PUBLIC-PRIVATE PARTNERSHIPS IN ENGINEERING PROJECTS

Case studies in the education sector

João Luz Nunes Cantarino de Carvalho
Instituto Superior Técnico, Civil Engineering Department

Abstract: The Portuguese government has been investing progressively more in public-private partnerships (PPPs) of engineering projects. Recently, it has launched a new program to renovate secondary schools all over the country, and has transferred more responsibilities to local authorities concerning pre and elementary schools, motivating new local PPPs within this sector. A wide variety of information about the subject was gathered in this dissertation, and the PPPs in the education sector were analyzed. Four Portuguese cases and a foreign experience were studied. In this analysis, it was found that some of the good practices, compiled in the theoretical chapter, are not being applied. Therefore, a risk analysis for the school sector was developed, hoping to contribute towards an increased number of partnerships reaching the best value, as well as contract management guidelines and a group of improvement proposals. In essence, it was concluded that there is a need to improve the transparency of the procurement phase, to homogenize the contractual documents, and to assure a better risk allocation.

Keywords: Public-private partnerships, PPP, project finance, risk allocation

1. INTRODUCTION

1.1 General introduction

Public-Private Partnerships (PPPs) in engineering projects are long term relationships between a public entity and a private one, with the objective of assuring the financing, construction, renovation and/or operation of a public service infra-structure. This kind of cooperation allows the public partner to transfer some of the risks of the project to the private partner and to learn with the practices of private sector.

The prominent objective in all PPPs is to achieve the best value for money or, in other words, get the best ratio between the service benefits and the cost to the public. There are six determining conditions to reach the best value (Grimsey et al., 2005): a correct risk allocation, a long term contract, an objective oriented approach, competition, performance monitoring with incentives, and the advantage of private over public project management.

In practice, while recognizing the potential of PPPs, the scientific community is not unanimous about their benefits. Some defend their budget advantages, best value, better service quality, better compliance with deadlines, risk allocation to the most efficient party to manage it, maximization of the private skills, innovation incentive, better efficiency, etc. However, there are bigger transaction costs implied and, consequently, a requirement for a minimum project dimension. Additionally, PPPs appear to imply a loss of control by the public sector, while requiring knowledge and practice, being subject to many unknowns and, therefore, hard to implement.
1.2 Portuguese entities and laws

The structuring of PPPs is a complex challenge involving different entities. From these, Parpública and Tribunal de Contas stand out. The aim of Parpública is to promote the use of PPPs for developing public services in better quality and efficiency conditions. One of the tasks of Tribunal de Contas is to supervise and regulate the PPPs assembling. However, the intervention on municipalities is scarce.

PPPs are mainly legislated by the Portuguese code of public procurement (inserted in Decree-Law 18/2008) and by the law of public-private partnerships (Decree-Law 141/2006). Decree-Law 18/2008 is already in conformity with the new EU Directives, which aim to simplify procedures and promote a cross-border competition (Tavares, 2008). At local level there are the Local Finance Law (Decree-Law 2/2007) and Legal Framework of Local Business Sector (Law 51-F/2006).

2. THEORY ABOUT PPPs

2.1 Life cycle elements of PPPs

The life cycle of a PPP project can be divided in four main phases: preparation, procurement, development, and operation. The preparation phase is where all the feasibility studies are made and the framework draft of the PPP is created. During the procurement phase there is a continuity of this work and the private partner is chosen. The infra-structure is completed in the development phase. Finally, the service is made available to the public during the operation phase.

2.2 Partnership viability

Before developing a PPP project, the public sector must perform several studies to demonstrate its viability, such as its economic justification, public sector comparator (PSC), affordability study, and the balance-sheet treatment.

The economic justification aims at justifying the investment made. The public sector comparator is a tool used to appraise the best value for money of the PPP option over the traditional ways of procurement. Figure 1 shows the different items used in the calculation of PSC.
The affordability study is made to guarantee that the public sector can honor its commitments during the partnership’s life. Lastly, the balance-sheet treatment study checks whether the partnership should enter public accountability or not. This evaluation depends on complex accountability rules, but in general it varies according to whether the users have to pay for the service or not, and who undertakes the construction, availability and demand risks (public or private).

2.3 Types of PPPs
PPPs can be divided in two big groups: contractual and institutional. Within the contractual type, concessions and private finance initiatives are particularly relevant. In a concession users have to pay part or the full amount of the project costs, unlike in a privately financed initiative. The institutional PPPs are a type of public-private cooperation owned by both private and public partners and created with the sole purpose of establishing the partnership. Therefore, it involves a Project Company jointly-owned by public- and private parties.

