



## **Research Project - Abstract**

# **Development of a standardised method for the calculation of life cycle costs of PPP-projects**

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## 1 Objective

Public Private Partnership (PPP) projects are a collaboration between the public and the private sector. Private enterprises offer the planning, construction, operation and financing of public buildings for periods up to 30 years for a fixed price. However, the calculation of costs for the various services needed during the life cycle of a building does not take into account the complex interactions between them and therefore does not observe a consistent standard so far. Traditionally, the costs for each sector are calculated separately. Connections between services and risks during the entire life of the duration of the project are usually not taken into consideration.

The objective of this research project was therefore the development of a calculation standard for PPP life cycle costing. The calculation and description of single cost elements in the different PPP-service sectors planning, construction, operation and financing with their mutual interdependences is imbedded in this standardised method.

For contractors offering PPP-services, such a method provides assistance in the detecting and description of each element of cost of the respective service sector (planning, construction, operation and financing), in a structured, comprehensive and clear way. Furthermore the existing interdependences between service sectors can be enumerated in a consistent form and then evaluated and finally displayed. Possible surcharges and cost allocations for indirect expenses, risk and profit are accounted in a coherent and comprehensible way, so that the effects that changes or improvements in one service sector may have on other sectors become obvious and are easy to grasp. For the public authority who receives this standardised calculation in the course of an award procedure, the advantage is an easy and reliable comparability of the different offers, as well as an improved traceability of each cost element for the control and valuation of the offers and the possible later changes in the work. This standardised calculation is aiming to be compatible with already existing calculation methods. The research project builds on the experience that has been gathered in PPP projects so far and is the natural continuation and advancement of already developed perceptions within the PPP-field. The research project was conducted in a three step process. In the first stage, the requirements of a standardised PPP-calculation method are discussed. Based on these basic considerations, important definitions are presented and a standardised service catalogue for PPP-services is created. In the third step, the calculation method is developed and presented.

## **2 Research assignment and accomplishment**

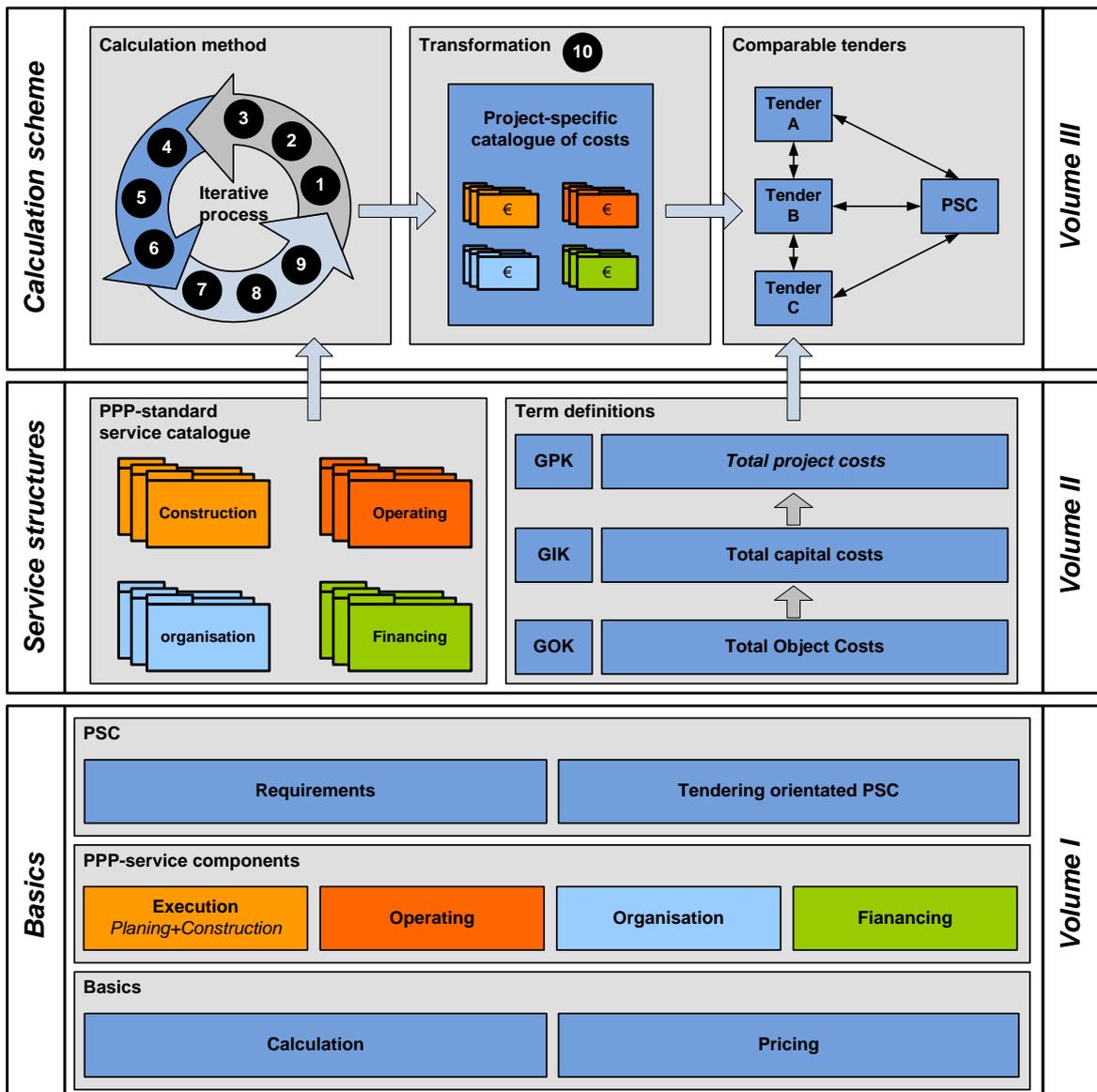
The research project “Development of a method for PPP-life cycle costing” was conducted in three comprehensive steps: development of the basics, definition of service- and term structures and development of a calculation method.

