PPP process models for service provision – PPP performance process model

Jennifer Dreyer, ETH Zurich, Switzerland (email: dreyer@ibb.baug.ethz.ch)
Gerhard Girmscheid, ETH Zurich, Switzerland (email: girmscheid@ibb.baug.ethz.ch)

PPPs (Public Private Partnerships) have been conducted as a practical form of cooperation between the public sector and the private economy since the 1940s. As science only started focusing on this issue at a much later date, the theoretical design of PPPs and in particular the corresponding processes are extensively unstructured. To reduce the complexity of PPPs and prevent opportunistic attitudes within the partnership, structuring, scientifically based models are needed that can serve as recommendations for actions for the participants of a PPP. Through the application of process models, PPPs can be incorporated into a wider spectrum of public works thus increasing efficiency. With the main objective of structuring PPP processes, this paper presents a PPP performance process model for structuring the functional-operational processes of a service provision PPP.

Keywords: Public Private Partnership, process model, cooperation, street maintenance and rehabilitation.

1. Introduction

Public Private Partnerships are an issue that first gained relevance in practice, before becoming the focus of science and research. The late involvement of science in the PPP development process caused the PPP processes to be extensively unstructured. The task of science is now to supply clear process structures for complex and long-lasting partnerships incorporating scientific theories, thus opening PPPs to a wider spectrum of public works and improving efficiency in future. The Institute for Construction Engineering and Management of the ETH Zurich is developing a process model for the maintenance and rehabilitation of communal street networks in Switzerland, which structures the cooperation between the public and private sectors for a service provision PPP [1].

2. Research methodology

In order to obtain scientific findings in business management issues, the hermeneutic paradigm [2] is being adapted for business and management research, leading, i.e., to the constructivist paradigm. The constructivist research approach aims at structure new socio-technical systems based on an intended input-output relation. The validation of the research project is based on triangulation, whereby the Principal-Agent Theory [3] and Giddens’ Theory of Structuration [4] are applied for theoretical reference framework.

3. Definitions

The entire spectrum of public-private cooperations can be structured by the “degree of cooperation” [5]. The degree (intensity) of cooperation is defined using a combination of the “degree of formal institutionalization” and the “scope of tasks of the PPP” (Fig. 1).
division of the public sector is a characteristic of the service provision PPP, the basic PPP model groups PPP outsourcing models and strategic PPP cooperation models could be applied.

4. Status of research

Existing research approaches mainly focus on the so-called procurement PPPs. To date there are no approaches in literature known in regard to structure service provision PPPs for those whole public divisions. As such, there is a general need to develop both functional-operative and normative-strategic structures for service provision PPPs.

5. PPP process model for maintenance and rehabilitation of communal street network

The overall PPP service provision process model [1] is structured into three linked parts: Partial PPP process models by the dimensions "phase" and "level of action". The high integration of the partial PPP partnership process model and the partial PPP performance process model in the performance phase is shown in figure 2. The high interlinked and integrated processes consist of two task categories, the coordination and routine processes (Fig. 2).

Coordination tasks, which consist of predictable tasks and ad hoc tasks, have to be annually or ad hoc planned by the planning and controlling board on the strategic level within the partial PPP partnership process model. After planning the proposals will be submitted to the public authority for decision making. The PPP performance process model is based (dependent) on the input of the strategic level (PPP partnership process model) in form of the local authority's decisions that include which coordination tasks should be performed in the actual period. The coordination tasks will be executed according to additional contracts based on the stipulations of the basis contract.

The routine tasks do not need any coordination. For their execution performance and output standards are initially determined in the contract. These standards ensure service performance for the routine tasks on the basis of output standards, such as the cleanliness index and other quality indicators. Following these modalities, the PPP project controlling is guided by the functional tender, which includes functional requirements of performance specification, thus allowing the private partner to choose how to fulfill the specified tasks. The results and the quality of the services need to be assessed by the public sector (or the planning and controlling board).

7. Conclusion

A PPP generates complex processes that can initially hinder their use for the performance of public tasks. The PPP performance process model enables non-opportunist partnership and cooperation agreements by focusing on the core competencies of the involved players and by structuring the processes.

