

Observations on PPP Models in the Ports Sector

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Abstract

The purpose of this paper is to set out the key characteristics of PPPs in the ports sector, so that they can be compared with those of PPPs in other modes of transport. In an attempt to get away from case-by-case descriptions, it has been based on a cross-sectional analysis by the author of over 400 container terminal concessions. This attempt to discover what constitutes the "norm" in port PPPs, and whether PPPs which are exceptions to the norm have themselves any underlying features in common.

Observations on PPP Models in the Ports Sector

1. Introduction

This paper summarises the key characteristics of the most common PPP models in the ports sector, and makes some broad comparisons with other modes of transport. It also points out a number of significant differences between countries in their choice of PPP models, in an attempt to identify some of the cultural factors which have influenced public-private partnerships.

The paper tries to avoid traditional short-hand terms for describing PPPs like BOO, BOT etc, as there are many variants within these arrangements, and the terminology is interpreted differently in different parts of the world. Instead it tries to develop an alternative approach based on key clauses in PPP agreements such as those governing obligatory/permitted activities, concession duration, exclusivity, investment, regulation etc which allow PPP arrangements to be compared at a finer level of detail.

2. PPP Models in the Ports Sector

Most PPP models in the ports sector sit within a landlord port structure in which a public sector port authority (often autonomous) enters into PPP contracts for a series of individual terminals. The operators of the terminals are usually, but not always, different, and the PPP model used may differ from one terminal to the next. The role of the port authority is to provide and manage common facilities like the breakwater and entrance channel, utilities and road and rail access; to regulate the individual PPPs; and to plan and implement the expansion and development of the port.

The most common PPP models for individual business units are:

- **The management/investment model for existing public assets:** The private operator manages publicly owned assets and makes additional investments in them, in exchange for being given the right to use them for a specified period of time. Ownership of the public assets remains with the public sector throughout this period; privately-funded fixed assets are usually (but not always) taken into public ownership immediately after construction, whilst privately-funded mobile assets such as mechanical equipment usually (but not always) remain in private ownership.

This is reflected in the “transfer-back” arrangements at the end of the contract period, when the right to use the assets (now a mixture of public + privately-provided) reverts to the public sector, which may then re-assign them to another operator. Various arrangements exist for compensating the private operator for the residual value of any investments made during its period of tenure. For fixed assets “no compensation” transfers are probably still the most common. Mobile assets paid for by the private operator, in contrast, can usually be withdrawn or sold-on to the public sector, reflecting assumptions about ownership which are either explicit or implicit in the contract.

This type of PPP model is generally associated with the port privatisation programmes which have taken place since the late 1980s in southern Europe, South America, Africa and South Asia.

- **The development rights model for new private assets (BOT).** Here the private investor buys the right to build new port assets and have exclusive use of them for a fixed period of time before transferring them over the public sector. This is a model which has been increasing in popularity in the ports sector as the stock of public assets suitable for private management has dwindled. However it raises the question of why private investors should have to give back their assets to the public sector, often free of charge, when a hotel complex built on the same waterfront site would be treated as freehold property.

One of the surprising things about the ownership structure of the ports industry is how few freehold private ports there are. There are freehold captive user terminals, usually part of vertically-integrated mining, agricultural or forestry enterprises, but common user terminals and multi-purpose ports are – with a few exceptions – concentrated in the UK and Turkey, both competitive free market business environments with long coastlines and lots of ports.

There seem to be four main reasons why the BOT model prevails over the private freehold model:

- The Latin legal tradition that the seabed up to the high water mark belongs to the State, and cannot be transferred irrevocably to any private enterprise. This has been a very important concept in Latin American port development.
- The high costs of shared infrastructure such as breakwaters and dredged channels, which need to be partially recovered from the shore-based terminals which benefit from them, as well as from ships. BOT contracts give public port authorities a continuing claim on terminal revenues/assets which would not be possible if freehold terminal development was allowed.
- The limited number of sites which are suitable for port development in some countries. Here the State may seek to retain a permanent stake in their development for strategic or monopoly profit reasons, without putting up any of the necessary investment. Road and rail schemes, in contrast, may have fewer locational restrictions.
- Safeguarding of the value of State-owned ports, in the face of competition from lower cost private freehold sites. This is apparent in the current arguments in Brazil between the operators of recently privatised public ports (grouped together as ABRATEC) and the developers of new greenfield sites at Itapoa and Santos, which has resulted in government intervention to halt the greenfield developments on “unfair competition” grounds. In this context, BOT schemes can be used to ensure that ports compete under conditions established by governments rather than markets.

