0.83)**	***Length:***	**24km**

Basic Facts

A. Project Initiation:

- Proposals for road links around Melbourne CBD to alleviate congestion from the growing northern, western and south-eastern corridors date back to the 1950s. The proposals included the construction of a ring road around the CBD and a tunnel under the Yarra River and Kings Domain. Reports in 1987 for *Metropolitan Arterial Road Access Study* and *National Roads Strategy Victoria* identified need for 2 projects to complete inner-Melbourne road network, Outer Ring Road & Western Link around CBD. The 1991 *Central Area Transport Strategy* involved extensive consultation and debate.
- In 1992 EOI were requested, with 5 proposals received, of which 2 consortia were short-listed for final bid. In 1994 the Transurban consortium was selected based on its financial proposal and plans.
- In 1994, the GoVic (VicRoads) released an Environmental Effects Statement on the Western Link and the Southern Link with close consultation with the Vic-Ministry of Planning, comprising representatives from Local and State Government, business and the general community. Various CBA had estimated significant NPV from various component of project (1993 AU$250-500M at 8% discount rate).
- Period of gestation 1987-1994 (7-years)

Sponsoring Govt:

- State of Victoria

Special Legislation:

- Melbourne City Link Act 1994

B. Project Procurement:

- Govt. invited proposals/tenders from international firms (1992-1994), and MCLA was responsible for land acquisition, public consultations, contract award, and general construction oversight.
- Private company to build toll road facility underneath the Melbourne CBD with several bridges over rivers, and connections to (and some upgrading of) three existing freeways. The company to open a tunnel for use in 1999, and operate it until 2034 (34-Year Concession), when ownership reverted to the government. The Company to receive revenue from road tolls until 2034, based on electronic tags permitting free-flow of traffic.
- Estimated initial cost was AU$2.0B of which AU$1.8B was to be financed by the consortium, with AU$265M to be financed by GoVic for associated works. The expected opening date for the Western Link was April 1999 (actual opening August 1999) and the Southern Link was December 1999

Public Agent:

- VIC Melbourne City Link Authority (MCLA)

Contractor:

- Joint venture of Transfield Ltd (AU), Obayashi Gumi Co. (JA) & Transroute (FR) through Transurban City Link Ltd, incorporated 1995, established as Unit Trust, and floated as IPO on ASX in 1996.

Construction Period:

- From 1996-2000 (5-years). Transurban bore construction completion risk, which was delayed due to problems with the Burnley Tunnel, resulting in cost-overun and litigation between Transurban partners (operating company vs. construction sub-contractor), following tunnel failure in February 2001. Project completed in December 2000 (opening of Burnley Tunnel). Full tolling commenced December 2001.
- Transurban showed completed asset value of Melbourne City Link on its balance sheet with historical cost of AU$1,915M (2001).

C. Project Financing:

Payment Stream:

- Transurban toll revenues form the main form of payment for the project.

Debt Structure (as of 2001):

- Long-Term Debt: AU$1,630M of Transurban LTD in the form of:

Case Study #4 – Road: Link – *Melbourne City Link (Australia)*

Country: **Australia**	***Year of Operation:*** **2000**
Cost (USD): **$1.80 B** **(AU$1.00 = US$0.83)**	***Length:*** **24km**

Basic Facts

- AU$361M inflation-linked bonds (term of 27-years) issued by Transurban;
- AU$927M of project-debt (three tranches with terms of 16-19 years);
- AU$200M of mezzanine debt (term of 24-years);
- AU$140M of non-interest bearing "concession notes", issued annually to satisfy its obligation to GoVic on end of concession. These are valued using NPV (face value as of 2004 was AU$796M);
- (and additional "offset" debt such as AU$795M infrastructure loan facility secured by cash collateral; AU$454M infrastructure note facility secured by cash collateral; and AU$94M land transport note offset by loan to Macquarie Bank).

- Govt. Debt Guarantee: except for AU$266M of associated works by GoVic, there was no debt or loan guarantee of other financial obligation by the GoVic to the project. The deferred nature of Concession Fees payable to GoVic are a form of "loan".
- Private Equity: Initially AU$510M from the Joint Venture partners, with AU$171M repaid during construction period.

D. Project Operations:

Traffic:

- May 2000, 520,000 e-tag transponders distributed to motorists, with traffic of 340,000 vehicles per day.
- July 2004, 1.4 M vehicles registered to use motorway; 970,000 e-tags distributed, with traffic of 550,000 vehicles per day (based on transactions).

Project Revenue:

- AU$255M (2004); with additional other revenue of AU$16M.

Operating Costs:

- AU$100M (2004); with additional costs for: corporate AU$12M; financing AU$56M; and non-cash depreciation AU$151M. An annual concession fee of AU$96M is paid to GoVic (for years 0-25 years; thereafter AU$45M for years 26-34 years). These may be satisfied by issuance of Concession Notes payable to GoVic. Transurban is seeking to have this treated as a tax-deductible expense – which was initially refused but under appeal.
- Net Cash Flow of AU$100 – but accounting loss of AU$48M with non-cash depreciation cost.

Public Acceptance:

- High level of motorist support, e-tag take-up greater than expected; less than 1% toll evasion.

Conclusions:

- Victoria Auditor (1995) found arrangements did transfer substantial project risk to Transfield, and that the State could legitimately reflect the project financing as private (i.e. off-book for public sector).
- Project was a "milestone" for Australia in further developing a private PPP industry for highways, as its scope and complexity in terms of construction risk and electronic tolling provided valuable lessons for further PPP projects. Transurban is now a major international PPP player.

Sources:

B. Perez (2004) *Achieving Public-Private Partnership in the Transport Sector* (iUniverse)
Transurban website: http://www.transurban.com.au
Transurban Presentation (2004) *Annual Results*
Transurban (2001) *Annual Report 2001*
Victoria Auditor-General *1994-95 Audit (Part 3.3 Infrastructure)*
J. Laurie (2000) *Melbourne City Link Project* (ATSE No.112)

#5 Confederation Bridge (Canada)

Country: **Canada**	***Year of Operation:*** **1997**
Cost (USD): **$0.80 B** **(CA$1.00 = US$0.83)**	***Length:*** **13.0km**

Basic Facts

A. Project Initiation:

- Under the Canadian Constitution (1867) the GoC was financially liable for the provision of ferry service connecting the (island) Province of PEI to the (mainland) Province of New Brunswick (NB). Ferry service costs were about US$35M/year (1992). Some form of "fixed link" across the Northumberland Straight had been long envisioned. The prospect of significant funding for ferry vessel replacement and dock facilities during the 1980s led to greater consideration of a bridge/fixed link.
- In 1986, GoC responded to private sector proposals, received in 1984, by initiating socio-economic, financial and environmental studies. In 1987, with study findings in hand, an RFP was released for financing, design, construction, operation of a fixed link.
- Period of gestation 1984-1987 (4-years)
- Premised on revenue diversion from existing GoC ferry subsidy of US$35M/year and fixed link (bridge) tolls paid by users, which were not to exceed the ferry toll revenue (US$11.5M/year) based on 1992 ferry service, adjusted for inflation.

Sponsoring Govt:

- Government of Canada

Special Legislation:

- CA-Northumberland Strait Crossing Act (1993) for payment of public subsidy.

B. Project Procurement:

- Govt. call for proposals (1987) resulted in 7 proposed consortia, 6 involving bridges and 1 involving a tunnel. Detailed evaluation of technical feasibility, regional impacts, environmental impacts occurred over 1987-88, with 3 consortia asked to submit detailed proposals including cost and financing. Local opposition (on environmental grounds) delayed project advancement to 1989. A detailed environmental assessment panel conducted work over 1989-91 (dealing with fishery impact, ice safety issues). In 1992, financial plans from the 3 consortia were received. Only 1 consortium (SCDI) submitted a proposal calling for a public subsidy below US$35M, and detailed final negotiations were conducted with Contract Award in 1993.
- Private company to build a concrete box girder bridge with two lanes of traffic (built for 100-year minimum life). Bridge to be opened for use in 1997, and operated until 2032 (35-Year Concession), when ownership reverted to the government. Company to receive revenue from bridge tolls (rate to be determined between GoC and SCDI) and Public Subsidy for 25-years at initial level (US$35M in $1992), partially (75%) indexed to inflation.
- Period of procurement 1987-1993 (6-years)

Public Agent:

- CA-Public Works (with Transport Canada)
- Straight Crossing Finance Inc (SCFI) was established as a GoNB Crown to provide tax-exempt federal subsidy payments to SCDI as concession holder.

Contractor:

- Strait Crossing Joint Venture (SCJV) of Straight Crossing Inc. (CA), Northern Construction Inc. (CA) and GTMI Inc. (FR). A subsequent bridge construction partner Ballast Nedem (NL) was brought into the consortium, Various subcontractors were hired, including Cofiroute (FR) as bridge operator.
- As of 2004, ownership is 50% Vinci Concessions (FR), OMERS-Borealis (CA), SC Infrastructure (CA), Ballast Nedam (NL).

Construction Period:

- From 1993-1997 (4-years). SCJV bore full construction completion/cost risks, against substantial package of guarantees held by GoC (e.g. Contractor Security, Independent Engineer, Insurance Trust agreements), a Cost Contingency (10% of US$60M), and US$210M guarantees (i.e. performance, labour/material and defects)

C. Project Financing:

Case Study #5 – Bridge: Link – *Confederation Bridge (Canada)*

Country: **Canada**	***Year of Operation:*** **1997**
Cost (USD): **$0.80 B** **(CA$1.00 = US$0.83)**	***Length:*** **13.0km**

Basic Facts

Payment Stream:

- GoC guaranteed fixed payments US$35M/pa ($1992 linked 75% to inflation).
- Bridge Tolls (2005) of US$32.80/auto, US$46.90/commercial truck, with higher toll for bus-coach. The bridge toll is paid for one-way traffic from PEI-Mainland.