References

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Jennifer Dreyer
ETH Zurich, Zurich, Switzerland (email: dreyer@ibb.baug.ethz.ch)
Gerhard Girmescheid
ETH Zurich, Zurich, Switzerland (email: girmscheid@ibb.baug.ethz.ch)

Abstract

PPPs (Public Private Partnerships) have been conducted as a practical form of cooperation between the public sector and the private economy since the 1940s. As science only started focusing on this issue at a much later date, the theoretical design of PPPs and in particular the corresponding processes are extensively unstructured. In practice this leads to PPPs being conducted with considerable effort und improvisation. To reduce the complexity of PPPs and prevent opportunistic attitudes within the partnership, structuring, scientifically based models are needed that can serve as recommendations for actions for the participants of a PPP. Through the application of process models, PPPs can be incorporated into a wider spectrum of public works thus increasing efficiency. With the main objective of structuring PPP processes, this paper presents a PPP performance process model for structuring the functional-operative processes of a service provision PPP (tasks of a whole public division).

Keywords: Public Private Partnership, process model, cooperation, street maintenance and rehabilitation.

1. Introduction

The first Public Private Partnerships emerged back in the 1940s in the USA as part of President Franklin Roosevelt's "New Deal" policy, although they were not called as such [1]. Pittsburgh is the best-known example, where the public sector and private economy joined forces in various companies to promote business development in the region [1]. Great Britain initiated cooperation between the public sector and private economy at a level that was exemplary throughout Europe in its Private Finance Initiative in the 1990s [2], producing efficiency improvements of up to 17% [3].

As such, Public Private Partnerships are an issue that first gained relevance in practice, before becoming the focus of science and research. The late involvement of science in
the PPP development process caused the PPP processes to be extensively unstructured. The task of science is now to supply clear process structures for complex and long-lasting partnerships incorporating scientific theories, thus opening PPPs to a wider spectrum of public works and improving efficiency in future.

Practical requirements with regard to PPPs focus primarily on project delivery, business and cooperation models, as well as on recommendations for action that can be applied by both the public sector and the private economy.

To satisfy the above mentioned requirements, the Institute for Construction Engineering and Management of the Swiss Federal Institute of Technology Zurich (ETH Zurich) is developing a process model for the maintenance and rehabilitation of communal street networks in Switzerland (together with the Federal Transport Ministry), which structures the cooperation between the public and private sectors for a service provision PPP.

2. Research methodology

In order to obtain scientific findings in business management issues, the hermeneutic paradigm [4] is being adapted for business and management research [5], leading, i.a., to the constructivist paradigm [6] [7]. The constructivist research approach aims to structure new socio-technical systems based on an intended input-output relation [5].

The validation of the research project is based on triangulation. Triangulation begins with the development of the constructive-deductive process model based on an intended input-output relation. The next triangulation step deals with embedding the theoretical reference framework in the constructive-deductive model, serving to eliminate the researcher's subjectivity and, thus, ensuring objectivity.

The Principal-Agent Theory [8] and Giddens' Theory of Structuration [9] are applied as theoretical reference framework. The Principal-Agent Theory [8] constitutes the theoretical base for optimally structuring contractual incentive mechanisms to protect against opportunistic behaviour. Structuration Theory [9] explains the formation of social structures, such as partnerships or actions. The Structuration Theory in organizational science consists of three dimensions: the duality of structure, the stratification model of the agent and the dialectic of control. It will be applied for structuring the functional cooperation relation.

The triangulation is completed by realizability test, where the theory-based constructive-deductive process model is subjected to constructive analytic testing to
evaluate whether the forecast input-output relation can be achieved (review of the input-output relation).

3. Definitions

Public Private Partnership is a contractually formalized long-term form of cooperation based on partnership between the public and private sectors with constituent characteristics [10]. The entire spectrum of public-private cooperations can be structured by the “degree of cooperation”. The degree (intensity) of cooperation is defined using a combination of the “degree of formal institutionalization” and the “scope of tasks of the PPP” (Fig. 1). In terms of their formal institutionalization, PPPs can be split into two forms of contractual agreement:

- Contractual agreements, where the (minimum) two parties stay economically and legally independent, and contractually agree on the cooperative exchange of certain services or goods.

- Partnership agreements between (minimum) two parties to form a new joint PPP-corporation, which deals with the obligations of the parties to the joint corporation.

