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PPP process model for service provision
PPP tender and award process model

Author(s):
Dreyer, Jennifer; Girmscheid, Gerhard

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ABSTRACT
Public Private Partnership (PPP) is a project delivery form which was been common practice since the 1940s. Science and research started focusing on PPP at a much later date, which has led to largely unstructured PPP processes. The task of science is to supply clear process structures for complex and long-lasting partnerships incorporating scientific theories, thus opening PPPs to a wider spectrum of public works, improving efficiency in future and preventing opportunistic behavior. The paper presents a PPP process model for communal street maintenance and rehabilitation in Switzerland with a main focus on the tender and award phase, embedding two new aspects. The first aspect is the service provision PPP. The second aspect includes the incorporation of strategic tasks for the development and the extension of street maintenance and rehabilitation and of constitutive tasks for the formation and the execution of the partnership besides contracting operational tasks.

KEYWORDS
Public Private Partnership, process model, cooperation, street maintenance and rehabilitation, tender and award

1. INTRODUCTION
The aim of a process model 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 behavior, and to create
a win-win situation for both partners. This is the only means of ensuring fair cooperation among the partners, which is absolutely crucial for a PPP to be efficient.

The Institute for Construction Engineering and Management at 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, enacted and in cooperation with the Federal Transport Ministry.

In order to differentiate from existing PPP approaches, the paper focuses on two new aspects. The first aspect is the service provision PPP for maintenance and rehabilitation of communal street networks, which is part of or the entire public task within a specific public division without any investment by the private partner. The second aspect is the incorporation of strategic tasks for the development of maintenance and rehabilitation and the extension of the street network and of constitutive tasks for the formation and the execution of the partnership within a PPP besides contracting operational tasks. The aim of the research work is to structure

- the tender and award process;
- the procurement process; and
- the partnering model.

for the planning and the decision making process for strategic tasks to prevent opportunistic behavior of the partners involved (Girmscheid, 2005).

PPP process models for long-lasting co-operations are not only important for developed countries but also for developing countries, to guide and control the emerging PPP projects into a win-win situation for both, the public and the private partner. Opportunistic behavior, which can easily occur when experienced PPP providers are dealing with the public organizations of developing countries, can be eliminated only by using PPP process models with a clear conceptual structure.

2. STATE OF PRACTICE - PROCUREMENT AND SERVICE PROVISION PPP

Public Private Partnership is a contractually formalized long-term form of cooperation based on partnership between the public and private sectors with constituent characteristics (Girmscheid and Dreyer, 2006).

PPPs are an attempt to raise efficiency in the fulfillment of public tasks. The aim of PPP is to ensure the taxpayers value for money (HM Treasury, 2000). Public efficiency is primarily improved by uniting entrepreneurial efficiency and public service know-how combined with faithful behavior in partnership. The efficiency drivers are characterized by the following factors (cf. (Girmscheid and Dreyer, 2006)):

- Sharing of risks;
- Life cycle orientation;
- Process oriented workflow within the partnership;
- Allocation of resources and know-how by the partners.
According to the definition of HM Treasury (HM Treasury, 2000) PPPs are explicitly foreseen for public works that do not involve investment. The first pilot projects for pure street maintenance are already ongoing in Great Britain (Portsmouth).

Following the international approach the entire spectrum of public-private cooperations can be structured in terms of the scope of tasks into two forms (Fig. 1):

- **Life cycle based Procurement PPP** for complete projects within a specific public division, including design, financing, construction and operation phase, and
- **Service Provision PPP** for part of or the entire task within a specific public division in the operation phase (performing services and providing products over a long period of time).

Street maintenance and rehabilitation as the subject of the current research project have to be classified to the second type of PPP (service provision PPP) as they fulfill a part of or the entire task within a specific public division.

Within a pure service provision PPP constitutive and strategic tasks have to be integrated in addition to operational tasks, to guarantee the cooperative and reliable nature of a PPP and to ensure efficiency, which distinguishes the service provision PPP from simple outsourcing of maintenance and rehabilitation works. The constitutive and strategic tasks should ensure best practice in fair and faithful cooperation.

