TIED SUPPLY CHAINS IN CONSTRUCTION PROJECTS: LESSONS FROM LONDON UNDERGROUND'S PUBLIC-PRIVATE-PARTNERSHIP

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This paper addresses the lessons learnt by London Underground (LU), the public sector contracting authority, when a tied supply chain arrangement, namely where shareholders are also commercial beneficiaries from sub-contracted delivery, was utilised by a consortium to upgrade its system under an innovative Public-Private-Partnership (PPP) model. Research on tied supply chains and their application in PPP agreements is significantly under reported. The paper sets out insights from industry using secondary sources, which include parliamentary reports and reviews. The paper postulates that different models of tied supply chains might exist, from those that rely on some form of equity structure to those that rely only on the collective reputation of the supply network. Five lessons learnt from the contracting authority's perspective are highlighted on the use of tied supply chains in PPP contractual arrangements. Whilst tied supply chains can be effective, they are better utilised in PPP contractual arrangements where there is certainty with the scope of works and required resources. During the bid evaluation stage the contracting authority must evaluate whether prospective bidding consortiums have satisfactory governance arrangements at Board level and across its tied supply chain. Furthermore, the contracting authority must include governance safeguards within the contractual documents and strictly regulate the tied supply chain to prevent failure. This paper provides a new insight into tied supply chains and their governance with respect to Public-Private-Partnership models, and other forms of procurement.

Keywords: governance, procurement, public-private partnership, tied supply chain.

INTRODUCTION

Public Private Partnerships (PPP) were introduced into the United Kingdom (UK) in the Conservatives' autumn 1992 statement, once privatisation of public sector assets had been exhausted (Gannon 2006). In the period 1992 to 2009, PPPs in the UK accounted for approximately £65bn worth of capital expenditure (HMT 2010a), represented 67% of all European PPPs by number (899 projects) and 53% by total value (Kappeler and Nemoz 2010). The UK's extensive use of PPPs has been primarily motivated on political-economic grounds (Gannon and Smith 2010). The most complex and controversial PPP undertaken globally was the partial privatisation of London Underground (LU).

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LU's £15bn PPP was shrouded in controversy, attracting significant opposition from The House of Commons Transport Select Committee, Greater London Authority's (GLA) Mayor Livingstone, leading academics and industry think tanks (Gannon 2006, 2010). The then Labour government, who initiated LU's PPP funding policy in March 1998, steered the project through multiple project reviews and two judicial reviews, eventually signing two contracts with the Metronet consortium and one with the Tube Lines consortium (Gannon, 2010). Four years into the contract Metronet's performance had been heavily criticised by the GLA's Transport Committee (GLA 2007) and in July 2007 went into administration with assets reverting back to the public sector a year later. Metronet's inadequate governance structures and tied supply chain arrangements were reported by the NAO (2009) as the main cause of failure. The subsequent collapse of Metronet resulted in an estimated loss between £170m to £410m to the UK tax-payer; and £540m to consortium shareholders (NAO 2009).

Traditional buyer-supplier governance forms for projects, based on adversarial relationships that emerge from competitive tendering, are often deemed to be wasteful (Eriksson, 2010, Hartmann and Caerteling 2010). Development of a governance structure, supported through appropriate mechanisms, for dynamic and temporary construction supply chains has led to governments' trialling different approaches. One innovative approach for government sponsored public projects is the development of self-regulating networks of organisations governed through rules they fix to achieve common action which also determine responsibilities and commitments of the individual company (Dunn-Cavelty and Suter 2009). Tied supply chains are an example of a self-regulating network established by the private sector in response to the government's requirement to deliver major investment in the UK's infrastructure. Tied supply chains are defined as a network of shareholders who are also the main suppliers to a project (NAO 2004). In a PPP context, this can occur where the equity shareholders of the consortium are the main suppliers 'tied' into receiving and delivering works to the contracting authority. This structure introduces a hierarchy into the tied supply chain, those that are equity shareholders and those that are bound by commercial gain linked to their own and supply chain reputation. In practice tied supply chains have merits in delivering efficiencies, security of supply, price certainty and knowledge retention for a traditional PPP.