This type of PPP model is associated with greenfield site developments in many different countries, but has been particularly important in N.W Europe where there is a long-established landlord port tradition.

- **The public-private joint venture model.** In this, the public sector has an influential or controlling stake in the Special Project Vehicle (SPV) which is set up to hold either a management-investment contract or a development rights contract for new port facilities. These contracts otherwise operate broadly as described above, although the existence of a large public sector stake in the SPV has a significant effect on the detailed provisions of the contract, as described later.

This type of PPP model has become the norm in China and Indonesia, but is rarely found elsewhere.

Management contracts, where the private sector operates port facilities on behalf of the public sector with minimal investment of its own, are now quite rare. This is partly because they generate small returns in relation to the inputs of relatively scarce management time required. There is also a history of failure caused by conflicts over strategy, usually arising when private operators are not given the freedom they need to satisfy public sector objectives for the contract.

Short-term leases of public assets of up to 15 years, often renewable, are more popular than management contracts because they give the operator greater commercial freedom. However they tend to be concentrated amongst:

- Small, slow growing sub-sectors of ports which are experiencing limited technological change, such as general cargo berths.
- Dedicated berths for the exclusive use of a single shipping line, where they are used as a means of locking-in key customers. These usually have ample spare capacity, and so require little private investment.
- Specific countries such as Japan whose port ownership/operating models are highly fragmented and now regarded as rather archaic.

3. Defining Characteristics of PPP Models in the Ports Sector

The main characteristics of PPP models in the ports sector can be defined in relation to eight policy issues: activities, investment, contract duration, exclusivity, performance requirements, labour, tariffs and concession fees. These are discussed in the sections which follow, which focus on container terminals, the sub-sector which has generated the majority of PPP agreements, and the only one for which large amounts of information have been published.

3.1 Activities

Most port PPPs impose strict limits on what private operators are allowed to do, usually in terms of the types of cargo they are allowed to handle. Intended to encourage efficiency through specialisation, this also protects the interests of the other private operators, and maximises the value which the port authority can extract through the creation of local monopolies.

Two other common limitations on PPP activities are the separation of cargo handling from marine services, and the design of PPPs on a terminal rather than a whole port basis.

Cargo handling activities have traditionally been separated from marine services (pilotage and towage). The latter enjoy significant economies of scale, and ports which can support several terminal operators are often unable to support more than one marine service provider of each type. Safety & security issues have led to the desire to keep marine services in the public sector or outsource them to a single operator of good reputation. Finally there has been concern that allowing terminal operators to provide their own tugs and pilots would lead to the bundling of port services in a way that might encourage anti-competitive behaviour.

The introduction of additional marine service providers in ports such as Hamburg, Rotterdam and Le Havre has begun to define the limits of these economies of scale more clearly, and this is leading to some PPP schemes which allow cargo handling companies to provide their own marine services. Although this is still very limited in extent, it may increase in importance as ports and terminals become larger.

The level of specialisation found in ports is not replicated in other modes of transport, and is one of the reasons why ports have entered into PPPs on a terminal rather than a whole port basis. Although some whole ports have been privatised on a PPP basis (e.g Port Sultan Qaboos in Muscat) these are mostly small.

The main reasons for the focus on terminals rather than whole ports in PPPs are::

- Variations in the profitability of different types of port activity. Most PPPs are for container terminals (usually the most profitable component of a port) or captive user bulk terminals linked to vertically integrated supply chains. There are plenty of specialist private operators in these two areas, but far fewer companies willing to take on multi-purpose ports as a whole.

- The reluctance of Governments to “let go” of ports, which are often seen as strategic assets and/or cash cows. The landlord port structure which sits above the terminal PPPs allows private sector efficiency and investment to be combined with continuing public sector control and a regular income flow.

