

METHODOLOGICAL FRAMEWORK TO IMPROVE PPP PROJECTS

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The Public–Private Partnership (PPP) plays a significant role in the construction industry. It is of special importance because of its weight in the global economy and the lack of funding for major projects. The PPP concept, as a procurement strategy, is successful only if the major stakeholders, namely the public sector, private consortium, and end–users are all satisfied with project outcomes. There have been reported cases of problems associated with the initial stages of the PPP process in terms of bidding costs and anticipated costs of construction and operation. The banks’ attention is currently centered on the promoters’ financial stability rather than on project quality. The key issue is to improve the efficiency for the whole building lifecycle. In this context, BIMM philosophy (not just Building Information Modeling but also Information Management) may be a powerful tool. In other words, is there room to put this concept in practice without jeopardizing service quality, innovation and efficiency? The answer to this question is explored in this paper. The use of Technical Sheets for PPP procurement like policy models may enhance systematic and integrated management of the whole building process. This technical framework allows one to collect project data, grouped into three areas: design, construction, and operation. In so doing, a Public Agency may assess project quality.

Keywords: Infrastructure, Project management, Private sectors, Policies, Project delivery, BIM.

1 INTRODUCTION

Infrastructure normally refers to a technical structure that supports and underpins the growth of a society, e.g., roads, bridges, water and power supplies, hospitals, and prisons (Infrastructure Australia 2012). Its privatization involves social, political, economic, legal and environmental dimensions, and consequently is much more complicated than traditional public procurement. Innovative procurement approaches have been developed in worldwide infrastructure projects through Public Private Partnerships (PPPs). This is a contractual arrangement with a long-term nature between the public and private sector to deliver facilities.

PPPs generally have a better performance in cost and time saving than traditional procurement methods. This is because private sector entities are profit-oriented; therefore, they seek to clearly maximize the cost and time performance of their projects (Liu *et al.* 2013, Yong 2010). A proof of this is given by the United Kingdom but also by US experience. For the former, one can cite the first eight Design–Build–Finance–Operate (DBFO) roads that achieved an average public cost saving of 15% (DBFO-

value in roads 1997). For the latter, the literature reports 10-40% cost savings and improvements in service quality and asset management (NCPPP 2003).

However, there are several problems within PPP environments. In 2005, Zhang identified six general barriers for PPPs: (1) social, political and legal risks; (2) unfavorable economic and commercial conditions; (3) inefficient public procurement framework; (4) lack of mature financial engineering techniques; (5) problems related to the public sector; (6) problems related to the private sector. Another issue is the ongoing debate about innovation in PPP projects. There are several opinions about that because it is hard establishing it in a clear way. Innovation depends on application fields (e.g., transports, public facilities, urban welfare, etc.), and social-economic conditions. According Minchin *et al.* (2015), the correlation between life span of project elements and concession period of project is not impressive in the reality. But the European experience, e.g., HafenCity of Hamburg (HafenCity Hamburg 2015), and the Ferencváros requalification in Budapest (Locsmándi 2011), revealed the utility of PPP projects with strong social and environmental dimensions. Another obstacle to innovation can be represented by the rigidity of PPP contracts (Leiringer 2006). This aspect can be overcome through contracts more flexible.

In light of the above, the paper adopted strategic measures through a framework, in terms of Technical Sheets, applied in the procurement phase. These sheets are developed by Politecnico di Milano within a research project named INNOVance, funded by Italian Ministry of Economic Development. In this project, the main purpose was creating a database, containing all the information that characterize the phases of the Building Process, easy and shareable by all the actors involved using BIM and BIMM tools.

2 KEY ISSUES IN PROCUREMENT PROCESS

In the current economic crisis context, the Public Authorities (PA) are relying more and more to the PPP types like DBFO, Build–Lease–Transfer and other contractual arrangements (Gottfried *et al.* 2014). In this environment, the role of finance (i.e., the banks) has become a priority and its attention is centered on promoters' financial soundness. But, what about the project and its quality? It always comes "after the budget!" while shifting the objective to project quality would be more appropriate. It is not possible to downgrade the project to the point of forgetting that the project has an intrinsic quality. This may be a guarantee for banks. (Calabrò Massey 2011).

On the other side, data confirm that up to one–third of the projects showed major changes in specifications during this stage. Furthermore, negotiations to finalize deals with a preferred bidder account for almost half of time spent on the entire tendering process (Soliño e Gago de Santos 2010).

In light of these considerations, it is possible to state that BIM may be a powerful tool capable of transforming PPP design methodology into a holistic and more global approach. In this way, the INNOVance database emphasizes its BIM nature to link the various aspects of the project (technical/performance, urban economic, social, legal) and involves the various parties such as designers, PA, constructors, suppliers, managers, financiers, and advisors in a life–cycle perspective.