Christopher (1998:19) defines an integrated supply chain as a 'network of connected and interdependent organisations mutually and co-operatively working together to control, manage and improve the flow of materials and information'. Integration is the extent to which separate organisations work together, in a co-operative manner, to derive mutually acceptable outcomes (O'Leary-Kelly and Flores 2002). Within an integrated tied-supply chain the network consists of interdependent and interconnected organisations acting both as suppliers and buyers working towards a common outcome. The danger is that governance structures involve judge, jury and executioner arrangements within the same umbrella organisation. In this context, the Special Purpose Vehicle (SPV), set up to act as the overall co-ordinator of the supply chain in a PPP, and typically involving some form of equity sharing amongst key stakeholders that will also be delivering the work, acts in the form of a supply chain broker (Male 2005). Hence, there are potential conflicts of interest inherent within this model, in that the SPV acts as a surrogate client of the supply chain, who it in turn has both selected and won the contract on the basis of the networks' collective reputation. Additionally, it can also be argued that a tied supply chain occurs where a collaborative form of procurement arrangement sets up a network structure under a

Framework arrangement. Here, the collective reputation of the supply chain, when chosen by a 'supply chain leader' or 'supply chain broker' (Male 2003) and who determines those firms included or excluded from the network, creates potentially different models of tied supply chains. For example, one type of model could exist where there is some combination of equity structure and collective reputation; through to another model that relies only on the collective reputation of the supply network, and where the lead supply chain leader or broker wins work under repetitive bidding structures such a Framework arrangement on behalf of the supply chain. The key issue is the nature of what constitutes the tied element, for example, collective reputation for commercial gain, equity relationships alone, or a hybrid, together with the duration of that relationship – short, medium or long term. It can be argued that Prime Contracting creates a form of reputation-based medium-term tied supply chain, whereas PPP creates a reputation and equity based long-term tied supply chain relationship where return on investment, commercial gain and reputational risk are important drivers.

Literature relating to tied supply chains and their application within a PPP context is significantly under reported. This paper addresses this gap through a combination of industry insight and the empirical investigation of the experiences of LU, the contracting authority, across an innovative tied supply chain structure implemented by the Metronet consortium. The paper closes with final observations and concluding remarks, also postulating an embryonic model for understanding tied supply chains.

LONDON UNDERGROUND'S PUBLIC-PRIVATE-PARTNERSHIP

Background

Two infrastructure contracts (BCV and SSL Infracos) were awarded to the Metronet consortium in April 2003 and one contract (JNP Infraco) awarded to the Tube Lines consortium in December 2002. The contract term was 30 years with three periodic reviews every seven and half years overseen by the PPP Arbiter; and was expected to attract £15.7 bn of investment over thirty years to LU with £9.7 bn (2002 prices) in the first seven and half years (NAO 2004). The PPP contract between LU and the Infracos (Infrastructure Companies) was comprised of a performance (bonus/penalty) payment mechanism to incentivise contractor performance. LU was charged an Infrastructure Service Charge (ISC) in return for a service delivered by Infracos. The PPP Arbiter, established under the GLA Act 1999, had a role to give direction and guidance on the price of work and disputes arising between contracting parties during each of the three review periods (PPP Arbiter 2010).

Metronet's Tied Supply Chain Model

The Metronet's legal, commercial, organisational and supply chain delivery structure was complex. First Metronet's Rail Companies comprised of two holding companies Metronet BCV and SSL Holdings Limited, each in turn comprising leading construction and construction-related firms each with 20% equity shareholdings: Atkins, Balfour Beatty, EDF Energy and RWE Thames Water. Second, each holding company had three further subsidiaries: Metronet Rail BCV/SSL Finance Limited, Metronet BCV/SSL Rail and Metronet Rail BCV/SSL Intermediate Limited. Third, Metronet effectively operated as a tied supply chain, comprising of Balfour Beatty, Atkins, Bombardier, EDF Energy and RWE Thames Water; and with each firm having a 25% equity shareholding (Atkins 2006). Finally, the Trans4m Alliance comprised Balfour Beatty, Atkins, EDF Energy and RWE Thames Water each with equal shareholdings (Atkins 2006).