Debt Structure:

- Long-Term Debt:
  - US$550M "real rate bonds" secured against guaranteed GoC annual payments which are 75% linked to inflation. These are inflation indexed, fully amortized and rated AAA by S&P (35-year term);
  - US$270M "toll revenue bonds" pledged against bridge toll revenues. The principal and interest payments increase over the 33-year term (i.e. accretion), and are rated A by S&P;
- Govt. Debt Guarantee: (see above for GoC public subsidy)
- Private Equity: Not known.

D. Project Operations:

Traffic:

- Bridge traffic volumes are not released (confidential).
- Based on GoPEI statistics there were 1.5M vehicles 2-way crossings (2003), or 4,230 vehicles/day.

Project Revenue:

- Not known.

Operating Costs:

- Not known

Public Acceptance:

- High level of motorist support.

Conclusions:

- Project was a "milestone" for Canada in developing a private PPP industry for public works, and in providing valuable lessons for further PPP projects. The overall project construction involved completion on time, but with rumored cost overruns borne by the private consortium, which did allow for a slightly higher initial bridge toll (10% above the baseline). The construction quality and environmental mitigation have proved excellent (to date).
- It is widely believed that the Confederation Bridge would not have been built as quickly, as cost-efficiently, and as well under traditional government procurement, as there was significant technological innovation in the design and construction methods.
- While the CA-Auditor General did estimate that project cost could have been US$37M lower (-4% of project cost) if financed by public debt, this did not address risk assumption and risk management motivating factors (or deadweight loss from taxation).

Sources:

Confederation Bridge website: http://www.confederationbridge.com
CA-Auditor General (1998) *PWGSC – Northumberland Straight Crossing Project (Update)*
CA-Auditor General (1996) *PWGSC – Northumberland Straight Crossing Project*
PEI (2003) *30th Annual Statistical Review*
R. Huijbregts (ed) (1996) *Case Studies on Build Operate Transfer* (Delft)
CCPPP (2002) *Successful Transportation PPP in Canada and the USA*

#6 Vasco da Gama Bridge (Portugal)

Country: **Portugal**	***Year of Operation:*** **1998**
Cost (USD): **$1.00 B** **(PTE 180.00 = US$1.00)**	***Length:*** **12.3km**

Basic Facts

A. Project Initiation:

- Vasco da Gama Bridge (VdG) across the Tagus River/Estuary at point where river basin is 10km wide, and 13km upstream of existing "April 25th" Bridge (1966) at a much narrower river section close to Atlantic Ocean. Traffic on the existing bridge close to maximum capacity 145,000 vehicles/day in early 1980s. Lisbon is Portugal's main port, and truck traffic was jeopardized by bridge congestion. Expanded bridge capacity needed to assure port freight traffic, and to accommodate commuter traffic and links to other regions of Portugal. Expansion of April 25th Bridge (early 1990s) from 4- to 6-lanes of traffic and light-rail on a lower deck.
- By 1990, PT-Ministry of Public Works, Transportation and Communications realized that 2nd Tagus Crossing was necessary. Portugal EU-accession in 1986 made structural funds available. PPP option considered on basis of UK-Dartford/Severn River Crossings. 2nd Tagus Crossing also serves to revitalize Lisbon waterfront district for EXPO'98, and connect to Lisbon Ring Road and major North-South motorways A-1/A-8.
- In 1991, Office for the Lisbon 2nd Tagus Crossing (GATTEL) formed as public authority for planning and procurement. Various alignments considered/evaluated on technical, financing, land expropriation and environmental considerations. Alignment was chosen in 1991, EU-funding agreement in principle, and cost/traffic forecasts made. Estimates that Tagus crossings (2-bridges) would increase 4%pa from 54M (1998) to 98M (2018) with US$2.00 toll (and traffic of 8M rising to 23M vehicles annually). Construction cost estimate of US$1.0B.
- Period of gestation 1985-1991 (6-years)

Sponsoring Govt:

- Government of Portugal

Special Legislation:

- PT-Decree Law No. 14A/91 established GATTEL.

B. Project Procurement:

- Govt. pre-qualification (1992) resulted in 8 proposed consortia, of which 5 invited to submit detailed proposals, with 3 responding (1993). Proposals premised on GoP public contributions, four scenarios which involved: transfer of the existing April 25th Bridge, an EU-Cohesion Fund grant, and a fixed or floating concession period, and alternative designs or modifications to bridge specifications.
- GATTEL evaluation focused primarily on the toll levels proposed and the concession length, along with maximization and certainty of private financing. In the final evaluation, GATTEL asked remaining two consortia to enter final negotiation phase (1994) to address technical/environmental and financial/contractual issues. Final proposals by the Lusoponte (PT) and Bouygues (FR) evaluated as comparable, although Lusoponte design had remained firm while other consortium proposal had gone through many changes. In 1994, GATTEL awarded the contract to Lusoponte. EU-Cohesion funds were only "activated" formally upon signing of the EU-Treaty (Maastricht) in April 1994.
- Interim concession agreement (1994) allowed Lusponte financing to close while remaining uncertainties were addressed: receipt of EU-Cohesion Fund grant, EIA completion, mitigation of wetland and bird preservation issues, public acceptance of increased tolls on existing bridge, rising interest rate environment, political decision (1994) to introduce frequent user toll discounts (for commuters).
- "Financial rebalancing" agreement agreed whereby GATTEL (i.e. GoP) to pay supplementary subsidies to Lusponte to allow attainment of 11.4% Project-IRR with lower toll levels.
- Private company to build a concrete pylon, cable-stayed bridge with 4-lanes of traffic. Bridge to be opened for use in 1998, and operated until either: 2.25B vehicle trips made on 2-bridges combined, or until 2028 (30-Year Concession), whichever came first, when ownership reverted to the government.
- Period of procurement 1992-1994 (3-years)

Public Agent:

Case Study #6 – Bridge: Link – *Vasco da Gama Bridge (Portugal)*

Country: **Portugal**	***Year of Operation:*** **1998**
Cost (USD): **$1.00 B** **(PTE 180.00 = US$1.00)**	***Length:*** **12.3km**

Basic Facts

- GATTEL (GoP public authority).

Contractor:

- Lusoponte consortia: Kvaerner (NO), following purchase of Trafalgar House (UK) 23.8%; Campenon Bernard (FR); Beto Pedroso Construcoes, Mot & Companhia, Somague-Sociedade de Empreitadas (PT) each with about 14% shares; and several smaller PT and UK contractors. Two Joint Venture companies established among partners: Novaponte-ACE led by Campenon Bernard for bridge construction, and Gestiponte-ACE led by Kvaerner for bridge operation (VdG & April 25th).

Construction Period:

- From 1995-1998 (3-years). Lusoponte bore construction completion costs (heavy penalties for late bridge opening) and fixed lump-sum cost (although 90% inflation protected).

C. Project Financing:

Payment Stream:

- Bridge Tolls (1998) of US$1.25/auto, up to US$6.00/commercial truck. The bridge toll is paid on traffic traveling South-North given toll plaza location, with toll level increase formula tied to inflation.
- EU-Cohesion Fund grant of US$350M (85% of "public" funds for project)
- PT $140M subsidy to compensate Lusoponte for reduced toll revenue due to local opposition;

Debt Structure:

- Long-Term Debt:
  - US$330M European Investment Bank (EIB) loan (20-year term) – 60% PTE:40% DM to partially cover FX currency risk – guaranteed (for 15-years) by Chase Investment (Int) and Banco Portuguese Atlantico (PTE) and various syndicates. Lusoponte initial pays interest only (to 2005) before paying down principal;
  - US$120M of PTE debt (presumably) issued by Lusoponte (10-12-year term), and US$60M as "capital cost deferred" (which is unclear). Lusoponte refinancing in 2000 (unknown).
- Private Equity: Not known.

D. Project Operations:

Traffic:

- Bridges traffic (1998) 30M vehicles (10% over forecast), with VdG 4.7M vehicles (60% over forecast).

Project Revenue:

- Not known.

Operating Costs:

- Not known

Public Acceptance:

- High level of motorist support. In 2002, the Macquarie Infrastructure Group (AU) increased its interest in Lusoponte to 30.5% in a deal indicating that "project" equity valuation is US$365M.

Conclusions:

- Project was a "milestone" for Portugal in developing a private PPP industry for public works, and for EU support through the Cohesion Fund (grant) and EIB (loans). Project construction completed on time.