3.2 Investment

The private investment requirements associated with PPP contracts may be either:

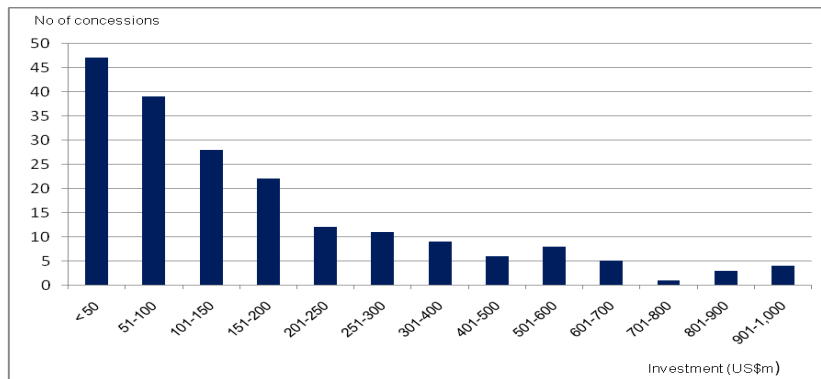
- Obligatory - clearly specified, with an agreed time schedule.
- Event-triggered – usually a requirement to increase capacity once berth utilisation reaches a certain level, with the form of the investment either pre-specified in the PPP or left to the operator’s discretion.
- Indicative – a broad programme agreed in advance but subject to change as the PPP progresses.
- Discretionary – left to the private operator on the understanding that investment will take place when necessary. Sometimes the PPP includes an estimate of expected investment costs over the life of the contract for benchmarking purposes.

Obligatory investments are most common in competitively-tendered PPP projects in countries which have problems with corruption, as pre-specifying the investment schedule increases the transparency of the bid evaluation process. It also makes the investment programme legally enforceable. Obligatory investment programmes are included in other PPPs when the investments are urgently required, and/or there is a single technical solution available.

Experience has shown that obligatory investment programmes lasting more than five years are rapidly overtaken by technological and market changes, and unless renegotiated lead to investments which are not really needed and costs which are higher than they should be. They have therefore been largely replaced by indicative investment programmes which can be modified by mutual agreement. This creates a less confrontational atmosphere between the PPP partners, encourages innovation, and ensures that the majority of investments are commercially justified.

There are large variations between PPPs in the total amounts of investment required – even for terminals of similar sizes and types – and in the split of responsibility for this investment between the public and private partners.

Figure 1 Size of Private Investment Requirement in Container Terminal Concessions (US\$m)



Source: Data compiled by the author. Figures relate to 195 concessions for which there is published information on investment requirements.

There has been a steady increase over time in the average amount of private investment required, which has been recovered through extensions to the concession period rather than increases in the tariffs charged to port users or reductions in the concession fees paid to the port authority/Government.

Table 1 Relationship Between Private Investment in Container Terminals and Concession Duration

Date of award of concession	1990-95	1996-2000	2001-05	2006-10
Private investment (US\$m)	182	126	184	306
Average concession duration (years)	27.2	25.2	29.7	31.6
No. of concessions in sample	28	48	47	45

Source: Data compiled by the author. Figures relate to 168 concessions for which there is published information on investment requirements and concession duration

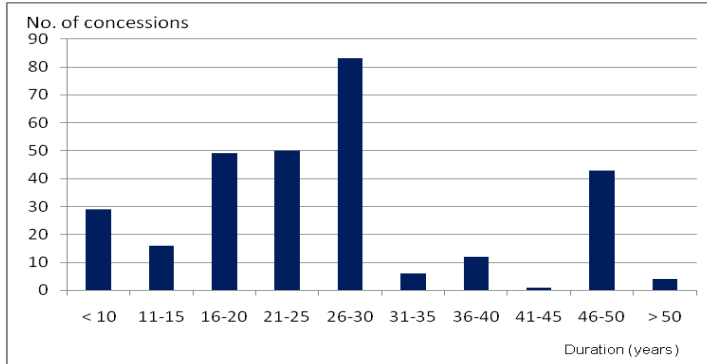
The increase in private investment requirements in container terminals can be attributed to several factors, including:

- The shift from brownfield to greenfield concessions as the best privatisation opportunities have been used up. Greenfield PPPs are much more capital intensive than brownfield PPPs, where most of the investments have already been undertaken by the public sector.
- Larger increases in traffic each year, technological change and shipping industry concentration have increased the scope for economies of scale in terminal operations, resulting in new terminals which are significantly larger than old ones.
- A high proportion of the new terminals are being built in China, where there is a preference for large PPP projects.
- Transfer of responsibility for basic infrastructure investment from the public to the private sector, as public sector budgetary constraints have moved the boundary line between public and private investments in ports.
- Investor confidence after a long period of high growth in container traffic, which had – until the onset of the recession – made it relatively easy to obtain debt funding for large projects.