In the first step, general basics of calculation and pricing were depicted and the PPP-service components (Execution, operating, organisation and financing) and their respective sources (e.g. standards), as well as the basics for a tender oriented Public Sector Comparator (PSC) deduced from theory and praxis were displayed. The first basic section is to be understood as the theoretical basis for the research project and is essential for the understanding of PPP-projects. For knowledgeable readers this section mainly serves as a useful reference for the basics in PPP-projects.

In the second step general terms and structures for the calculation of PPP-projects got defined. A catalogue of all the services normally occurring in PPP-projects was developed as a consistent standard. Thus the potential to consider all sorts of PPP-services in the calculation was created. Furthermore, uniform term structures for PPP-offers were defined. The general standards and definitions created in this section can also be used detached from this specific calculation method with any PPP-projects.

In the third step the actual calculation method with its four integral process steps was developed. It is based on the essential findings and results that were developed in the previous steps.

To mirror the structure of the research project, the final report was divided into three volumes, so that each reader can find the desired content easy and quick. The following figure explains in a graphic form the described procedures within the respective research steps and shows the corresponding classification of the research reports in volumes I to III.



The research project was supervised and assisted by a committee of specialists with various professional backgrounds. The committee was composed of public authority representatives, large and medium-sized PPP-contractors, the research patron BBR and the big German building associations, and could therefore give essential help while working on the research project and established the results in the public sector and in the industry.

### **3 Summary of the achievement**

This newly developed method for PPP-costing will be of essential help to the calculation of PPP-projects, in order for them to meet the high and complex requirements of an economic life cycle costing approach.

In the research work, connections, relations and influences between service sectors were analysed and their relevance for life cycle costs was checked. If, for example, more money is invested in a good insulated outer shell during the construction, the heating costs during the operating stage will be lower. A carpet as flooring will cause different cleaning costs during the operating stage than linoleum. Additionally it must be exchanged more frequently. The developed method that takes these connections into consideration yields a much better comparability of tenders and their long term validity.

When it comes to the costs of PPP-projects, different terms without consistent definitions are in use. Thus, terms that provide a clear distinction between costs and service are defined, such as total object costs, total capital costs and total project costs. Many different standards and guidelines describe the occurring services in the life cycle of a building. For PPP-projects, which generally have terms from 20 to 30 years, neither a consistent tendering structure nor a consistent monitoring structure exists to date. That is why Stuttgart's construction operation experts developed a structure in the form of a PPP-standard catalogue. The method of how to consider connections and relations between service sectors was also integrated in this catalogue.

Hence it allows the user to do better benchmarking of tenders. Not only the costs of tender analysis, but also the costs for risk premiums could be reduced or even saved altogether, because services and associated expenses become much better predictable. Thanks to the simplified identification of the most economic tender with the help of the standard method for the calculation of PPP-projects, the user receives an ideal construction for the best possible building price. The developed method for PPP-life cycle costing is characterised by the newly created consistent and integrated calculation background. This basis offers the possibility to display costs in an adequate and comparable way, even if the procedure differs during the actual calculation. In this stage of development the integrated costing method consolidates the four service parts execution, operating, organisation and financing of a PPP-project.