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## **1. Managing transport infrastructure PPPs and alliances**

### *1.1. Introduction*

In many countries, Public Private Partnerships (PPPs) have been supporting the development of major transportation infrastructure assets as roads, tunnels, bridges, railways, ports, airports, and urban transits. Due to the three following trends the transport sector has taken extensive advantage of PPPs delivery model (Roumboutsos, 2015): the growing demand for transportation services, the ability to secure potential revenue cash flows through user payments (directly through, e.g. tolls or indirectly through taxation), and European transport deregulation policy supporting the introduction of the private sector in domains traditionally addressed by the state.

The growing economic importance of PPPs for society has triggered research interest with respect to private involvement in project delivery and financing of public infrastructure projects. A PPP is based on relationships between public and private partners and focused on the construction, maintenance, and operation of public infrastructure and the associated provision of commercial and other public services or activities (Bult-Spiering and Dewulf, 2006; Voordijk *et al.*, 2015). In the literature two contrasting types of PPP have been discussed: the concession model and the alliance model (Van Marrewijk *et al.*, 2008). In a concession model, the private partner has the responsibility for design, construction and financing, while an alliance model consists of a joint enterprise between private partners and a state agency (Van Marrewijk *et al.*, 2008, p. 592).

PPP structures are typically more complex than traditional public procurement. There are often more parties involved in a project and also the costs of PPPs are generally higher. The long time horizon and the bundling of project phases make PPPs vulnerable to external and internal risks. External risks are changes in transport demand, travel behaviours, and regulations. Internal risks

are the inclination of some parties involved in the PPP to subcontract design, construction or operation services to other organisations or other divisions within their parent organizations which can create principal-agent problems. Hence, major challenges in the management of PPP transport infrastructure projects are the development and use of mechanisms that can cope with these risks, uncertainties, and interdependencies in these arrangements.

Contributions in this special issue are partly based on research conducted within the framework of COST Action TU1001 (2010-2014) on “Public Private Partnerships in Transport: Trends and Theory” (P3T3) funded by the European Community COST Programme. The COST Action P3T3 network consisted of over 50 European PPP researchers. This network was initiated to address the theoretical basis for PPPs in the transport sector considering the following three issues: the decision-making process; the assessment and monitoring of PPP performance; and the implications of the external environment with respect to efficiency. During the workshop “Case Analysis of PPP Transport Projects” on 2-4 July 2014 at the University of the Aegean, Rhodes Island, Greece, preliminary research findings were discussed with young PPP researchers. At the P3T3 Final Conference in Brussels on 8-9 October 2014, research findings on the three issues just mentioned were discussed with the academic community, as well as policy-makers and practitioners. Earlier versions of the contributions of this special issue were presented at the P3T3 workshop and conference just mentioned. These contributions are now introduced first. Next, conclusions and directions for future research are presented based on these contributions.

## **2. Contributions**

The first paper by Felix Villalba-Romero and Champika Liyanage entitled “Implications of the use of different payment models – the context of PPP Road Projects in the UK” deals with an important question to be answered by the public sector when managing PPP transport infrastructure projects. This question is “how is the infrastructure going to be funded?” Within this setting, “funding” is related to the origin of the payments to cover the costs of the public services, that is to say, who pays for it in the end (Abdel Aziz, 2007); whereas “financing” considers the source of the funds needed to build the infrastructure. The party who lends or provides the money in the beginning usually requires a return as a compensation for the risk assumed and also expect the funds to eventually be repaid. The resulting amount of payments should cover the initial investment of the assets and the cost to maintain and replace them. There are basically two funding mechanisms: public budget that eventually is supported by tax payers, and direct charges to users. The private sector will only participate if the project is financially feasible, which means that the expected payments will cover all costs including a return for the finance provided. The major objective of the study of Felix Villalba-Romero and Champika Liyanage is to identify the benefits and issues inherent to different approaches to payment of the services acquired through PPP procurement. The focus is on PPP road infrastructure projects in the UK.