In terms of their scope of tasks, PPPs can be differentiated in (Fig. 1):

- Life cycle based procurement PPPs for complete projects, including design, financing, construction and operation phase within a specific public division, and

- Service provision PPPs for certain tasks of a whole public division within the operation phase (only) (performing services and providing products over a long period of time).

![Fig. 1 Distinction among the PPP basic model groups in reference to formal institutionalization and scope of tasks](image-url)
Based on the degree of cooperation (formal institutionalization and scope of tasks of the PPP, Fig. 1) the PPP spectrum can be systematized into three basic PPP model groups:

- **PPP Outsourcing models** – low degree of cooperation:

  Elementary form of PPP-cooperation based on the stipulated contractual agreement to transfer certain public tasks/services of a whole public division to private provider. Examples of such cooperation include the operation of IT-installations of public administration (whole public division) and the operation of public facilities (school, swimming pool, sport arenas).

- **PPP Contract models** – medium degree of cooperation:

  Complex, sophisticated form of PPP-cooperation based on the stipulated contractual agreement to procure complete projects, additionally including the operation over a defined period of time. Examples of such cooperation include the design, construction, financing and operation (whole life-cycle) of public infrastructure facilities, such as schools, tunnels or roads by a private enterprise.

- **Strategic PPP Cooperation models** – high degree of cooperation:

  Most integrative form of PPP-cooperation based on a partnership agreement to procure complete projects as well as certain public tasks of a whole public division. Examples of such cooperation include joint ventures comprised of the public sector and private enterprises that are set up to design, build and operate public infrastructure facilities, such as schools, tunnels or roads or to perform services as the operation of infrastructure facilities.

As the fulfilment of certain tasks of a whole division of the public sector is a characteristic of the service provision PPP, the basic PPP model groups PPP outsourcing models and strategic PPP cooperation models could be applied.

### 4. Status of research

International literature (cf. also [10]) on the subject of Public Private Partnerships mainly focuses on discussing and presenting cost-efficiency analyses (Public Sector Comparator), financing including risk management processes, as well as contractual aspects ([11] [12] [1] [13] [14] and many more).

The phase wise description of PPP project procedures, which roughly outline the steps needed for a PPP, can be used as an initial approach to develop process models ([15]...
Guidelines issued by public institutions explicitly outline only certain parts of the value chain of a PPP, such as the selection of bidders and the evaluation of bids [16], or guidelines for the involvement of personnel into a PPP [3]. As such, these guidelines only deal with certain parts of a PPP, which leads to the PPP being controlled by the public sector in certain partial aspects only.

Hintze [18] outlines proposals for the handling of decision-making problems as they occur at BOT projects. For these BOT projects he supplies the theoretical draft for the distribution of responsibilities between client and contractor. Kuhmlehn [19] develops a fair, objective and interest-reconciliating tender and award model to be used for standardizing PPP tenders and awards [19].

Process models in business management are primarily used to structure normative-strategic and operational processes within a company. The development of structured, particular partnership process and organizational models has not much progressed in research. Based on the approaches by Hintze [18] and Kuhmlehn [19], this research project will structure the cooperation between the public and private partners from the initiation of the project up to the dissolution of the PPP. It focuses on the phase of performance (contract fulfilment) and here, in particular, on the avoidance of opportunistic behaviour, conflicts and confrontation thus improving efficiency of PPP by ensuring an optimal process structure.

Existing research approaches mainly focus on the so-called procurement PPPs, which are characterized by the provision of private capital and the construction and operation of specific public projects within a specific public division. PPPs can also be used to improve efficiency of certain public tasks of a whole public division that do not require investment. To date there are no approaches in literature known in regard to structure service provision PPPs for those whole public divisions. As such, there is a general need to develop both functional-operative and normative-strategic structures for service provision PPPs.

5. PPP process models for maintenance and rehabilitation of communal street network

5.1 Street maintenance and rehabilitation as the subject of a PPP

The presented research project deals with the maintenance and the rehabilitation of communal street networks, which are tasks over a whole public division that encompasses the operational phase during the life cycle of the infrastructure and is defined as “service provision”. Unlike a procurement PPP, the infrastructure is already
existing, and is not being built within the scope of the PPP. Instead the infrastructure is being maintained, rehabilitated, repaired or partly renewed.