Sources:

B. Perez (2004) *Achieving Public-Private Partnership in the Transport Sector* (iUniverse)
IADB (1995) *Directory of Innovative Financing*
Macquarrie Website: http://www.macquarie.com.au/au/mig/news/20021129.htm

Case Study #7 – Tunnel: Link – *Wijkertunnel (Netherlands)*

#7 Wijkertunnel (Netherlands)

Country: **Netherlands (Holland)**	***Year of Operation:*** **1996**
Cost (USD): **$0.30 B** **(DFL1.00 = US$0.50)**	***Length:*** **1.4km**

Basic Facts

A. Project Initiation:

- Development of the Wijkertunnel began in the 1960s and a route was determined in 1974. By the 1980s traffic congestion in the Randstad (southern region of Noord-Holland, south of Amsterdam) was significant and involved road accidents, as there was a spatial split between growing housing/population in northern Noord-Holland (including Amsterdam), and growing employment south of the Noordzeekanaal (North Sea Canal) (e.g. Schipol Airport).
- The Amsterdam Ringroad (1990) increased traffic flow and volume, but significant congestion was soon felt on the Velsertunnel on the west of the Amsterdam "traffic screen", and crossing to the south of the Noordzeekanaal. The relief of traffic congestion on the Velsertunnel was the primary objective of the Wijkertunnel. The business community actively pursued tunnel building in 1987 to relieve congestion. The Dutch House of Representatives (2nd Chamber) decided to pursue private financing, with repayment from tunnel tolls. Mid-1980s recession, high unemployment and budget deficits led to GofHolland plans to finance as PPP the planning and tendering of the Wijkertunnel in 1991 (and earlier Noordtunnel, in 1988). However, opposition to tolls resulted in the project being underpinned by "shadow toll" public payments.
- Period of gestation 1983-1988 (6-years)

Sponsoring Govt:

- Government of the Holland (Netherlands)

Special Legislation:

- Dutch Programma van Eisen (PvE)

B. Project Procurement:

- An initial proposal for works (Wijkertunnel and another tunnel facility, with tolls) was proposed in 1989, to which 6 consortia expressed interest. The fall of the government in 1990 postponed any proposal selection/contract award. Political debate regarding privatization, tolls, public ownership ensued. A decision was made to pay shadow-tolls with a sliding scale so that volume increases were rewarded at a decreasing marginal payment. The estimated cost of the Wijkertunnel was DFL400M (excluding interest and taxes).
- The GoH. invited proposals/tenders (1991) from firms with financial liquidity (DFL100M) and experience with major tunnel construction, and selection criteria was the most economically advantageous bid. Initially, the bulk of the funding (now estimated at DFL600M) was to be private, coming from the NMB-Postbank (later ING Bank) and public grants from the National Highway Fund.
- Negotiations on financing and concession agreement terms took place in 1991-92 with contract award in1992. Construction began in 1991 on access roads.
- Private company to finance and operate a 2-tube, 4-lane road tunnel under the Noodzeekanaal, with access routes (A-22, near A-9), extension of the A-9, connection of N-23 with A-9 and other works. Actual construction works were executed under direction of the Rijkswaterstaat (Public Agency). Tunnel to be opened for use in 1996, and operated until 2026 (30-Year Concession), when ownership reverted to the government. Company to receive revenue from shadow toll payments for vehicles using the Wijkertunnel and the parallel Velsertunnel, but GoH could excerise "buy-out" right after each 10-year period by paying the total cost of tunnel construction (on top of whatever shadow toll revenues had already been paid).

Public Agent:

- HL-Ministry of Transport and Public Works (concession/payment). Rijkswaterstaat (construction)

Contractor:

- Financial Concession granted to Exploitatie Maatschappij Wijkertunnel (EKW) consisting of ING Bank (HL), Nationale Nederlanden (HL) and Commerzbank (GR), who were to finance DFL480M (80% of cost).
- Construction consortium was (separately?) selected of Tunnel Combinatie Nederland (TCN), and Tunnel Engineering Combinatie (TEC) and other engineering contractors.

Case Study #7 – Tunnel: Link – *Wijkertunnel (Netherlands)*

Country: **Netherlands (Holland)**	***Year of Operation:*** **1996**
Cost (USD): **$0.30 B** **(DFL1.00 = US$0.50)**	***Length:*** **1.4km**

Basic Facts

Construction Period:

- From 1993-1996 (4-years). Project criticized as there appeared to be little real risk assumption for traffic to justify the higher private financing costs. Presumably there were construction completion/cost risks borne by some combination of the construction consortia/ING finance consortia, although GoH provided some form of guarantee for tunnel opening..

C. Project Financing:

Payment Stream:

- GoH shadow-toll payments from DFL1.56/vehicle (traffic band 0-35M/yr) falling across 6-bands to DFL0.47/vehicle (traffic band >47M/yr), as of 2001 for total traffic on the combined Wijkertunnel/ Velsertunnel system.

Debt Structure:

- Private debt-equity ratio of 84:16 was required by GoH (2nd Chamber) for the 80% private financing.
- Long-Term Debt:
  - DFL$402M LTD issued by EMW;
  - DFL$74M of EMW "subordinated loan" as the main form of private "equity";
- Govt. Funding: DFL$122M grant from GoH Infrastructure Fund, although actual costs were 8% lower than planned resulting in DFL$45M savings (i.e. actual grant of DFL$77M).
- Private Equity: DFL$3M from the EMW partners (i.e. true equity position of <1%)

D. Project Operations:

Traffic:

- Wijkertunnel traffic initially diverted from the Velsertunnel, with 11% traffic inducement amounting to 580,000 veh-km per working day. Traffic flows across Amsterdam "traffic screen" increased by 2.5%.

Project Revenue:

- Not known.

Operating Costs:

- Not known. Maintenance and management of the Wijkertunnel was subcontracted by EMW to the state company Rijkswaterstaat for DFL4M/year (1996) indexed to inflation over the concession period. Major repairs were the risk/responsibility of EMW.

Public Acceptance:

- High level of motorist support.

Conclusions:

- Dutch Court of Audit (1980s) found that the private finance arrangements were more costly (perhaps +10-15%) than public financing. This criticism, along with the substantial political indecision/turmoil surrounding the project resulting in GoH rethinking of PPP during the 1990s, resulting in the establishment in 1999 of a PPP Knowledge Centre under the HL-Ministry of Finance.
- Mistakes made during this project, demonstrated a lack of public competence in PPP procurement.

Sources:

R. Huijbregts (ed) (1996) *Case Studies on Build Operate Transfer* (Delft)

EU (2004) *Resource Book on PPP Case Studies: Case 24: Wijkertunnel Randstad*

J. van Haam, J. Koppenjan (1999) *Public Private Partnership as Challenge at the Start of the New Millennium* (Delft)

AVV Transport Research Centre (2002) *Final Report-Annex 4: Overview of Passenger Transport Policy in the Netherlands*

G. de Jong, E. Kroes (2000) *The Impacts of the Amsterdam Ringroad: 5-Years After* (ECMT)

#8 Sydney Harbour Tunnel (Australia)

Country:	**Australia**	***Year of Operation:***	**1992**
Cost (USD):	**$0.60 B** **(AU$1.00 = US$0.83)**	***Length:***	**2.3km**

Basic Facts

A. Project Initiation:

- Proposals for 2nd Harbour crossing in early-1980s with several schemes for new bridges, mostly at some distance from the existing Harbour Bridge, attracting local opposition regarding new traffic routes.
- In 1986, GoNSW announced private consortium to undertake a feasibility study for tunnel, and subsequently the construction of a tunnel under Sydney Harbour. GoNSW suggested that competitive bidding would be unfair as private consortium already invested substantial capital in feasibility study.
- Period of gestation 1986-1988 (3-years)
- Partial CBA was undertaken by the private consortium. NSW-Department of Environment and Planning argued that the project had negative NPV. NSW-Department of Main Roads (in Environmental Impact Assessment) considered the CBA ratio to be between 1.0-1.5.
- Premised on revenue diversion from increased tolls on existing Harbour Bridge, with fixed payment stream based on *projected* (not actual) Bridge traffic.

Sponsoring Govt:

- State of New South Wales

Special Legislation:

- Sydney Harbour Tunnel (Private Joint Venture) Act 1987

B. Project Procurement:

- Govt. did not invite proposals/tenders from other firms, and accepted the private offer, subject to satisfactory negotiation of design/other features.
- Private company to build a road tunnel having two tubes, each accommodating two lanes of traffic. Tunnel to be opened for use in 1992, and operated until 2022 (30-Year Concession), when ownership reverted to the government. Company to receive revenue from tunnel tolls until 2022, and Net Bridge Toll Revenues from 1987 to 2022. GoNSW granted a lease of 35 years on the floor of Sydney Harbour and associated areas.

Public Agent:

- NSW-Department of Main Roads (later Roads and Traffic Authority)

Contractor:

- Joint venture of Transfield Ltd (AU) & Kumagai Gumi Co. (JA) through Tunnel Holdings Ltd. which owned Sydney Harbour Tunnel Co. Ltd. SHTC responsible for construction/operation, with much (70%) of the construction subcontracted, especially Transfield Kumagai Contracting Ltd.

Construction Period:

- From 1988-1992 (4-years). Tunnel Co. bore construction completion risk, with risk of default if tunnel not completed for 18-months beyond scheduled date of July 1992. Tunnel completed in August 1992.
- NSW-RTA shows asset value of Sydney Harbour Tunnel on its balance sheet with historical cost of AU$683M.

C. Project Financing:

Payment Stream:

- GoNSW guaranteed fixed payments AU$40-50M/pa to meet bond financing requirements of SHTC.
- GoNSW funding secured by raising the (existing) Harbour Bridge toll from AU$0.20 to AU$1.00 in 1987 (and to AU$2.00 in 1992), and increasing the toll in line with the CPI, with increases to be implemented in 50 cents increments. GoNSW retained discretion over Bridge/Tunnel tolls, as the Tunnel Co. cannot charge a toll higher than the Harbour Bridge, for which the govt. operates and collects the toll revenue.