The second paper of Rick Janssen, Robin de Graaf, Marnix Smit and Hans Voordijk is entitled “Why local governments rarely use PPPs in their road infrastructure projects: understanding the barriers”. Starting point of this paper are barriers to applying PPPs for infrastructure provision. Although these barriers have been studied extensively, this has mostly been at the national level (e.g. Liu and Wilkinson, 2011; Zhang, 2005). Although local-level PPPs have seen increasing interest (Bel *et al.*, 2013), the barriers to using PPPs for local road development projects have

received little attention in the academic literature. The research presented in this paper fills this gap in the knowledge. The objective of this study is to identify barriers that prevent local governments from applying PPPs in their road development projects. This was achieved by developing a chain of evidence explaining why local Dutch governments rarely apply PPPs in such projects. By providing insights into the argumentation used to explain barriers for using PPPs, and the relative significance of the various barriers, this research provides an overview of the barriers and arguments for their existence. In total, 37 barriers were identified. Four of them consistently stand out. First, the application of PPPs requires local governments to adapt their current working methods, which amounts to a large impediment to local governments applying PPPs. Second, local government employees believe that applying PPPs might effectively exclude local contractors from involvement in projects. Finally, local governments experience the whole PPP approach (the third barrier) and the PPP contract (the fourth) as overly complicated.

The third paper of Henrico Plantinga and André Dorée entitled “Procurement strategy formation: (re-) designing rail infrastructure project alliances” starts with considering the potential impact of procurement on public performance. Because of this potential impact the issue of selecting the most appropriate project delivery system has received considerable research attention in the construction management literature (Love *et al.*, 2012). The study of Plantinga and Dorée investigate the reasoning behind the development of a particular procurement approach by a public infrastructure sector organization: the project alliance. In the alliancing literature, the “real gain-share/pain share” mechanism is considered essential to the concept of project alliancing. This mechanism is thought to align interests and thus behaviour among project participants, which is assumed to enhance project performance. The case study presented here focus on the development of a range of applications of the concept of project alliancing in rail infrastructure projects by the Netherlands railway agency (ProRail) over a period of 15 years. Since the initial project in 1998, ProRail implemented several procurement approaches that are all alluded to as “alliances”. Documents of the project alliancing projects over the past 15 years are analysed. An interesting result is that, on the one hand, formulations are found in these documents that explicitly proclaim the extension of the pain/gain sharing domain to its “reasonable maximum”. On the other hand, evidence indicates an implicit preference to limit the shared domain to that “considered strictly necessary”. The latter is demonstrated in the move towards sharing only specific risks. The argument underlying the first formulation seems to follow the logic of interest alignment: the greater the shared domain, the fewer conflicts of interest may be expected. The latter’s logic seems to be driven by defence and risk avoidance. The difference in reasoning between the “domain maximizers” and the “domain minimizers” also holds clues to the evolutionary development of the alliance method.

The fourth paper of Derek Walker and Beverley Lloyd-Walker entitled “Understanding the motivation and context for alliancing in the Australian Construction Industry” also deals with alliances. The purpose is to explore and explain the circumstances in which an alliance is the most appropriate choice of delivering infrastructure projects. While alliancing has often been argued to provide superior value for money as compared to traditional approaches such as Design and Construct, considerable debate continues about its success and applicability as a project procurement delivery strategy. The study draws upon survey research undertaken on 61 completed project alliances in Australia in 2008, 2010, and 2012 and a further study of program alliances undertaken in 2013 in which 50 subject matter experts from Australia, Europe, and the USA were interviewed (Walker and Lloyd-Walker, 2015). The second study led to the

development of the Relationship Based Project Procurement (RBP) Taxonomy. One important element of this taxonomy is the motivation and context that leads to the choice of a project procurement method. Taking this element of the RBP taxonomy as starting point it is shown in this study that conditions for adopting an alliance may be either internally driven or externally influenced. Internal drivers for selecting an alliance are best value, experimentation (when innovations and flexibility of contract provisions are necessary) and the need for learning and upskilling in-house staff or contractors. External drivers for adopting an alliance is a crisis or emergency (an alliance is assumed to respond quickly to an emergency), competition for resources (an alliance helps to form a team that can deal with these challenges), and unknown risks (alliances can cope well with uncertainty and/or ambiguity).