2.4 Payments and duration
The remuneration of private partners is function of the duration of the partnership, of the public payments and of the rates charged to users. The combination of these three factors have to result in a project financially viable and with an acceptable internal rate of return (IRR), otherwise the investment will not appeal to the private sector. However, the IRR should not be too high in comparison with the project risks and difficulty in order to satisfy public interests.

The total duration of a partnership can be divided into two financial periods: the payback period and the return period. The payback period is the necessary time to recover the investment made on a project, i.e., to reach zero discounted cash flows (DCF). The retribution period is the remaining time of the partnership, which should be long enough to let the private partner benefit from the deserved retribution. Figure 2 illustrates these two periods and the respective evolution of the DCF.

![Figure 2 – Relationship between the partnership period and the net present value (NPV)](image-url)
2.5 Financing

While preparing this paper, the following two financing models for PPPs were found: the project finance model and the forfeiting model.

The project finance model focuses on the project cash-flows as a payment guarantee for the debt. Due to the inherent uncertainty of this model, several studies of viability are designed to minimize the risks of nonpayment (also known by due diligence studies). This model is only suitable for big projects. The costs of such studies, each having to be case specific, greatly increase the transaction costs and are very time consuming. Consequently, only projects with sufficient business volume can balance such investment. This is the main limitation of this model.

In the forfeiting model the public sector commits to pay part of the payments to the lending entity. This amount should only be sufficient to pay the debt. The lending entity just has to asseverate that the private partner has the capabilities to conclude the construction, after which the public entity is obliged to pay. It is as if the debt was made for the private partner and, hence, it may not enter the public debt. This model allows saving time and money because it does not require such complicated studies. Nonetheless, it does not promote a risk allocation as complete, in particular the risk of insolvency of the special vehicle identity.

Figure 3 depicts a theoretical model, based on a Dirk Daube scheme, for one unique project with three different financing variants and, therefore, with a different risk allocation degree (Daube et al., 2008). The sum of the investment, operation, maintenance, and transfer risks costs is the award price.

![Figure 3 – A comparison of the total costs of different financing variants for PPPs](image)

2.6 Risk identification and allocation

The correct identification and allocation of risks are fundamental for the success of PPPs. The purpose of this process is to reduce long term costs, make the private partner fulfill deadlines, meet
quality patterns at pre-defined costs, increase the project efficiency (lower costs with higher incomes), and establish a more consistent costs prevision (Mascarenhas et al., 2005). All the consulted bibliographies agree that risks should be allocated to the most suitable party to manage them. The risk allocation should aim at reaching the best value for money.

2.7 Choice of private partner

The choice of private partner should always have a prequalification of proponents; otherwise the project will not be attractive for the private sector because of the great costs involved in developing the bids and the reduced probability of award. Within these conditions it is possible to choose between the restricted procedure, the negotiated procedure and the competitive dialogue. Between these three the competitive dialogue is the one that provides better conditions for innovation.

2.8 Monitoring the partnership

After a PPP is defined and awarded, it is necessary to monitor and manage the contract. In general, this implies monitoring the performance of specific factors of the project, checking availability, and managing interventions or compensations for exceptional events.

When the private partner has to be compensated, it is necessary to make a financial balance. In this procedure, the public authority helps the private so that he does not get benefited or harmed by the event. These transformations should occur in a way that does not modify the private IRR and the ratio remuneration/debt (Yescombe, 2007).

It is also common to anticipate the possibility of the private partner not corresponding to the public expectations. Generally, in these cases, a group of contractual clauses is defined. They are the step in (take control of the project temporarily), substitution of the private partner and termination of the contract.

3. PRATICAL ANALYSIS OF THE EDUCATION SECTOR

3.1 The renovation of the Portuguese schools

By analyzing the recent programs launched by the Portuguese central government and the new tendency at local level, the number of PPPs in the education sector is expected to increase in the following years. The program Programa de Modernização do Parque Escolar do Ensino Secundário foresees to reclassify and modernize 330 schools until 2015 through a PPP model. At the local level the transfer of competencies about education has increased the municipalities’ responsibility over nursery and first cycle schools, which already motivated several new schools under the PPP scheme.

3.2 Case studies

Five cases were studied in this paper. From these, four were Portuguese and one was Danish. The model used in all cases was the institutional one. Most of the models encompassed financing, design, construction, maintenance and conservation for a period between 25 and 30 years. It was
also found that the contractual models were similar to each other. Figure 4 shows the contractual framework of one of the cases.

![Diagram of contractual framework of one of the cases]

Teaching was kept public responsibility. All the Portuguese cases bundled several schools in one single award.