In order to structure the processes and develop a process model, each responsibility, function or task needs to be assigned to either the private enterprise or the local authority. To identify and properly describe the tasks needed to maintain and to rehabilitate the streets, the task categories and their associated tasks for maintenance and rehabilitation of the street network system have to be (clearly) defined. The aim should be to ensure that the private partner performs as many maintenance and rehabilitation tasks as possible in order to best exploit the synergetic potential arising from the partnership.

The task categories of communal street maintenance and rehabilitation can be classified into routine and coordination tasks (Fig. 2). Routine task categories, such as basic cleaning, must be performed continually and recurrently. Coordination task categories consist of predictable tasks and ad hoc tasks. (Fig. 2) Predictable tasks, for example rehabilitation works, are plan able measures, which have to be managed by a 1-5 year plan. Ad hoc tasks, for example measures due to heavy natural impacts by rain or snow or unforeseen man-made damages, have to be coordinated and managed by ad hoc measurements.

<table>
<thead>
<tr>
<th>routine task category</th>
<th>coordination task category</th>
<th>predictable (per year)</th>
<th>ad hoc</th>
</tr>
</thead>
<tbody>
<tr>
<td>snow and ice clearing operation</td>
<td></td>
<td></td>
<td>complete snow and ice clearing operation</td>
</tr>
<tr>
<td>street cleaning</td>
<td>basic cleaning</td>
<td>cleaning because of happenings</td>
<td>cleaning because of natural disaster</td>
</tr>
<tr>
<td>small rehabilitation</td>
<td>rehabilitation because of abrasion</td>
<td>rehabilitation because of unforeseen damages</td>
<td></td>
</tr>
<tr>
<td>street lightning</td>
<td>basic cleaning</td>
<td>renovation / upgrading</td>
<td>repair / replacement because of unforeseen damages</td>
</tr>
<tr>
<td>technical services</td>
<td>basic cleaning</td>
<td>renovation / upgrading</td>
<td>repair / replacement because of unforeseen damages</td>
</tr>
<tr>
<td>botanical maintenance</td>
<td>basic maintenance</td>
<td></td>
<td>maintenance because of unforeseen damages</td>
</tr>
<tr>
<td>repair and renovation / new projects</td>
<td></td>
<td></td>
<td>repair, renovation and upgrading because of abrasion</td>
</tr>
</tbody>
</table>

Fig. 2 Task assignment matrix
5.2 Configuration of PPP process models for service provision

The aim of process models is to reduce the complexity and uncertainties in order to minimize the contractor’s information advantage over the client and vice versa, thus largely avoiding opportunistic behaviour, and to create a win-win situation for the partners.

To define a process model for the complex situation within a service provision PPP the successive breakdown of the value adding process into modules, elements, and particular tasks is needed [20].

The overall PPP service provision process model [20] is structured into the two dimensions of “phase” and “level of action” (Fig. 3) The dimension “phase” is chronologically structured into “concept-tendering phase” and “performance phase”. The dimension “level of action” is structured into the normative-strategic and the operational level. Out of these dimensions three interlinked partial PPP process models for the overall model of PPP service provision are derived (Fig. 3).

<table>
<thead>
<tr>
<th>level of action</th>
<th>phase of concept-tendering</th>
<th>phase of performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>normative / strategic</td>
<td>(partnership does not exist)</td>
<td>PPP partnership process model</td>
</tr>
<tr>
<td>operational</td>
<td>PPP tender and award process model</td>
<td>PPP performance process model</td>
</tr>
</tbody>
</table>

Fig. 3 The interlinked partial PPP process models for street maintenance and rehabilitation services

The PPP tender and award process model includes the operative processes during the concept and tender phase and provides local authorities with a procedure for initiating the PPP, the call for tender of the PPP services, and the involvement of a private partner for the PPP.

The PPP partnership model comprises the normative-strategic processes during the performance phase. The model contains guidelines and procedures for the strategic planning and controlling of the PPP service provision, especially for the planning of predictable and ad hoc tasks and the overall performance controlling. To ensure the objectives of this service provision PPP, a planning and controlling board with participants of both partners is implemented. Furthermore the relationship between the two partners must be formed on the normative-strategic level, which is based upon
transparent procedures for decision preparation and decision making, conflict-solving mechanisms and information systems. On this normative-strategic level the relationship between the partners and their objectives, culture, norms and values are established.