The fifth paper of Joaquim Sarmiento and Luc Renneboog is entitled “Anatomy of public-private partnerships: their creation, financing and renegotiations”. Starting point of this study is that PPPs have frequently been subject to renegotiations, which occur when particular events change the financial conditions of a PPP-concession. These renegotiations are often regarded as a pitfall in PPPs because the most likely outcome is an increase in the costs to users and/or taxpayers or a reduction in the quality of service. Subsequently, renegotiations contribute to a negative perception of PPPs (Engel *et al.*, 2009; Guasch and Straub, 2006). PPPs, however, have particular characteristics that make them prone to renegotiations. Given its long-term nature, a PPP contract cannot be complete and unforeseen changes at the revenue or cost structure over time could necessitate a renegotiation (Engel and Galetovic, 2014). Still, there is a lack of research on the dynamics of these renegotiation processes. This study fills this gap by answering the following question: why and how are PPP contracts renegotiated? The objective is to provide a thorough insight in the PPP process in order to understand problematic contracting and possibly subsequent renegotiations. To this end, two case studies are developed that provide examples of a well conducted negotiation, providing solutions and best-practices for subsequent negotiations, and of a poorly conducted negotiation, teaching what not to do or implement. The two case studies reflect why and how both PPPs renegotiate. It is shown that governments ought to be extremely careful when designing a PPP-concession and a corresponding contract, and should anticipate on the occurrence of renegotiation events. In addition, regulation and monitoring of the contract over the long project life cycle are critical.

### **3. Conclusions and future research**

Based on the contributions to the special issue five conclusions and directions for future research emerge that are relevant for the management of transport infrastructure PPPs: the use of hybrid funding models, the management of PPPs by local governments, a more deliberate planning of the use of a particular PPP procurement approach, the mix of internal and external drivers for adopting an alliance, and PPP-contracts that anticipate on the occurrence of renegotiation events.

First, it is concluded that different payment methods for PPP road infrastructure projects can be used, if certain conditions are met. Use of shadow toll can be advantageous as it transfers demand risk to the private sector. Direct tolls should be adopted with care, as, although it also transfers demand risk to the private sector, it may come a high cost to the user. Improved payment mechanisms based on performance seem appealing as well. Since all the payment methods have their own pros and cons, the use of hybrid funding models could become more appropriate for many PPP project as they can combine the strengths of two or more payment methods, whilst

cancelling out their disadvantages. More future research is needed to investigate the implications of hybrid models of funding/payment in PPP transport infrastructure projects.

Second, it is concluded that managing PPPs by local governments requires a different approach to that at national government level. Not all of the available national-level research results and thinking can be directly applied to the local level. Hence further studies are required. A useful field of research would be to focus on the working methods of local governments and consider how PPPs can fit with them. Research should also focus on the contracting and selection processes employed by local governments as they create several barriers to applying PPPs and explore why local governments perceive the PPP contract and contracting scheme as complicated.

Third, it can be concluded that the development of different applications of a PPP delivery model when procuring transport infrastructure seems to be evolutionary rather than deliberately planned. Variations in PPP alliancing applications are mostly based on implicit reasoning processes that occur within single project teams, and thus remain irretrievable for evaluation or redesign purposes. Since procurement is an important means to achieve overall strategic goals, especially in the case of public clients that outsource a major part of annual budget, proper explication of such implicit reasoning processes is crucial to allow for a more deliberate procurement and management of transport infrastructure PPPs.

Fourth, it can be concluded that when making a decision to adopt an alliance there must be a compelling logic to choose an integrated project delivery form as an alliance. This logic follows either a single overriding single driver or a combination of internal (best value, the need for innovations and learning) and external drivers (a crisis or emergency, difficulties in getting the right resources, and unknown risks). The internal/external logic mix that indicates an alliance being appropriate varies with each project. More future research is needed to investigate under which circumstances what mix of internal and external drivers is optimal for adopting an alliance.

Fifth, it is concluded that PPP projects must be designed to address (*ex ante*) the issues that can lead to renegotiations and to facilitate them in a balanced manner. Even with a well-functioning institutional framework, external factors, such as changing economic conditions or a changing political environment can make the concession characteristics obsolete and require renegotiations. It is important to have an independent body that monitors the PPP life-cycle, limits the public sector's liabilities, and learns from negotiation process in order to avoid inefficiencies for future PPPs. More research is needed on how the government should anticipate on the occurrence of renegotiation events in PPP contracts.

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