Metronet Rail BCV/SSL was the main company through which refurbishment works were undertaken. Contract supply was arranged on an asset group basis: Rolling stock and Signalling supply delivered by Bombardier Transportation using a lump sum supply contract, Track with Balfour Beatty Rail Projects using a Schedule of fixed rates and the Trans4m Alliance was setup to deliver Station and Civil refurbishments using a target cost supply contract (Atkins, 2006). It is evident from these arrangements Metronet had not only a very close interconnectedness between firms that are equity partners / shareholders but also had responsibilities for ongoing service provision during the delivery phase.

Operational Performance

During the First Review Period Metronet's operational performance was reported by the GLA's Transport Committee as being mixed (GLA 2007); and it had during this period awarded itself 60% of the contract's capital expenditure (PPP Arbiter 2006). Whist rolling stock was operating successfully under a tied supply arrangement, track replacement and station and civil works operated in a situation where the tied supply chain was not effective. The main reason was that the rolling stock and signalling contract had an output based specification and certainty with the scope of works. Track, on the other hand, had variable volumes of work, with stations and civil works having input based specifications, but were less certain in terms of scope since asset condition was open to considerable uncertainty.

LESSONS LEARNT

Metronet's delivery response to LU's PPP contract outlined earlier utilised a tied supply chain, from which five lessons can be learnt. These will be discussed further below.

1. **Strict governance arrangements are essential across all the tied supply chain.**

Metronet's governance and leadership was reported a being poor, leading to inappropriate risk management and financial control across its tied supply chain (NAO 2009). Governance was particularly poor in the Trans4m alliance, dominated by shareholders who were suppliers for station and civil works. Decision-making power lay with the suppliers, demonstrating conflicts of interest, rather than with the Board of Metronet Holdings, who also lacked the independence, and, continuity at senior executive levels (NAO 2009). Halldorsson et al, (2007) have argued that tied supply chains conform to network theory as the interacting companies 'adapt their processes and systems to each other' to achieve the goals. However, Metronet's governance arrangements prevented its Board from capturing the issues that arose within its own tied supply chain, as conflicts of interest surfaced with suppliers, and, in the delivery of a complex programme of works in the first review period. Furthermore, the Department for Transport's (DfT) governance arrangements were also criticised for their 'hands off' approach to LU's PPP arrangement HMT (2010b).

2. **Ensure alignment of public and private objectives.**

The tied-supply chain governance model reflects a self-regulating network of organisations working towards a common, government-explicitly stated goal (Dunn-Cavelty and Suter 2009). However, Metronet's shareholders and its tied supply chain were not aligned with the objectives of LU and the PPP Arbiter. This lack of alignment in the supply chain was evident from deficiencies of reporting and the expected programme for upgrade of assets and performance specified within the

contract. The PPP Arbiter reported that the information from the Metronet consortium was not sufficiently detailed and had significant weaknesses. The main areas outlined by the Arbiter concerned delivery and cost information, and, explanations for variances related to claims (PPP Arbiter 2006). This deficiency of information further suggests difficulties in the review and management of the tied supply chain.

3. Necessity of benchmarking costs to assess future value for money.

The tied supply chain was criticised for its failure to deliver to a market discipline expected by a PPP (NAO 2009). By limiting the supply of services to the tied supply chain members, this created an inward looking consortium focused on achieving its financial returns rather than the efficiencies anticipated through a PPP mechanism. This, in turn, limited their ability to benchmark their own prices with a competitive market place and provide value for money to LU. This was in stark contrast to the Tube Lines consortium that tendered the majority of its works competitively.