3.3 Contract Duration

The initial duration of container terminal concessions, before allowance for renewal options or negotiated extensions, is shown in Figure 2. Around two-thirds are for 20-30 years. The distribution is not symmetrical, as there are relatively few concessions of 31-49 years duration, and a secondary “spike” at 50 years caused mainly by the large number of 50 year JVs negotiated in China.

Figure 2 Duration of Container Terminal Concessions (years)



Source: Data compiled by the author. Figures relate to 293 concessions for which there is published information on duration.

Around 15 % of container terminal concessions include renewal options. In addition around 5-6% of concessions have already been extended by mutual agreement. If options and extensions are taken into account, the average concession duration increases by 10% from 27 years to 30 years.

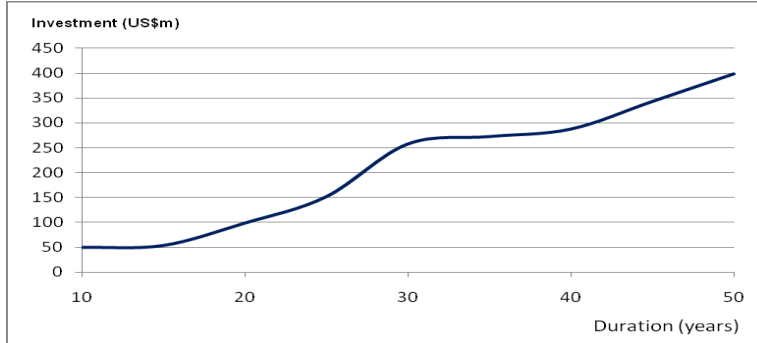
There are significant geographical variations in concession duration:

- The Middle East and NE Asia (Japan, Korea and Taiwan) are the regions with the highest proportion of short term concessions (up to 10 years). In the case of the Middle East this may be due to the way the ports industry developed during the construction boom of the mid-1980s, with a high reliance on expatriate management contractors such as Grey McKenzie and Sealand. In the case of NE Asia, it reflects the continued use of the asset leasing model, although this is now changing in favour of concessions which include private investment.
- Concessions in China are dominated by 50 year contracts, reflecting:
 - the continuing involvement of the port authority through JV agreements
 - a cultural preference for long term relationships.
- Individual countries at particular periods of time seem to settle on preferred contract durations and then apply them to all PPP projects, irrespective of their economic fundamentals (copy-cat concessioning).

There is a clear relationship between concession duration and investment requirements when the data are highly aggregated. This can be seen by comparing the average investment associated with container terminal concessions of different duration in Figure 3. However there is considerable variation in the investment required in concessions of similar duration, so the correlation between investment and contract duration is low ($r^2 = 0.37$) when based on individual terminals rather than size bands.

There are no examples in the ports sector of PPPs in which investors are allowed to propose their own concession duration, or in which the concession lasts only until the costs of the original investment have been recovered and an agreed profit margin earned, as occurred in some of the early road and bridge PPPs.

Figure 3 Relation Between Container Terminal Concession Durations and Investment Requirements



Concession duration (years)	Up to 10	11-15	16-20	21-25	26-30	31-40	Over 40	Average
Investment (US\$m)	49	52	98	151	257	287	398	212
No of concessions	(8)	(10)	(36)	(34)	(45)	(11)	(26)	(170)

Source: Data compiled by the author

Economic logic suggests that concession duration should be linked not only to investment costs but also to the breakeven period required to recover these costs, and the rate of return required by private operators. This has been studied using financial models of container terminals by Theys and Notteboom [1]. It is not possible to make a precise comparison between their theoretical results and the empirical findings in Figure 2 as insufficient information is available on the tariffs and operating costs of the terminals involved. However the general impression gained is that real-life concession periods are longer than would be predicted by the Theys & Notteboom model, and less regularly distributed. Why does this occur?

Five main explanations can be put forward:

- **Asymmetric risk.** Most port authorities are “failure averse” rather than “risk averse”. For port authorities the “worst case” scenario is often that of no bidders turning up, whilst the second worst scenario is that of the private partner requesting a major restructuring of the agreement part way through. So there is a tendency to add a few extra years onto the concession period just to be on the safe side.
- **Recovery of “soft” investments** in marketing, training, IT systems etc. These are rarely included in investment costs, yet absorb a lot of senior management time for which compensation is required. The concept of “intangible” investments is rarely encountered in discussions of port PPPs, although it is a common item in the balance sheets of private port operators.
- **Continuity of employment.** Short duration PPPs create considerable uncertainty for the workforce, which in ports is often highly unionised and resistant to PPPs. Longer concessions provide more incentives for operators to invest in the labour force, as well as offering greater continuity of employment.
- **Transaction costs.** Private operators’ bidding costs can easily reach US\$ 1.0m even for a fairly simple concessions, and the port authority’s costs, which are less obvious, may be a lot higher.
- **Reduction in Government interference.** Short concessions increase the scope for government interference, whether this is through changes in the terms and conditions of the PPP contracts each time they are renewed, or pressure on the operator to adapt (at its own cost) to unforeseen policy changes in order to improve its chances of contract renewal. This has been one of causes of the decline in popularity of 10 year management contracts.

3.4 Exclusivity

Exclusivity - monopoly rights over the provision of a specified port service for a fixed period of time or until traffic reaches a certain level – was a common feature of early port PPPs, but has become less prominent due to acceptance of the inevitability of competition, increased investor confidence in the PPP process, and the fine-tuning of other clauses in PPPs to reflect the needs of small, marginally viable projects.

3.5 Performance Requirements

Port authorities generally support the view that PPP agreements should include legally enforceable performance targets, even though it is difficult to define meaningful targets which fully capture customers' requirements. What is regarded as essential by one customer may be seen as no more than "nice to have" by another.

Some key customer requirements – for example "flexibility", "early notice" or "faster document processing" – are difficult to quantify or affected by factors outside of the terminal operator's control such as Customs working hours or delays in ship arrivals. So the inclusion of productivity targets in port PPPs has been restricted to bland and fairly easy to achieve targets such as gross or net handling rates (TEUs per crane-hour or ship-hour) and has generally been declining.

Two performance requirements have been increasing in importance, however: minimum guaranteed throughputs, and environmental targets linked to greenhouse gas emissions.

3.6 Labour

Labour is a sensitive issue in port PPPs because many existing terminals are still substantially overmanned, and exposed to restrictive working practices. Strong unions have often resulted in wage rates which are well above those paid for comparable skills in other sectors, and there are still cases of nepotism in the reservation of jobs for family members.

Labour transfer arrangements have been particularly important in the management/investment model, where private operators take over the workforces employed by their public sector predecessors. They are less important in the BOT and JV models, although these types of PPPs also try to avoid disturbing labour relations.

One of three main approaches is normally used when transferring an existing labour force into a PPP:

- The port authority or Government undertakes a major labour force restructuring in advance of the PPP, so that the staff transferred to the private operator are broadly in line with its requirements.
- The pre-PPP workforce is transferred to the private operator, who must retain it for a specified period of time before reducing it through natural attrition or voluntary redundancy schemes. In this situation, private operators are usually allowed to make gradual changes to the terms and conditions of employment, providing these are no worse than before and/or are acceptable to the unions or workers' representatives.
- The private operator is given complete freedom to hire and fire, and to set its own terms and conditions of employment. This is quite rare in brownfield PPPs but is becoming more common in greenfield PPPs, particularly those which are physically distant from existing port operations.

Private operators are rarely allowed to undertake compulsory redundancy schemes, but the rapid growth in international trade has absorbed a lot of surplus labour, reducing the need for redundancies.

3.7 Tariffs

There is a fundamental distinction between PPPs which are free to set their own tariffs, and those whose tariffs are regulated, either by a formula within the PPP agreement or by the port authority or an independent regulator. Unregulated tariffs are found in areas where there is a lot of inter-port or intra-port competition, regulated tariffs where geography, traffic volumes and/or terminal specialisation create natural monopolies.

Unlike toll roads whose tariffs are precisely defined, tariff regulation in ports usually takes the form of tariff ceilings which are not to be exceeded for individual shipments or – more rarely – in aggregate. This reflects the political hope that over time tariffs will draft downwards below the ceiling in response to competition from other ports; this sometimes happens, but many tariffs remain close to the regulated maximum.

The main cause of any downward drift below the tariff ceiling is customer discrimination i.e the offering of discounts to customers who have the option of going somewhere else. Although most PPP agreements in the ports sector contain clauses prohibiting discriminatory treatment of customers, customers are so unlike in their requirements that it is quite easy to differentiate between them and justify different tariffs on economic grounds.