The PPP performance model comprises the functional-operative processes during the performance phase and is therefore just one of a total of three partial PPP process models needed to structure this complex service provision PPP for street maintenance and rehabilitation. The PPP performance process model focuses on the execution of the routine and coordination tasks as well as on output controlling.

The partial PPP process models are interlinked by gaining input from and providing output to each other. The description of the PPP’s functions and tasks need to be defined as an input for the contractual agreement almost within the PPP tender and award model. Thus, the functional-operative PPP performance process model represents the basis for the PPP tender and award process model. It also provides the basis for the PPP partnership process model, because the procedure of the functional-operative processes constitutes important directives for the cooperation in the partnership. These procedures must be embedded in the partnership’s culture and policy. The partial PPP performance process model plays a decisive role in the overall process model.

5.3 Mechanisms of the PPP performance process model

The high integration along the level of action of the partial PPP partnership process model and the partial PPP performance process model in the performance phase is shown in figure 4.

The high interlinked and integrated processes consist of two task categories, the coordination and routine processes (Fig. 4). As stipulated, the routine processes and respectively their tasks (routine tasks) do not need any coordination, because they have to be executed according to contractual requirements. Routine tasks are managed/controlled by the company. For the execution performance and output standards are initially determined in the contract. These standards ensure service performance for the routine tasks on the basis of output standards, such as the cleanliness index and other quality indicators. Following these modalities, the PPP project controlling is guided by the functional tender, which includes functional requirements of performance specification, thus allowing the private partner to choose how to fulfil the specified tasks. The results and the quality of the services need to be assessed by the public sector (or the planning and controlling board).

Coordination tasks, which consist of predictable tasks as well as ad hoc tasks, are subject of the coordination process. They have to be ad hoc or annually planned,
coordinated and dedicated within the PPP partnership process model according to the normative-strategic requirements and their regulations. After planning the coordination tasks by the planning and controlling board the proposals will be submitted to the public authority for decision making. The coordination tasks will be executed according to additional contracts based on the stipulations of the basis contract.

**Fig. 4 PPP partnership and performance process models of a service provision PPP**
The PPP performance process model is based (dependant) on the input of the strategic level (PPP partnership process model). The contractor who performs the routine and coordination tasks is the main player in the partial PPP performance process model.

Coordination tasks and routine tasks can be reconciled as follows: The contractor is provided with an annual contractually specified budget (routine budget) that covers both the routine tasks and a contingency for ad hoc tasks. In addition, to maintain the street quality throughout the life cycle, an annual budget for predictable tasks of first priority (predictable budget) is provided. The predictable tasks of first priority are proposed by the planning and controlling board and approved by the local authority.

If ad hoc tasks are not needed or do not fully arise within the budgeted year, the contractor can propose to the board, to use this contingency in the following year for predictable tasks of second priority. Before carrying out those tasks, the contractor has to await the respective decision of the planning and controlling board. As such, the contractor can optimize his capacities, and is at the same time covered in terms of annual contract volumes. The advantage for the local authority of this adaptable services plan is the steadiness and control of budgets and the transition to flexible services of predictable tasks resulting in optimal assurance of the street network quality and of user safety and satisfaction.

If over several years no resources from the ad hoc contingency become available for predictable tasks of second priority, these tasks become first priority and will be executed with resources out of the predictable budget, which is passed recently every year. Ongoing controlling by the contractor and the planning and controlling board ensures optimal coordination between contract fulfilment (operative realization process) and budget planning (planning process).

6. Conclusion

A PPP generates complex processes that can initially hinder their use for the fulfilment of public tasks. The partial PPP process models enables non-opportunistic partnership and cooperation agreements by focusing on the core competencies of the involved players and by structuring the processes.

PPP process model increases the benefit for the client (public sector) within a PPP by implementing efficient cost-performance structures. In times of stagnating or even declining public budgets local authorities can gain competitive advantages compared with other communities. For the private partner PPP for the maintenance and rehabilitation of communal street network constitutes a new challenging business
In addition the PPP approach offers opportunities to economically increase the taxpayer’s value for money.

In times of conflict and confrontation in the construction industry, PPP process models provide the basis for partnership-based cooperation by specifying the actions and the decision making processes among the partners by means of a scientifically founded process structure based on the theoretical reference framework of Theory of Strategic Network, Structuration Theory and Principal-Agent Theory.

References