4. Selecting the right contractual model.

LU's PPP contract was a combination of an output-based specification for rolling stock and signalling; and, input-based specifications for track, stations and civil works. Whilst the rolling stock and signalling contacts worked relatively well under Metronet's tied supply chain arrangement, it was unfortunate that track, stations and civil work did not. LU's PPP was unlike traditional PPPs where the scope is clearly specified and asset condition is known. Whilst security of supply is cited as one of the main advantages of the tied supply chain for the consortium and contracting authority, Metronet's tied supply chain was constrained by changing obligations in the case of stations and changing volumes of work in the case of track. A PPP contractual arrangement should not be used where a significant amount of the scope of work is unknown namely, the condition of the asset base, and especially on a large operation and complex environment such as LU's metro.

5. Verify and validate bid assumptions.

Two assumptions were made about Metronet by the PPP bid evaluation team that proved to be incorrect: shareholders within the consortium would prevent 'rogue behaviour' within the tied supply chain; and second, Metronet's lenders would enforce an effective financial discipline if required (TfL 2008). The public sector no longer has the technical ability to precisely define, contractually control and monitor ever increasing complex infrastructure projects. In other words, its informed or intelligent client role had a number of deficiencies (Aritua et al 2009, Aritua et al 2011). Further, this places considerable pressures early in the process on public sector organisations using this form of procurement approach (Aritua et al 2009). The Public Accounts Committee (PAC) added that the 'DfT was naive to expect lenders to exert strong oversight of Metronet's governance and financial health to protect their investment', especially when the UK government guaranteed 95% of lenders' risk (HMT 2010b). It is clear Governments do not have the specialised skills or resources required to ensure the level and degree of control necessarly for such complex undertakings and have to rely on external advisors (Dunn-Cavelty and Suter 2009). Retained in-house government knowledge to support the informed client role becomes very problematic.

OBSERVATIONS AND CONCLUDING REMARKS

The paper has advanced knowledge on the structures and implications of a tied supply chain in the context of PPP arrangements. As a consequence, and taking account of other procurement strategies existing within the construction industry, it has also

proposed that different models of tied supply chains can exist in practice. One example occurs where a network of suppliers are tied together in the form of an equity shareholding as in the case of a PPP arrangement, and, where those same shareholders are also responsible for delivery. A second example occurs where a network of suppliers are tied together to work within collaborative procurement structures, and, where the network jointly bids as a supply chain under a Principal Supply Chain Leader that secures longer term work for the supply chain through Framework arrangements. This exists in the case of the Defence Estates Prime Contracting (Defence Estates 2010) or National Health Service ProCure 21+ Frameworks (NHS 2010). These types of Framework Agreements typically exist for some 3 to 5 years. Whilst they are not a guarantee of work for the tied supply chains in the Framework, there is an underlying assumption that the commercial integrity and success of the supply network relies on the collective reputation of the network. Equally, there is not an associated equity structure in place. This is an example of non-equity based tied supply chain working within a strategic partnering structure. A third example, and similar to the second, occurs where a network of suppliers agree to bid for work on a project-specific partnering arrangement (Bennet and Jayes 1998). There is again a 'reputational consensus' that in bidding for the work a particular composition of key supply chain partners within the network, operating under a lead 'supply chain broker', will have a greater chance of winning than the competition. In contrasting the three examples, the first relies in the long term on both the equity structure of the tied supply chain, and a reputational and appropriate commercial governance structure. The second relies on a reputational consensus within a medium term commercial relationship but with no equity structure in place, whereas the third relies on the same principles but it is for a much shorter duration.

Whilst tied supply chains can be effective for contractors and suppliers they are more appropriate for contracts where scope of work is certain and resource levels are known. They lack, however, flexibility, and, are not appropriate where asset condition is unknown or there are changing volumes of work. The tied supply chain in a PPP context requires strict regulation and legislation to enable an Arbiter to enforce governance and delivery. Furthermore, robust corporate governance arrangements need to be in place across the supply chain, especially where there are equity shareholder and delivery inter-relationships to the fore. There is also a strong argument to suggest that if government reduced its level of guarantees considerably this would force stronger governance structures within the PPP arrangement. Finally, the contracting authority needs to include safeguards within the contractual documentation and ensure bids are compliant with these requirements.

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