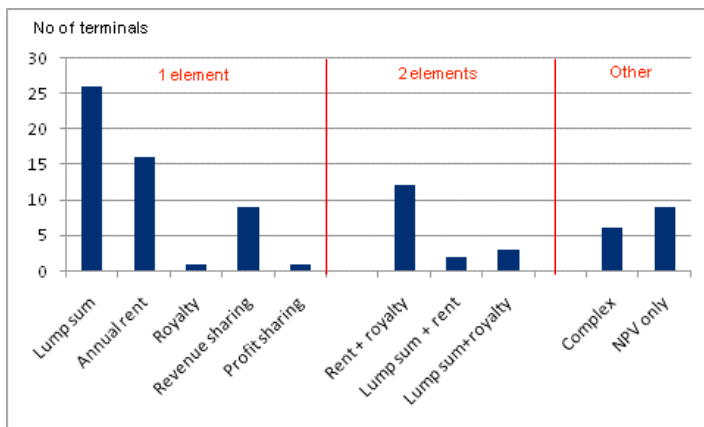
The level of customer differentiation which exists in the ports sector, and terminal operators' knowledge of their customers' business strategies, are both much larger than in road and rail PPPs, although similar scope for customer discrimination may be found in the airports sector.

3.8 Concession Fees

The structure of payments made for the right to operate a PPP may also differ by mode of transport. In the ports sector a wide variety of mechanisms is used, varying from lump sums through annual rents and throughput-related royalties to revenue sharing agreements. Some PPP agreements combine these elements into more complex payments structures designed to share risks more equitably.

There are at least 85 container terminals with published data on concession fees. Of these 60% have a simple fee structure (one mechanism only), 20% use two payment mechanisms in combination (usually rent + royalty), whilst 20% have a more complex fee structure or publish only the expected level of fees (usually as an NPV), not their structure

Figure 4 Concession Fee Structures for Container Terminals



Source: Data compiled by the author

In general:

- **Lump sum** payments are the most common mechanism in competitively-tended concessions, partly because of the popularity of terminal auctions in South America.
- **Annual rents** are most important in ports which have a property-oriented culture, are extremely risk averse, or wish to do not more than recover the costs of port infrastructure. Rents are a particularly common form of payment in negotiated – as opposed to competitively tendered – concessions, as they can be benchmarked against near by commercial properties or set using an administrative formula linked to the taxable value of the land.
- **Royalties** are a popular way of sharing the benefits of traffic growth, but expose the port authority to increased commercial risks if – for reasons beyond its control - there is a downturn in traffic.
- **Revenue** sharing was first introduced on the Indian sub-continent, and is also common in the smaller ports in the Philippines, but is now spreading into complex fee structures as a way of protecting port authorities against inflation risks. Conflicts of interest arise when revenue-sharing port authorities also regulate tariffs.
- **Complex fees** with more than two elements allow the flow of fees to be more closely tailored to the terminal's cash flow. They are usually associated with a fairly sophisticated approach to risk sharing elsewhere in the PPP.

In the ports sector the size of the concession fee offered is probably the most important single criterion for selecting the private sector partner. This may be because the design of most terminals is fairly standard, with limited scope for innovation (container terminals now have almost the status of a “commodity”); the bidders are usually well known international terminal operators or shipping lines, or prominent local businesses capable of providing a similar standard of service; or the port authority wishes to use the PPP process to capture for itself some of the “economic rent” associated with container terminals.

Private investors bidding for individual terminal concessions have widely differing views about their value, and the proportion of that value they are prepared to hand over to their public sector partners. A review by the author of 14 container terminal concessions which attracted a total of 41 bids showed that although 20% of losing bids were within 20% of the winning bid, the “worst” 20% of the losing bids were more than 70% below the winner.

4. Conclusions

This paper focuses on the issues to be discussed in AWG1 (how does national culture affect PPPs?) and AWG2 (how does mode of transport affect PPPs?). It concludes that in the ports sector in general, and container terminals in particular:

- National culture has a striking impact on choice of PPP model in China and one or two other countries, and also affects a few details of the PPP agreement, most notably duration. However the majority of countries use standard international PPP models which reflect the economic fundamentals of the projects, although they have a tendency to “copy cat” individual clauses from one agreement to the next without taking into account differences between projects.
- Mode of transport is an important determinant of PPP model. The primary distinction is between links (road and rail) and nodes (ports and airports). The detailed information included in this paper is intended to stimulate a debate about the similarities and differences between ports and airports as nodes, before comparing “nodal” PPPs with those designed for links.

References

[1] Theys.C and Notteboom.T *The economics behind terminal concession durations in seaports*, IAME Conference, Copenhagen 2009