Debt Structure:

- Long-Term Debt:
  - AU$223M GoNSW "Net Bridge Revenue Loan" issued against future diverted tolls from the Harbour Bridge (net of toll collection costs); the level of the loan (and diverted revenues) were fixed in the act, independently of the actual Bridge revenue (i.e. all demand risk to GoNSW). Loan was advanced in monthly installments

Case Study #8 – Tunnel: Link – *Sydney Harbour Tunnel (Australia)*

Country:	**Australia**	***Year of Operation:***	**1992**
Cost (USD):	**$0.60 B** **(AU$1.00 = US$0.83)**	***Length:***	**2.3km**

Basic Facts

from July 1987 to September 1992. Loan is interest-free, with repayment in 2022, subordinated to the payment of all senior debt of the company. Mills estimates that the net present value to GoNSW of loan repayment was AU$40M, so that AU$180M was a quasi-grant;

- AU$490M inflation-linked bonds issued by Tunnel Holdings (initially AU$394M – this was increased around 1992 by AU$95M to (presumably) eliminate loan (below) from Tunnel Holdings, and (possibly) to cover cost-overrun);
- AU$40M loan (quasi preferred equity) from Tunnel Holdings (which was repaid in 1992);

- Govt. Debt Guarantee: (see above for GoNSW loan) An "Ensured Revenue Stream Agreement" paid bridge net tolls based on *projected* (rather than actual) traffic volumes, removing substantial traffic risk from the Tunnel Co. The NSW-RTA shows 2003-04 payment of AU$38M, based on Tunnel toll revenue (collected by the Tunnel Co.) of AU$47M; and the SHTC financial obligations to meet bonds/loans of AU$85M.
- Private Equity: AU$7M from the Joint Venture partners

D. Project Operations:

Traffic:

- Cross-Harbour (Bridge & Tunnel) traffic increased 13% in 1993 after opening of tunnel; and by 1998 was 30% above 1991 traffic.
- 60-65,000 vehicles per day (average over 1992-2002)
- 85,000 vehicles per day (2004)

Project Revenue:

- $47M/pa from Tunnel Tolls; $38M/pa from diverted Bridge Tolls

Operating Costs:

- Not known

Public Acceptance:

- High level of motorist support.

Conclusions:

- NSW Auditor (1996) found arrangements placed substantial project risk with the RTA, including:
  - operating risks: as the Ensured Revenue Stream obliges the RTA to make additional payments to the Tunnel Co. if the inflation rate is lower than projected and actual traffic volumes are below projected.
  - financing risks because, although finance for the project was raised by issuing bonds fully underwritten by the private sector, the responsibility for those bonds rests with the State.
- Project was a "milestone" for Australia in developing a private PPP industry for highways, and in providing valuable lessons for further PPP projects, which have involved more substantial risk assumption by the private sector.
- Best seen as a Design/Build/Maintain contract with private financing fully underwritten by State revenue guarantee.

Sources:

NSW-RTA *Annual Report 2004*

AU-DoTARS website: http://www.dotars.gov.au/transprog/govt_links/ppp.htm (PPP)

G. Mills (1991) *Commercial Funding of Transport Infrastructure* (Journal of Transport Economics and Policy)

G. Hepburn et al (1997) *Private Investment in Urban Roads* (AU-Industry Commission Staff Research Paper)

NSW Audit Office (1996), *Financing Infrastructure: Private Profits from Public Losses*, Public Accounts Committee (Parliament of NSW)

University of Wollongong *Sydney Transport Projects(Chapter 4)*

Case Study #9 – Rail: Network – *RFI/TAV (Italy)*

#9 Treno Alta Velocità (Italy)

Country: **Italy**	***Year of Operation:*** **1991**
Assets (USD): **$13.80 B** **(EU€1.00 = US$1.29)**	***Length:*** **1,100km** **(on 2012 completion)**

Basic Facts

A. Corporate (Network) Initiation:

- Ferrovie Dello Stato (FS) / Rete Ferroviaria Italiana (RFI) / Treno Alta Velocità SpA (TAV) are GoItaly state corporations involved in railway infrastructure and operations.
  - Ferrovie Dello Stato (FS) is the holding company for all state rail subsidiaries. Established in 1905 to take over failing private railways, by 1940 it had a railway network of 17,000km. It became a joint stock company in 1992, and became a holding company (FS Holdings SpA) in 2001. The sole shareholder is the IT-Ministry for Economy and Finance. Technically, it holds a 70-year concession for rail (and sea transport);
  - Rete Ferroviaria Italiana (RFI) is responsible for design-construction-operation of railway infrastructure, and owns the infrastructure and network facilities (e.g. stations), currently 16,100km. It was established in 2001 as a subsidiary of FS Holdings to meet EU directives (1998) on railways;
  - Treno Alta Velocità spA (TAV) is the infrastructure project manager for high-speed rail network development. It was established in 1991 with share capital of US$55M, of which 40% was public capital from FS and 60% was private capital underwritten by Italian/foreign banks, financial and insurance companies. Under HSR concessions granted by FS it began construction on Milan-Naples and Turin-Venice lines. In 1998, FS reorganized TAV by buying private shareholdings, making TAV a 100% subsidiary of RFI (and FS). The commitment to access private capital for 60% of HSR investment was affirmed. For HSR network: TAV is design/construction project manager; and RFI is infrastructure operator;

Sponsoring Govt:

- Government of Italy

Special Legislation:

- Various Acts and GoItaly Directives, Concessions and Agreement.

B. Corporate Procurement:

- The GoItaly Contract for Programmes (2001-05) envisioned finding of US$32B for HSR between Turin-Milan-Naples. Under the 1991 Concession Agreement (FS-TAV) and various amendments to the 1991 Implementation Agreement for the Concession, the financing of HSR infrastructure was to be:
  - 40% public financing of the investment in the form of no-interest loans from RFI to TAV; and
  - 60% commercial financing of debt to be issued by TAV.
- Debt service was to be underwritten by RFI during the period of construction and preliminary operation; with TAV responsible for ongoing debt service/repayment from HSR user fees to be paid to it by the HSR operator. TAV holds the HSR usage rights to 2041 under its Concession, and is to make HSR infrastructure access available to RFI against payment of a user fee. RFI is to manage/maintain the HSR infrastructure and act as access manager for the HSR network. Within the limits of EU directives, the HSR system will be made available to Trenitalia and other (private) operators.
- Various General Contractors were selected in 1991-92 (FIAT, IRI, ENI) following "private negotiation" to conduct planning and implementation of HSR on a route-basis, under Concession from FS-TAV. Timeframes, costs and construction methods were established through Supplementary Deeds to the Concession Agreement, as approved at the Conferenze di Servizi (1992). The agreements called for the work to be implemented:
  - Up to 60% by member companies of the Consortia of General Contractors;
  - No less than 40% by subcontractors selected by the General Contractor following European calls for tenders (compliant with EU directive); or
  - By subcontractors of the General Contractor.
- Specific "anti-mafia" measures were adopted by TAV. However, two Concessions were terminated with General Contractors (Cepav Due/ENI, subsequently reinstated; and Iricav Uno-Due/IRI), and the 2002 TAV Annual Report reports criminal investigations regarding TAV staff and those of certain contractors, as well as other civil proceedings against various contractors.

Case Study #9 – Rail: Network – *RFI/TAV (Italy)*

Country: **Italy**	***Year of Operation:*** **1991**
Assets (USD): **$13.80 B** **(EU€1.00 = US$1.29)**	***Length:*** **1,100km** **(on 2012 completion)**

Basic Facts

- Infrastrutture (ISPA) SpA was established in 2002 as a 100% state owned financial intermediary (of Cassa Depositi e Pretiti) to establish favourable conditions for infrastructure funding by private investors and by directly financing them with public funds. ISPA will issue bonds (US$32B over 6-years) for use by TAV, with TAV debt repayment with income from tolls and public subsidies.

Public Agent:

- FS (holding company);
- TAV (HSR project manager/concession holder)

Investors:

- Despite the period (1991-1998) of private (partial) equity in TAV, the funding of HSR in Italy is either directly done by the GoItaly or indirectly through state-guaranteed debt issued on the commercial market (through FS-ISPA-TAV)
- TAV has (2002) equity capital of US$7.0B which was subscribed by RFI through the conversion of interest free loans to share capital.

Construction Period:

- The Italian HSR system is expected to be 1,110km when the network is completed in 2012
- TAV (2002) shows tangible asset value on its balance sheet of US$13.8B, of which the bulk was HSR works in progress (US$12.0B)

C. Corporate Financing:

Payment Stream:

- TAV is to receive HSR access fees from RFI as the HSR access manager, who in term will be paid by the HSR operator (Trenitalia or private operator).

Debt Structure (as of 2004):

- Long-Term Debt: US$6.76B of TAV LTD in the form of:
  - US$3.03B debt issued by the European Investment Bank (EIB) (various loans with term of 25-years);
  - US$0.61B debt issued by Cassa Depositi e Prestiti (State-Bank) with term of 22-years);
  - US$1.18B debt issued by various Italian banks (various loans with terms of 2-22 years);
  - US$1.93B debt issued by various foreign banks (various loans with terms of 8-25 years).
- Public Equity: US$7.0B from GoI shareholder (RFI).

D. Corporate Operations:

- HSR system will be completed around 2012. As of 2005, 254km Florence-Rome line was in operation.

Capital Expenditures:

- TAV (2002) shows capital expenditure of US$2.92B in the form of advances paid to contractors for the 4 routes under construction (Rome-Naples, Bologna-Florence, Bologna-Milan, Turin-Milan).

Conclusions:

- TAV can best be described as a public company, operating on commercial basis, securing public and private (debt) capital, but whose commercial viability to repay loans from HSR access fees is uncertain.
- The role of private equity is restricted to construction "bridging" finance, which is likely minimal given TAV makes ongoing contractor advances (presumably against work completed).