In this regard, the public sector plays a decisive role in the development of a tool such as BIM, imposing it in calls of tenders as a useful instrument for the design of the entire building process (EUPPD 2014).

By doing so, attractive benefits can be obtained in terms of reduced cost, execution time (design and construction) and of better quality, helping the PPP market become more efficient. Indeed, the examination of 32 projects started in the USA that make use of BIM technology has evidenced the following benefits: reduction of up to 7% of the scheduled times; save of up to 10% of contractual value deriving from verification of the interferences; elimination of 40% of the unexpected; reduction of up to 80% of the necessary time for cost estimation (Love *et al.* 2013).

3 METHODOLOGICAL APPROACH

This study is mainly prompted by international experience in PPP projects, coupled with tools developed in INNOVance research. In order to fulfill and manage a public infrastructure or services, public procurement principles have to be followed such as accountability, transparency, value of money, and fair competition (Zhang *et al.* 2013). Accountability requires allocating responsibility among project stakeholders and answerability of the concessionaire to the government. Transparency is supported by an open approach that should be used to encourage the establishment of a mutual trust between public and private bodies. In this way, the likelihood of asymmetric information is reduced. Value of money because value does not rely only on the minimum price (economy) but also on the maximum efficiency and effectiveness of the project. Fair competition guarantees the elimination of the abuse of near-monopoly powers, competitor bashing, and predatory pricing.

The methodology developed in INNOVance research is supported by a questionnaire survey and/or interviews administered to experts/experienced practitioners in several public agency or private firms, Sheets by *Autorità per la Vigilanza sui Lavori Pubblici* (Authority for the Supervision of Public Works), and a literature review.

The proposed framework is composed by the Work Technical Sheet (WTS) and three principle dossiers:

- Descriptive Dossier (DD)
- Tender Dossier (TD)
- Specialized Dossier (SD) (Figure 1)

The WTS collects all information about the asset, from a more general level of information to a more particular one, summarizing the client's objectives and relevant information about the project under consideration. These objectives should be expressed in terms of desired outcomes, performance standards, and basic control requirements rather than detailed project specifications. The following information should be included in brief: (1) background of the project; (2) client's requirements in terms of outputs; (3) technical scheme subdivided in architectural, structural, energetic and acoustic aspects. When WTS is filled out, it is possible to pass to the Dossier.

In a logical order, the first is DD. It is composed by DataBase Dossier (DBD) and Land Background Dossier (LBD). The DBD has all information about the characters involved in the building process, grouped in macro categories: client, design firms, specialized figures, contractors and sub contractors. For each of these, it has to give indications about the qualifying requirements in terms of their financial, technical, and commercial standing. Furthermore, an indication of any work done on traditional and/or innovative procurements has to be added. The LBD collects information regarding to the land according to: land data (e.g., constraints and site quality), cadastre, urban parameters, details of any existing facilities, available technical documents.

The TD is a kind of guideline that should be formulated to assist interested parties in preparing tender proposals and clients in evaluating tenders. It is composed of Procurement Dossier (PD), Economic Dossier (ED), and a TimeTable Dossier (TTD). The TD puts in link the several technical aspects of the building process, from its embryonic phase to its execution. It is subdivided in: tender and its awarding, work's Supervisor¹, project Progress Report and it is an Interim Payment Certificate², modifications, initiated by the private sector, changes to accommodate project enhancements or revisions of service requirements, tests. The ED describes the economic information such as the initial economic amount, the economic amount after modifications and/or enhancements, and the final amount. The TTD collects project advertisement, pre proposal meeting, the deadline for submission of written questions, the deadline for the client to respond to these questions, the submittal of proposals, the presentation of proposals, the notification of rankings, and the beginning of negotiations for concession agreement.

The last macro group of dossier is SD. It is divided in the Geotechnical and Geological Dossier (GGD), Structural Information Dossier (SID) and Maintenance Dossier (MD). The GGD deals with information regarding land aspects from a geotechnical and geological point of view like landslide risk analysis, land classification, and geotechnical characterization. The SID focuses on information regarding structural typology adopted about elevation and foundation Structures. The MD focuses on specialized information relative to maintenance plan and program: description (Maintenance contractor), a brief about maintenance plan and maintenance operations.

This framework, how it is structured, allows the application in different projects (from transports to public facilities). The purpose of INNOVance will be that to validate it in more projects, among which PPPs, in order to improve information management during the procurement phase of a project.

¹ A kind of the foreign Client's Engineer and his function is controlling the work of the Contractor, as a guarantee for the Client that the Contractor works well, in time and according to the costs defined.

² These documents justify the payment for work done, obviously they depend on the context and the percentage of work progress.

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