The first case studied shows that there were many companies interested in the procurement papers, which is revealing of a PPP market in Portugal. This is desirable, because it stimulates competitiveness and hence helps attaining the best value for money.

The majority of the cases studied tried to coordinate the PPP with an attempt to raise funds from the central government financing program, QREN, which was not always successful, particularly due to taking too much time. In fact, it appears that this kind of cooperation was chosen in all four cases as a way to overcome budget limitations rather than obtaining a better value for money.

This is because all the cases studied in Portugal have shown deficiencies in the viability studies. More specifically, they did not show any expectation of better value for money for a PPP option (or, in other words, the PSC was not calculated).

In the majority of public tenders, a significant amount of time was taken for the preparation and procurement phase. There was also controversy around the projects and, in some cases, this controversy was responsible for delaying the award. Regardless of all these problems, in schools already in operation, the users replied with positive feedback.

Despite the satisfaction of users, it is argued that there were some mistakes on the PPPs’ framework, which affected the best value for money. All the cases studied in Portugal had a public open tender without the pre-qualification of candidates, and the prices of the processes were unjustifiable high. There was also one case that did not cover the design of the facilities and where
the bid evaluation was made by a consulting firm that did not prove to have technical qualifications for the work. In another case the period to deliver the bids was too short (just 15 days).

Additionally, all the cases had very incomplete contract management terms. Moreover, the risk allocation was insufficient since the responsibilities for cleaning, gardening and surveillance, as well as water, gas and electricity consumption were on the public side.

The bundling of different kinds of projects in one single award is equally susceptible of criticism. This method is not recommendable because it inhibits competition and does not maximize the use of private specialization in a single type of project. It was also difficult to compare the bids due to their lack of uniformity, especially concerning their financial maps.

The fifth case was the Danish one. This was a good example of how PPPs can help the public sector to improve and provide innovation to the schools, mainly through the use of competitive dialogue. Moreover, the PSC was calculated and indicated an advantage of 10% in comparison with traditional procurement, which shows the viability of this kind of cooperation to provide new schools. Conversely, it is highlighted the long period taken in the procurement phase, as did the Portuguese cases.

3.3 Lack of transparency in the sector

PPPs are complex and should therefore be subject to public scrutiny. The consultation right is foreseen in the Portuguese law, although in practice the reality is that it is very difficult to consult these documents. In order to build up the present work, several public identities were contacted without any positive answer. Contacting the Access Commission to Administrative Documents (CADA, in the Portuguese abbreviation) proved to be the best way to acquire information. Nevertheless, this procedure took several months to hold results.

3.4 Examples from other European countries

There are new trends and innovation from other European countries which could be used in the Portuguese PPP education sector. Some examples are the standard contracts, guidelines, a PSC of reference, the promotion of pilot-projects, the development of performance indicators, the definition of design quality indicators, the use of availability criteria, and the option for new forms of financing, such as the forfeiting model. Some of these measures already proved to decrease costs and speed up procedures.

3.5 Education sector risks

Although there are several risks concerning PPPs in the educational sector, like the financial ones, the main ones are about political and local conditions, as well as construction and operation issues. Regarding the political risks, it is possible to point out the support given by the public sector, law changes, costs with permissions, approvals, and population perturbations against the PPP. Local conditions risks refer to expropriations, soil conditions, old buildings conditions, environmental impacts, archaeological findings, soil contaminations, and the need to respect a timeframe window to work, among others. Construction risks are related to costs, conception problems and technical
difficulties, while operation risks address the public ability for paying the service provided, the income expected through complementary services, the need of schools to adapt to new circumstances over time, and operational costs above expected.

### 3.6 Contract management and monitoring guidelines

Formula 1 was designed to assess the monthly payment to the private partner according to the pre-defined payment, service availability, and performance factors.

\[
\text{Monthly payment} = \max \left\{ \frac{\text{pre-defined payment}}{\text{bad performance deduction}} - \frac{\text{bad performance deduction}}{\text{unavailability deduction}} \right\} - 0 \tag{1}
\]

A group of indicators was developed to calculate *bad performance deductions* related to the education sector. The appreciation of these performance indicators with a scale from 0 to 20, where 0 corresponds to bad performance and 20 to an excellent performance, was also suggested. Using this evaluation and the formula number 2, it is possible to assess the *low performance factor*, that multiplied by 20% of the pre-defined payment should be equal to the parcel *bad performance deduction* (formula 3).

\[
\text{Low performance factor} = \frac{n \times 20 - \sum_{i=1}^{n} \text{performance indicator assessment}_i}{n \times 20} \tag{2}
\]