Sources:

Ferrovie dello Stato website: http://www.ferroviedellostato.it
FS (2003) *Annual Report*
TAV website: http://en.tav.it
TAV (2002) *Annual Report*
P. Beria et al (2004) *The Italian Experience in Transport Infrastructure: A Survey*
Freshfields-Bruckhaus-Deringer (2004) *European Railway Legislation-Italy*
Lovells (2002) *Italian Railway System*
OECD (2003) *The Italian General Government Sector* (STD/NAES(2003)16)

Case Study #10 – Rail: Network – *ARTC (Australia)*

#10 Australian Rail Track Corporation (Australia)

Country: **Australia**	***Year of Operation:*** **1998**
Cost (USD): **$1.70 B (5-years) (AU$1.00 = US$0.83)**	***Length:*** **3,626km**

Basic Facts

A. Project Initiation:

- Between 1962 and 1995, the GoA invested significantly in State-owned rail track to standardize railway gauge and establish an interoperable national rail network. This allowed, in 1995, the commencement of private interstate freight rail service.
- In 1997, the Governments (Commonwealth and States) agreed to manage/operate the interstate rail network as a single network. In 1998, the GoA established the Australian Rail Track Corporation (ARTC) to manage open access commercial arrangements and to manage infrastructure development for the national (interstate) rail network.
- Related policy also resulted in the 1990s with the privatization of the GoA public freight operator; the Victorian freight rail network and operator; the WA rail network and operator, and the various passenger rail operations. In 2001, the GoNSW privatized its public freight operator. GoQueensland retains ownership of its rail network and freight operator.
- Period of gestation 1995-1998 (4-years)

Sponsoring Govt:

- Commonwealth Government (with State Government agreement)

Special Legislation:

- None. ARTC established under Corporate Law.

B. Project Procurement:

- In 1998 the GoA transferred title to ARTC for rail track it owned across the country (Kalgoorlie WA to Broken Hill/Albury NSW). The ARTC entered into a 15-year lease agreement for the interstate standard gauge rail network with the GoVictoria. The ARTC secured the right to sell through access in Western Australia under an agreement with the private rail owner/operator. The ARTC entered (2004) into a 60-year lease agreement with the GoNSW for management of the interstate network and the Hunter Valley regional network. Queensland retained the right to manage interstate freight access on its rail network, for which private operators and its public corporation (Queensland Rail) can secure access.

Public Agent:

- AU-Department of Transport and Regional Services (DoTARS)

Contractor:

- Private, not-for-profit corporation, owned 100% by GoA (Commonwealth).

Construction Period: (n/a – as most assets were existing, with upgrading plans)

- The GoA committed AU$191M to extend the mid-continent North-South rail line to Darwin, which was tendered as a design/build contract with the private sector. Construction occurred 2001-03 with train operation starting in January 2004.
- The GoA, through ARTC is committed to AU$1.8B of rail investments over the 5-years (2004-09):
    - ARTC lease in NSW commits AU$872M in rail investment over 6-years;
    - GoA provided capital grant of AU$450M to ARTC in 2004 for capital works; and
    - GoA announced *AusLink* investments for rail for a further AU$550M.
- ARTC shows fixed assets (2004) at historic cost of AU$235M, and undepreciated value of AU$193M.

C. Project Financing:

Payment Stream:

- ARTC rail access fees are the main form of payment for operating costs. Most major capital projects are funded through GoA capital contributions (as equity).

Debt Structure (as of 2001):

- Long-Term Debt: nil
- Govt. Equity of $843M comprised of:

Case Study #10 – Rail: Network – *ARTC (Australia)*

Country: **Australia**	***Year of Operation:*** **1998**
Cost (USD): **$1.70 B (5-years) (AU$1.00 = US$0.83)**	***Length:*** **3,626km**

Basic Facts

- AU$235M of GoA share capital (AU$92M initial, and AU$143M contributed in 2004);
- AU$77M of "Asset Revaluation Reserve" (i.e. book entry); and
- AU$531M of "Retained Earnings", of which AU$450M was contributed by the GoA in 2004, and $81M was true retained earnings (after AU$7M of dividend to GoA shareholder for 2004).

D. Project Operations:

Traffic:

- Gross tonne-km of 30.3B in 2003-04 from 11,800 scheduled train services.
- Rail freight market share has increased to 65-70% for East-West long-haul markets; and to 20% for medium-haul North-South and East-West markets. Overall, rail freight is 22% of total freight intermodal market.

Project Revenue:

- AU$108M (2004).

Operating Costs:

- AU$88M (2004); including non-cash depreciation AU$11M.
- Net Cash Flow of AU$30M – but accounting gain of AU$20M with non-cash depreciation cost.
- Track maintenance and capital investment was AU$48M in 2003-04; comprised of AU$26M in routine maintenance, AU$11M for periodic major renewal, and AU$11M for capital works.

Public Acceptance:

- High level of motorist support, e-tag take-up greater than expected; less than 1% toll evasion.

Conclusions:

- The establishment of the ARTC was part of the GoA policy to "privatize"/commercialize the rail transport sector, to seek efficiency gains in operation, movement towards user-pay, while at the same time to assist the rail sector to become more competitive to road freight. A major policy has been to establish "competitive neutrality" between the modes, which is largely restricted by the under-recovery of road infrastructure costs. This is being addressed separately with State Governments.
- The ARTC has succeeded in securing management and access rights for the interstate rail network, in improving rail safety, in facilitating private rail freight operators with improved rail infrastructure, and in establishing a capital plan for rail improvements, which will be mostly funded by GoA grants.
- The ability of the ARTC to attract private equity is nil, and its mandate currently precludes private equity. Generally, the extent of private financing for the rail network is in the payment of commercial rail access fees by private rail freight operators to cover ongoing operations with some minor contribution to rail maintenance/capital.

Sources:

ARTC *The Rise, Decline and Rise of Australia's Railways*
ARTC *The Agreement in Summary* (NSW lease)
ARTC *Annual Report 2004*
Booz Allen & Hamilton (2001) *Interstate Rail Network Audit*

#11 Arlanda Express (Sweden)

Country:	**Sweden**	***Year of Operation:***	**1999**
Cost (USD):	**$0.65 B** (EU€1.00 = US$1.29)	***Length:***	**42km** (train operation)

Basic Facts

A. Project Initiation:

- The concept of a rail-link between Stockholm CBD and Arlanda International Airport (42km) had been around since the 1980s. The construction of a third runway, environmental concerns and growing road traffic increased pressure for a rail link.
- Between 1989-1993 GoS engaged in studies and political discussion to move the project forward. The Swedish Railway Administration was involved in planning. GoS financial situation precluded use of public debt, so private capital was sought. Given the limited expertise (and rail equipment) available domestically, and international competition was envisioned. Sweden was not a member of the EU during the Arlanda Express procurement.
- Period of gestation 1987-1993 (6-years)

Sponsoring Govt:

- Government of Sweden

Special Legislation:

- None. ACTA established by Cities' Councils.

B. Project Procurement:

- The Swedish Railway Administration was tasked with ~20km expansion (2- to 4-tracks) in the railtrack closest to Stockholm.
- Proposal sought construction of 20km of new dual railtrack (integrated with national network), 7km of tunnels, 3 stations at Arlanda Airport, link with Stockholm Central Station and 7-trainsets.
- A GoS agency (A-Banan Projekt AB) was to own the railtrack and trainsets upon completion (1999) by the consortium, with the consortia being the construction company and Arlanda Express operator over a 40-year concession from 2000-2040.
- In 1993, bids were solicited, resulting in negotiations which were concluded with contract award in 1994 to the Arlanda Link Consortium (ALC) of Swedish/UK partners.

Procurement Period: (1993-1994) 2-years.

Public Agent:

- A-Banan Projekt AB (jointly owned by Swedish Railway Administration and LFV Airport Authority).

Contractor:

- Arlanda Link Consortium: NCC and Siab (SW) responsible for construction, civil engineering, power lines; Vattenfall (SW) for power utility; Mowlem (UK) for tracks and switched; and GEC Alsthom (UK) for trainsets and signal/telecommunication systems. "A-Train AB" was formed by Mowlem/GEC Alsthom as the Arlanda Express operating company.

Construction Period: (1995-1999) 4-years.

C. Project Financing:

Payment Stream:

- A-Train AB receives ticket revenue for Arlanda Express, and (effectively) undertook 20km track and station construction as "design/build" sub-contract of overall Concession.

Debt Structure (as of 1999):

- Long-Term Debt: US$520M
  - US$170M in long-term debt issued to various banks by A-Train AB;
  - US$140M "conditional loan" from GoS, on which a dividend is payable upon specific conditions (in 2004 "written-down" by US$14M by GoS);
  - US$100M in "shareholder" debt, likely issued over short-terms by various ALC partners;
  - US$110M "lease" (unclear on details) presumably for trainsets

Government Grant:

Case Study #11 – Rail: Link – *Arlanda Express (Sweden)*

Country:	**Sweden**	***Year of Operation:***	**1999**
Cost (USD):	**$0.65 B** (EU€1.00 = US$1.29)	***Length:***	**42km** (train operation)

Basic Facts

- US$125M from the GoS

Private Equity:

- Not Known (initially).
- In 2003 Macquarie Bank (AU) bought 100% of A-Train AB for total consideration of US$58M (i.e. close to 50% equity write-down for initial project investors). Cash portion of purchase was US$10M.

D. Project Operations:

Traffic:

- 2.4M passengers (2002) on 41,000 train trips.

Project Revenue:

- US$47M (2002) in ticket revenue and other proceeds (A-Train AB "turnover").

Operating Costs:

- Not Known.

Public Acceptance:

- Reasonable level of passenger use. Apparent "distress sale" of A-Train AB assets to realize (limit) loss by original investors.

Conclusions:

- Project was a "milestone" for Sweden in developing a private PPP industry. Important design innovation brought to project stations. Resulted in valuable infrastructure assets which will revert to public ownership in 2040.
- It is unknown whether initial investor loss of equity was occasioned by construction cost-overruns, lower than forecast passenger traffic, or higher operating costs (or combination of above).

Sources:

Arlanda Express website: http://arlandaexpress.com

U.Karlstrőm (2005) *Transport Infrastructure Investment: Funding Future Infrastructure Needs* (CEMT/OCDE/JTRC/TI1(2005)2)

K. Sundberg (2004) *A-Banan Projekt AB* (Presentation)

Swedish National Debt Office (2004) *Annual Report 2004*

Macquarie Bank (2004) *Annual Review 2004*

IBL (2003) News Release on website: http://bankrupt.com

Case Study #12 – Rail: Link – *Alameda Corridor (USA)*

#12 Alameda Corridor (USA)

Country: **USA**	***Year of Operation:*** **2002**
Cost (USD): **$2.43 B**	***Length:*** **32km**

Basic Facts

A. Project Initiation:

- The Alameda Corridor is a 32km rail freight expressway between the Ports of Los Angeles and Long Beach (PLA-PLB), and the transcontinental terminus and mainlines of the Union Pacific (UP) and BNSF Railways in Southern California.
- In 1981 the Ports Advisory Committee (PAC) created by the Southern California Association of Governments (SCAG) to deal with highway/rail congestion/access to the two ports. In mid-1980s PLA-PLB developed an Intermodal Container Transfer Facility (ICTF) with funding backed by Southern Pacific Railway (now part of UP). In 1985, Alameda Corridor Task Force looked at rail access. A 1998 Consolidated Rail Corridor Strategic Plan recommended government agency be established. In 1989 the Alameda Corridor Transportation Authority (ACTA) was created by PLA-PLB and the Los Angeles County Metropolitan Transportation Authority (LACMTA).
- From 1996-2001, the PLA-PLB (two busiest US container ports) each spent more than US$1.0B on new port facilities (separate from Corridor), including new docks, land, and intermodal connections.
- The US$2.4B Alameda Corridor featured below-grade track, elimination of all at-grade road crossings, bridge replacements – and aimed to increase port capacity (in light of booming US-China trade), reduce congestion and smooth cargo flows into/from the two ports.
- Between 1989-1996 ACTA involved in project planning (1990-93), community consultations, arrangement of financing, land acquisition (1994-95), and environmental impact assessment (1996).
- Period of gestation 1985-1996 (11-years)

Sponsoring Govt:

- LACMTA, City of Los Angeles, City of Long Beach, PLA-PLB (which are owned by the Cities).

Special Legislation:

- None. ACTA established by Cities' Councils.

B. Project Procurement:

- In 1997 construction began. Works included 8 subprojects on the North End and 6 subprojects on the South End procured through traditional contracting (design-bid-build), with ACTA engaging private expertise for project management. The Mid-Corridor 16km "trench" was solicited as a design-build fixed-price contract US$712M which solicited in 1997 and awarded in 1998 to Tutor-Saliba (US). A contract review/audit by the US-DOT estimated (1999) that eight contracts showed engineering cost savings of 9% (relative to initial estimates – worth US$82M in savings), although half (4%) was subsequently "lost" through contract change orders. ACTA risk management involved a US$25M Owner-Controlled Insurance Program for various liabilities (general, excess, workers' compensation, railway protection, environmental impairment, owners' protection), and a rigorous safety program A further US$200M (8% of project costs) was set aside for contingencies.
- *Public Agent:*
- ACTA

Contractor:

- Tutor-Saliba for main DB-Contract; various contractors for other subprojects.

Construction Period: (1997-2002) 5-years.

- ACTA does not report a comprehensive balance sheet with fixed assets value.

C. Project Financing:

Payment Stream:

- ACTA rail access fees paid by UP/BNSF for Corridor use and Container Traffic [US$15.79/full-TEU for "waterbourne" (using two ports), *regardless of Rail Corridor use*; US$8.42/other railcar using the Corridor; and US$4.21/TEU for "non-waterborne" (i.e. transiting Corridor but not using the ports)]. A Maintenance of Way charge is levied on the two railways to cover Rail Corridor maintenance costs.

Case Study #12 – Rail: Link – *Alameda Corridor (USA)*

Country: **USA**	***Year of Operation:*** **2002**
Cost (USD): **$2.43 B**	***Length:*** **32km**

Basic Facts

Debt Structure (as of 2004):

- Long-Term Debt: US$1.84B (2005)
  - US$1.84B in senior lien (45%) taxable bonds, and subordinate lien (55%) tax-exempt bonds secured by revenue pledge of railway user fees and container charges. These were issued in 1999 (US$1.16B), backed by a US$400M US-DOT loan, and 2004 (US$0.69M), following a favorable tax ruling allowing more tax-exemption. Some of the bonds (of 1999; and all of 2004) were capital appreciation bonds, which are heavily discounted at issuance in lieu of initial interest payments due;
  - US$400M loan under the Railroad Revitalization and Regulatory Reform Act (1976), which was repaid with accrued interest (US$173M) from the 2004 bond issue receipts;
- LACMTA contribution of US$355M, of which US$71M was from federal US-DOT sources and US$284M was state/local); and a US$7M State of California grant (as of 1999);
- Ports Funding of US$394M was provided (as of 1999). Likely repaid through bonds issue in 1999. It was expected that the Ports will need to provide ongoing funding of up to 40% of ACTA debt service fees (perhaps to 2018) to cover debt service payments which exceed projected user fees. However, the 2005 ACTA Budget shows no Ports payments, with bond proceeds from 2004 sufficient to meet 2005 debt service charges.
- Railways Funding of US$18M was provided (as of 1999).

D. Project Operations:

Traffic:

- 16,000 train movements (2004) on the Rail Corridor; carrying about 3.7M containers on the Corridor.
- Roughly 12M TEU transiting the two Ports (2003) – so perhaps 30% of container flow to the two Ports arrives/departs through the Rail Corridor (below the 50% anticipated modal share).

Project Revenue:

- US$72M (2005) in the form of use/container fees (US$65M, with 94% from waterborne full containers) and maintenance of way (US$4M).

Operating Costs:

- US$82M (2005) for general/administrative, maintenance of way, and debt service (not including depreciation); and US$74M for additional rail projects capital expenditure, of which US$42M was for construction (which was funded from 2004 debt issue proceeds).
- Net Cash Flow of -US$10M would have been payable by two ports to cover operating loss (debt service above revenues) had the 2004 debt issue proceeds not been available.

Public Acceptance:

- High level railway use. Some dispute between ACTA/railways concerning container fee payments related to non-Corridor traffic through two ports. Local community complaints regarding lack of economic development support (e.g. local jobs during construction), and ongoing air quality..

Conclusions:

- The funding by ACTA is widely cited as a successful US case of PPP, although it involves no private equity or substantial risk assumption beyond construction completion/cost under the Design-Build subcontract. All of the private capital was debt secured against revenue bonds for which railways are expected to pay (through user fees/container charge) the bulk, and for which the public Ports bear risk.

Sources:

ACTA website: http://acta.org
ARTC (2005) *Program Budget 2005*
D. Luberoff, J. Walder (2000) *US Ports and the Funding of Intermodal Facilities*
A. Agarwal et al (2004) *The Alameda Corridor* (Metrans)
US-DOT (1999) *Review of the Alameda Corridor Project* (Office of Inspector General-Audit)

#13 Bremen-GVZ (Germany)

Country:	**Germany**	***Year of Operation:***	**1988**
Cost (USD):	**$0.50 B est. (EU€1.00 = US$1.29)**	***Size:***	**203ha (site area)**

Basic Facts

A. Project Initiation:

- The Bremen Güterverkehrszentren (GVZ) or "freight village"/"dry port" was conceived in the 1960s and plans to establish a GVZ were made in 1984.
- Bremen-GVZ has grown from 35ha (1988) to 100ha (1992), 130ha (1994) to 200ha (2001).
- The GoGermany, in association with the state-owned railway (DB, since 1994 a "commercial" operation) and post-office, published a plan (1993) for a network of 38 GVZ around (West) Germany, to serve as modal interchange points and the nuclei for broad range of transport/logistic services. Bremen-GVZ is the largest of these facilities.
- Despite government hope that GVZ would become urban transshipment/consolidation centers (and help in the shift of road freight to rail), the bulk of GVZ shipments are inter-regional and international. The number of GVZ have grown from 5 (1995) to 19 (1999) and 32 (2002), of which 18 offer integrated logistic services. As of 1998, there is a GVZ association (DGG) which is a member of Europlatforms, and EU lobby group/industry association.
- Period of gestation 1984-1987 (4-years)

Sponsoring Govt:

- Bremen State

Special Legislation:

- Bund-Länder-Grundsaetze zu Güterverkehrszentren (GVZ) (2001) for GoGermany funding.

B. Project Procurement:

- It is not known when construction began, but the initial GVZ was in operation in 1988, and has been expended several times over the intervening 13-years until its present configuration (2001).
- The Bremen-GVZ (2005) features access/connections to road (A-27/A-1)-rail (DB, 4-track 2.8km with annual lift capacity of 230,000 TEU (as of 1994))-inland waterway (Wesser)-seaport (Bremen New Port 3km)-Airport (Bremen 6km). It is a 203 hectare site with 330,000sqm of covered warehouse space, 200,000sqm of covered warehouse rail-road interchange, and 30,000 sqm of covered cold storage. It features customs services, trailer and machine rental services, 110 on-site private transport/logistic service providers (with 3,000 staff), fuel station, office rental, catering, post office.
- It is reported that Government and the private sector formed a partnership to acquire the land, and that Government funds were used to build the basic transport infrastructure. Private service providers developed their own specific sites for distribution centers, truck servicing and other transport/logistic support service.
- Under the GoGermany programs to support GVZ, funding can be secured to construct terminals and purchase handling equipment. Consortia can apply to build and operate the terminal, with applications assessed for freight volumes, operational relations and terminal location. Funding conditions included: the terminal had to need public funding for financial viability; the terminal operator must be different from the terminal owner; there must be open terminal access; there must be at least bi-modal access; there is a commitment to operate the facility over a defined period. 80% of public funds were a capital grant; while 20% was an interest-free loan. Initially (1993) US$2.6B over 10-years was pledged (roughly US$40M per GVZ). Since 1997, there is greater willingness to invest in intermodal facilities which do not involve the state-owned DB railway. In 2000-01 US$300 was spent on 10 projects.
- A Bremen-GVZ addition (2003) involved 110,000 sqm high-bay racking warehouse operated by BLG Logistics and built at a cost of US$77M, which will be used by Tchibo, Minolta and DaimlerChrysler.
- *Private Owner:*
- GVZ City-Logistik Bremen GmbH, a private limited liability company.
- The company members include a representative of all companies at the facility, the DB railway, and the State of Bremen.