Where \( n \) is equal to the number of performance indicators utilized.

\[
\text{Bad performance deduction} = \text{low performance factor} \times 0.2 \times \text{pre-defined payment} \tag{3}
\]

For the calculation of the *unavailability deduction* the use of specific weights for each space/service was suggested. In case of unavailability of a space or service, the value of the *unavailability deduction* can be assessed through the formula number 4.

\[
\text{unavailability deduction} = \frac{\sum_{i=1}^{k} \text{weight of space or service unavailable}_i \times \phi_i}{\sum_{j=1}^{n} \text{weight of space or service}_j} \times 1.2 \times \text{pre-defined payment} \tag{4}
\]

Where,

\[
\phi_i = \frac{\text{unavailability period}_i}{\text{total availability period required}} \tag{5}
\]

The coefficient of 1.2 in formula 4 increases the pre-defined payment by 20%. This measure aims at discouraging private partners to have unavailable spaces or services. Although not in the formula, it was also recommended to add a time penalty coefficient for long periods of unavailability, e.g. equal to 1.0 in the first month, 1.2 for the second month and 1.4 for the third and followers.

This payment mechanism tries to penalize the private party for underperforming or the emerging problems in service availability. A gold rule is to start the payments only after completion of the construction of infrastructures and after the operation effectively starts.

Concerning contractual changes, it is recommended that if a particular change increases the IRR, the private party shares the benefit, and if it decreases the IRR, the private party is compensated.
with not more nor less than the necessary funds to keep the private IRR constant. To facilitate this methodology, the public side should have full access to the management accountability of the partnership.

A collection of possible contingencies such as the step in by lenders, by the public side, the substitution and early termination were also discussed. The basic principle defended was to penalize the private partner if responsible for what happened and guarantee that no penalization occurs otherwise.

3.7 Improvement proposals

According to the information obtained, there seems to be a need to improve the transparency of the public tenders, specifically through more complete financial maps, easier to compare and by facilitating the access to the contractual documents. There is also a need to improve the monitoring of legal aspects, for instance, if the discount rate used is the one defined by law.

Having a more active participation of a specialized central entity on local PPPs, like Parpública, would also be advantageous. Besides helping with the structuring of the procurement phase, this entity could support the municipalities and users by divulging relevant information on the internet.

As a complement, the competitive dialogue or the negotiated procedure are two models proved effective in other countries which are not currently being used in Portugal in the education sector PPPs. An increase in this kind of models and the implementation of a price limit to charge for the public tenders’ documentation could be beneficial. Notwithstanding, these measures should be tested before full implementation.

In addition, the standardization of the bids, in particular the contractual conditions and the financial statements, as well as the requirement for consulting firms that evaluate the bids to demonstrate their technical qualifications, are also necessary measures. It is also important to develop more complete availability and performance indicators, as well as a PSC of reference.

Furthermore, there is a need to get the society close to the projects and promote the flexibility of the educative spaces (e.g. letting the private partner explore the space outside the school hours).

Finally, it is believed that a more open and innovative mind is needed, e.g. experiencing new financing methods, like the forfeiting model.

4. CONCLUSIONS

The development of this work made possible to conclude that the PPP model in the education sector is of general knowledge in Portugal. The generalized model is institutional, with design construction, financing, maintenance and conservation being responsibilities of the private side.

However, the actual model is not ensuring an effective allocation of all risks due to the absence of performance monitoring and the allocation of responsibilities like cleaning, surveillance, gardening and water, gas and electricity consumption.
The privates’ better efficiency and capacity to innovate is not being well explored. Municipalities have shown a lack of knowledge about the implementation and management of PPPs.

It seems PPPs at local level are only being used to overcome budget limitations instead of achieving better value for money. The Portuguese procurement phase has proved to be time consuming and to sustain the disrespect of some good practices, in particular the calculation of the PSC. Furthermore, there is a lack of transparency and innovations to make the use of schools’ space more flexible.

Several measures which could result in a better value for money to PPP projects were identified; e.g. the development of performance, availability and design quality indicators.

Currently, PPPs in the educational sector are expected to increase. Therefore, it is important to correct the bad practices identified in this work, in order to avoid them in the future.

Nowadays, it would be useful to study the medium durations of each phase of PPPs’ structuring and compare them with the traditional procurement. It would be equally useful to evaluate the transaction costs in order to find if there is a minimal business volume threshold to make a PPP option viable. Finally, there is a need to investigate further in order to contribute for the elaboration of a PSC of reference, standard contracts and indicators for performance, availability and quality of design.

REFERENCES