Case Study #13 – Intermodal Hub – *Bremen-GVZ (Germany)*

Country: **Germany**	***Year of Operation:*** **1988**
Cost (USD): **$0.50 B est.** **(EU€1.00 = US$1.29)**	***Size:*** **203ha** **(site area)**

Basic Facts

- The Board of Directors has: 3 members from State of Bremen, 4 members from facility companies, 1 member from DB rail and 1 independent member.

Construction Period: (1986-2001) 16-years.

- No financial data for Bremen-GVZ are presently available. It is reported (1994) that US$300M had been spent on the Bremen-GVZ. Given expansion of 54% (in terms of ha), estimated current cost is US$500M.

C. Project Financing:

Payment Stream:

- Rent to private transport/logistic service providers is at a rate of about US$xx/sqm.

Debt Structure (as of 2004):

- Long-Term Debt: Not known.

Government Funding:

- Half of the investment (to 1999) was made by the Bremen State government (US$150M)

D. Project Operations:

Traffic:

- Not known.

Project Revenue:

- Not known.

Operating Costs:

- Not known.

Public Acceptance:

- Bremen-GVZ has grown substantially and its services feature prominently in regional economic development material. The recent (2003) investment affirmed Bremen's role as a major call-centre, internet and mail order sales center.

Conclusions:

- The Bremen-GVZ has long been recognized as one of the world's leading intermodal transport/logistic facilities, and an example of public-private partnership intermodal transport. It is unclear (at present) the financial structure, specifically the private equity contribution and current revenue stream for the facility. However, recent private investments and the steady expansion of the facility indicates commercial viability and sustainability.

Sources:

Europlatforms (2003) *Introduction* (Submission to EU)
Bremen *Somehow Bremen is a Success Story* (b:g group)
US-FHWA (1994) *European Intermodal Programs: Planning, Policy and Technology*
US-FHWA (2000) *Summary Report*
http://www.logistics-pilot.de (2002) *BLG Builds New Logistics Centre for Tchibo in Bremen*
DGG (Association of GVZ) (2004) *GVZ-Standorte* (Map)
DGG (2003) *Status Quo de GVZ in Deutschland* (Presentation)
DGG (2003) *Added Services in Logistics Centres* (Presentation S. Nestler)
http://www.freignt-village.com (2000) *Quality of Freight Villages Structure and Operations*
http://www.eutp.org (2000) *Germany* (Member State Report)
A. McKinnon (1998) *International Review of Urban Transhipment Studies and Initiatives*

#14 St. Lawrence Seaway Management Corporation (Canada)

Country: **Canada**	***Year of Operation:*** **1998**
Cost (USD): **$3.00 B (in 1959) (CA$1.00 = US$0.83)**	***Length:*** **3,700km (navigable waterway)**

Basic Facts

A. Project Initiation:

- Between 1954-59, the Governments of Canada and the United States funded construction of the bi-national St. Lawrence Seaway to create a navigable waterway to the upper mid-continent, as an alternative to rail freight for bulk commodities. The Canadian assets were administered by a Crown corporation – the St. Lawrence Seaway Corporation; while US assets were managed by an agency of the US-DOT – the Saint Lawrence Seaway Development Corporation. Tolls were to cover operating costs, but given the particular revenue sharing agreement between the US-Canada, these were more than sufficient for the US assets, but inadequate for the Canadian assets. This made it difficult to achieve binational agreement over toll rate increases.
- In 1995, the GoCanada established the National Marine Policy which encouraged commercialization of marine transport through the establishment of non-for-profit private Port Authorities for national/international ports, greater use of user-pay in the sector, and commercialization of the Canadian assets of the St. Lawrence Seaway.
- Between 1995-98 the GoC negotiated with Seaway shippers, ship-owners and other stakeholders to organize and development an agreement for the management and ongoing operation of the Canadian Seaway assets. In 1998 the SLSMC was established..
- Period of gestation 1995-1998 (4-years)

Sponsoring Govt:

- Government of Canada

Special Legislation:

- SLSMC established under Corporate Law. *Canada Marine Act* (1998) authorized GoC to enter into agreement with SLSMC to manage assets.

B. Project Procurement:

- As the GoC policy was to transfer marine assets to not-for-profit groups of local stakeholder, there was no competitive tender, and direct discussions/negotiations ensued.

Public Agent:

- CA-Transport Canada (TC)

Contractor:

- Private, not-for-profit corporation, owned 100% by Seaway stakeholder without debt.

Construction Period: (n/a – assets were existing, with upgrading plans)

- SLSMC manages Seaway assets under 20-year set of agreements which specify: asset renewal plan, operations/maintenance agreement, toll rate regime, and ongoing GoC liability to cover operating deficits (including capital investment).
- The GoC contribution is through a Trust Fund to cover the "capital deficit" of the SLSMC, as the defference between the Asset Renewal Plan requirements and the toll fees raised.
- SLSMC shows fixed assets (2004) at historic cost of CA$34M, which does not include Seaway major assets whose ownership remains with the Crown.

C. Project Financing:

Payment Stream:

- SLSMC access fees are the main form of payment for operating costs. The GoC provides a "top-up" payment to finance the asset renewal plan.

Debt Structure (as of 2004):

- Long-Term Debt: nil
- Govt. Equity of CA$36M in the form of assets transferred for SLSMC use, secured by a limited recourse promissory note payable without interest upon termination of the concession; less CA$24M as commitment by SLSMC to contributions of the Capital Fund Trust.

D. Project Operations:

Case Study #14 – Inland Water: Network – *SLSMC (Canada)*

Country: **Canada**	***Year of Operation:*** **1998**
Cost (USD): **$3.00 B (in 1959) (CA$1.00 = US$0.83)**	***Length:*** **3,700km (navigable waterway)**

Basic Facts

Traffic:
- Gross tonnes of 41M in 2003-04 from 4,300 vessel movements (down 20% from 1998 peak)
- Seaway freight market share has decreased relative to rail.

Project Revenue:
- CA$64M (2004) – generating CA$2M operating surplus

Operating Costs:
- CA$62M (2004); including non-cash depreciation CA$3M.
- Net Cash Flow of CA$5M – but accounting loss of CA$3M with non-cash depreciation cost and net effect of capital expenditures less GoC contribution for Asset Renewal.
- Asset Renewal of CA$24M (2004), as part of 5-year plan for CA$170M to enhance Seaway assets.

Public Acceptance:
- High level of Seaway stakeholder support, although Seaway volumes continue to decline from peak of 1998 due to weaker competitiveness for time-sensitive movements by rail, and poor international competitiveness of bulk commodities (e.g. iron ore, coal).

Conclusions:
- The establishment of the SLSMC was part of the GoC policy to commercialize the marine transport sector, to seek efficiency gains in operation, movement towards user-pay, while at the same time to maintain and preserve the Seaway assets as a Crown resource.
- The SLSMC has succeeded in securing stakeholder agreement for efficient management of Seaway operations, for rising tolls, and to ongoing binational discussions as to needed Seaway infrastructure improvements.
- The ability of the SLSMC to attract private equity is nil, although its mandate provides for private equity. Generally, the extent of private financing for the Seaway is in the payment of commercial tolls by private shippers to cover ongoing operations with some minor contribution to Seaway maintenance/capital.

Sources:

TC-Communiqué *Seaway Operations Commercialized* (1998)
SLSMC Web-Site : http://www.greatlakes-seaway.com/en/aboutus/slsmc.html
SLSMC *Annual Report 2003-04*
SLSMC *Strategic Plan 2004-07*
TC *Performance Report 2002-03*

Annex 2: Case Study Methodology

Case Study Methodology Adapted From US-GAO (1990) *Case Study Evaluations* "Guidelines for Reviewing Case Study Reports"		
Criteria #	**Description of Criteria**	**Approach in Study**
A. Design		
1	Study questions stated clearly and explicitly.	1. To identify and select "successful" examples of PPP in road/rail/inland water/intermodal transportation infrastructure. 2. To investigate the reasons for, and attributes of success including: conceptualization, development, tendering/contracting, building, and management. 3. To document measures of post-completion success in terms of: usage, cost-efficiencies, technological innovation, public acceptance etc. 4. To identify Key Success Factors of successful PPP.
2	Method clearly described	1. Draw on existing primary and secondary literatures to identify candidate PPP subjects 2. Gather readily available additional material and populate a standard template 3. Identify key-informants for review of Draft material for accuracy, alternative data and interpretations 4. Complete templates and begin to draw generalizations and lessons-learned 5. Identify Key Success Factors
3	Time span sufficient to address core issues fairly.	1. Candidate PPP subjects must have completed construction and opened operations prior to the middle of 2004 (in most cases – prior to end of 2003)
4	Case selection described and appropriate for study purpose	1. Exemplary PPP subjects, as evidenced by citations in literature and expert opinion 2. Based on judgment of Client or Consultant, relying on experience and knowledge
B. Data Collection		
5	Methods described and appropriate for study purpose.	1. Extensive analysis of primary literature (e.g. Studies, Audits/Evaluations, Annual Reports, Industry Reports) 2. Extensive review of secondary literatures (e.g. OECD, UN, academic) 3. Discussion and referrals from international experts, Client, Consultant networks 4. Identification of Expert Reviewers for each Case Study subject for review of Draft material 5. "Triangulation" of data from alternative sources based on thematic review.
6	Consistency of application in data collection	1. Single principal investigator to ensure data collection consistency
7	Information sources described and appropriate for study purpose.	1. All published sources cited 2. All informed expert material cited 3. Potential source-bias examined, assessed and described

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C. Data Analysis		
8	Data analysis methods described and appropriate.	1. Comparison of multiple data sources for consistency 2. Review of Draft material by Expert Reviewers for each subject 3. "Triangulation" of data via explanation (story) building and thematic review
9	Interpretation difficulties described and resolved.	1. Discussion of unknown, confidential or censured data, and implications for study completeness 2. Discussion of possible bias in data and reporting 3. Discussion of ambiguous or uncertain findings or interpretation
10	Other studies/results reviewed and reconciled.	1. Discussion of all relevant studies and results contradictory or not supportive of main findings 2. Identification and discussion of alternative interpretations
D. Reporting of Findings		
11	Methodology strengths and limitations described.	1. Limitation of analysis discussed 2. Weaknesses of data discussed
12	Issues identified and fairly considered pro/con	1. Issues, topics for further research identified 2. Limitations on interpretation discussed
13	Explanatory and influencing factors discussed with method of determination described	1. Contextual factors identified and discussed. 2. History, politics, opposition, problems of PPP subject discussed. 3. Potential alternatives to PPP model selected discussed.
E. Impartiality and Generalizability		
14	Proper safeguards to ensure competence and impartiality of observer/analyst	1. Initial bias and prior expectations/hypotheses of principal investigator discussed 2. All data sources and opinion of Expert Reviews and Client assessed for possible bias
15	Draft report subjected to comments/review	1. Draft material subject to Expert Reviewers for each Case Study subject 2. Draft Report subject to Client review and comment
16	Adequate information to assess generalization and their limitation	1. Qualifications to findings disclosed 2. Alternative interpretations discussed

Annex 3: Definitions

There are several bases of defining and characterizing private sector involvement in transportation infrastructure. Some of these focus on the financial, legal, functional aspects of the public-private relationship.

The OECD Terms of Reference follows a "financial/legal" approach and suggests a typology which focuses attention on the funding source and nature of contractual undertaking, and includes:

a. Off budget, public sector mechanisms (*i.e.* specialized agencies with borrowing power, state run enterprises, etc.).
b. Mixed-funding mechanisms (*i.e.* involving the participation of both public and private capital).
c. Concessions (*i.e.* infrastructure is leased for a fixed period to a private organization, which manages it on a commercial basis).
d. Build, Operate, Transfer (BOT) mechanisms (*i.e.* a concession is awarded to a private organization to finance, build and operate tolled infrastructure during a limited period).
e. Build, Own, Operate (BOO) mechanisms (*i.e.* a private organization finances and builds infrastructure, which is owned, tolled[69] and operated for an unlimited time).

The UK in its Private Finance Initiative (PFI) uses a vocabulary based on a "functional" approach focuses attention on the functions performed and risks undertaken, and includes:

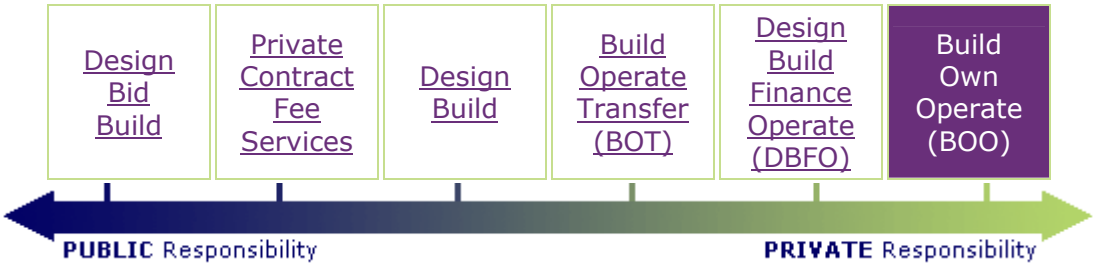
f. Design-Build (DB) also called "competitive contract tender", focuses on fixed price, output-based contracting for infrastructure, relying on conventional public (debt) financing. It should be remembered that there is always private "bridge" construction financing of the contractor, to manage cash-flow between the "lumpy" progress payments by the public buyer. In this form, the full cost (less "hold-back" for warranty purposed) is paid to the contractor upon completion – and is not matched to facility use.
g. Design-Build-Operate (DBO) relies on conventional public (debt) financing, with the contractor receiving payment for construction (as in DB) and a subsequent fixed-price output-based operations and maintenance (O&M) contract for operations. (*i.e.* sometimes linked to traffic use, or for lane-availability).
h. Design-Build-Finance-Operate (DBFO) as above, but relies on private finance for construction, with the public payment linked to output over the life-cycle of the asset for a fixed period of time, often linked to linked to traffic use, or for lane-availability. Generally, a DBFO=BOT project. The tolls (i.e. payment by public sponsor) to private provider may be derived from real tolls imposed on motorists (e.g. Spain) or shadow tolls paid by the public sector (e.g. UK).

Several agencies have attempted to portray the various PPP models along a continuum that ranges from "public sector ownership" of infrastructure acquired through traditional or conventional procurement (i.e. design-build under a cost-plus contract, with a high degree of process interaction between the public client and private contractor resulting in frequent design

[69] Note: For the purposes of this project, "tolling" could include shadow tolls.

amendments/changes that necessitate contract price increases) to "private sector ownership" of infrastructure through privatization (perhaps with economic regulation of rates of return or capital base).

These typically show the PPP (e.g. DB-BOT-DBFO) models in the middle of the continuum:



Source: US-FHWA http://www.fhwa.dot.gov/ppp/boo.htm

The US-FHWA website for PPP presents a continuum with the following definitions:

Design-Bid-Build (Conventional)

Invcolves segregation of design from construction responsibilities by awarding them separately to an independent private engineer and a separate private contractor.

Private Contract-Fee Services

Involves transferring responsibility for services typically performed in-house by the public sector e.g. Operations & Maintenance (O&M), Program & Financial Management (P&FM) under a fee-for-services contract, following a competitive process where the winning private sector proposal is based on best value, reflecting both price and technical qualifications.

Design-Build (Fixed Price)

Involves a fixed-price contract for architectural/engineering services and construction to a single firm, consortium, joint venture or other private sector entity assembled for a particular project.

Build-Operate-Transfer (BOT)

Involves an integrated partnership combining the design and construction responsibilities of design-build procurements with O&M (i.e. jointly a Design-Build-Fixed Price and a Private Contract-Fee Service) of a single facility or group of assets to a private sector partner. This project delivery approach is known by a number of names, including "turnkey" procurement, BOT, and DBOM (Design-Build-Operate-Maintain). Bundling of build-operate allows for "whole-of-life" design efficiencies (e.g. building to higher initial construction standard to reduce ongoing operations costs). The asset reverts to public ownership (i.e. it is a form of "asset-lease" arrangement)[70].

[70] The US-FHWA definition does not refer explicitly to private financing. The EU (2003) maintains a similar differentiation of BOT-DBFO, with the former financed and owned by the public sector during the contract (why the

Design-Build-Finance-Operate (DBFO)

Involves an integrated partnership combining designing, building, financing and operating are bundled together and transferred to private sector partners. The additional element (for the US-FHWA) is the use of debt leveraging revenue streams based on tolls, lease payments, shadow tolls, vehicle registration fees etc. These may be supplemented by public sector grants in the form of money or contributions in kind, such as right-of-way.

Build-Own-Operate (BOO)

Involves the granting of ownership rights in perpetuity to develop, finance, design, build, own, operate, and maintain a transport asset. The private sector owns the asset outright and retains the operating revenue risk and all of the surplus operating revenue in perpetuity. Unlike the above forms of procurement of a public asset, this involves asset privatization.

It would appear that the important distinction for the US-FHWA between BOT and DBFO comes down to the relationship of payments to *outputs* (e.g. usage) in the case of DBFO, whereas payments under BOT need bear no relationship to facility usage and are based on *inputs*. This is important in terms of risk-transfer as it highlights traffic risk assumption (which is always with the public sector under this definition of BOT, and which may be with the public sector for DBFO-shadow tolls, or with the private sector with DBFO-real tolls.

An unfortunate aspect of the nomenclature is that the "F" (i.e. private finance) is equally an aspect of BOT, so the distinguishing characteristic between BOT and DBFO is not highlighted in their respective names. It may be useful to highlight this by referring to BOT-***input*** and DBFO-***output.***

The US-FHWA definitions of BOT/DBFO may involve a useful distinction to maintain in this study, provided that the (somewhat) restrictive definition of BOT is accepted. However, most of the commonly referred to BOT-projects involve toll revenues which base the payments to the private sector on asset usage, and which (in the typology above) should be properly referred to as DBFO-projects. If the US-FHWA restrictive definition of BOT is not accepted for use in this study, then the distinction between BOT and DBFO collapses and these terms have no substantive difference. Usage would solely be a matter of preference.

Most of the successful examples in this study will be BOT/DBFO, with various shades of colour depending on the specific nature of the contract process, concession agreement, financing, and risk assumption undertakings. Appropriately, this study should focus on identifying the differences between various successful projects, rather than on attempting to draw unnecessary classification differences.

"O"?), and the latter financed and owned by the private sector during the contract. Under the US-FHWA/EU definitions, most of the European examples of PPP would be DBFO and not-BOT.