### 3. STATE OF RESEARCH

International literature (cf. (Girmscheid and Dreyer, 2006)) on the subject of Public Private Partnerships mainly focuses on discussing and presenting cost-efficiency analyses (Public Sector Comparator), financing including risk management, and contractual aspects (e.g. (Grimsey and Lewis, 2004) (Roggencamp, 1999) (Merna and Owen, 1998) (Girmscheid, 2006a)).

Existing descriptions of the phases of PPP project procedures outline the steps needed for a PPP only roughly (Savas, 2000), (Behnen, 2004) (Girmscheid, 2006b). 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, or guidelines for private partners to take on public sector employees (HM Treasury, 2000). As such, these guidelines only deal with certain parts and phases of a PPP.

Hintze (1998) outlines proposals for the handling of decision-making problems as they occur at BOT projects. For these BOT projects he supplies a theoretical draft for the distribution of responsibilities between client and contractor. Kumlehn (2001) develops a fair, objective and interest-aligning tender and award model to be used for standardizing PPP tenders and awards.

Process models in business management are primarily used to structure strategic and operational processes within a company.

Existing research approaches focus on procurement PPPs within a specific public division. But PPPs can also be used to improve the efficiency of part of or the entire public service tasks within a specific public division without investment. To date there are no known approaches in literature with regard to the formation of such service provision PPPs.

Based on these approaches (Hintze, 1998) (Kumlehn, 2001), the research project is structuring the partnering between the public and private partners from the initiation up to the dissolution of the service provision PPP within a specific public division without investment by the private partner.

4. RESEARCH METHODOLOGY

In order to obtain scientific findings in business management issues, the hermeneutic paradigm (Guba and Lincoln, 1994) is being adapted for business and management research (Girmscheid, 2004), leading, i.a., to the constructivist paradigm (von Glasersfeld, 1998). The constructivist research approach aims to structure new socio-technical systems based on an intended input-output relation (Girmscheid, 2004).

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.

System theory (von Bertalanffy, 1973) and the principles of cybernetics (Ashby, 1956) are applied to structuring both the PPP structure frame and the PPP tender and award process model. System theory enables the analysis of structures and functions (processes) of the PPP with the aim of forecasting system behavior.

The principal agent theory (Jensen and Meckling, 1976) and Giddens' theory of structuration (Giddens, 1985) are applied as a theoretical reference framework for the PPP partnering model and the PPP performance process model to restrict opportunistic behavior (PPP performance process model and PPP partnership process model). The principal agent theory (Jensen and Meckling, 1976) constitutes the theoretical base for optimally structuring contractual incentive mechanisms.
to protect against opportunistic behavior. The theory of structuration (Giddens, 1985) explains the formation of social structures, such as partnerships or actions. The theory of structuration 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).

5. PPP PROCESS MODEL FOR MAINTENANCE AND REHABILITATION OF COMMUNAL STREET NETWORKS

The development of the PPP process model for a service provision PPP is based on two layers (Fig. 2). The first layer is system theoretically developed. It is the background layer and can be denoted as “PPP structure frame”. The second layer is the model layer. It covers the “overall PPP process model”.

5.1 The background layer - PPP structure frame

The PPP structure frame provides the system theory-based background for the development of the PPP process model. It is composed of three levels (Fig. 2):

- the global environment level (pictured as dark gray area, Fig. 2);
- the partnership level (pictured as light gray area, Fig. 2); and
- the model dimension level (pictured as a cube in the centre, Fig. 2).

The PPP process model, to be developed, is embedded in the global environment level, which covers the interacting interests of the involved stakeholders of a PPP, such as sovereign, users, legislation and employees. The global environment level ensures the consideration of political, legal, environmental and social factors, that must be taken into account for any entrepreneurial (or political) action (Sydow, 1992).

The global environment level influences the partnership level, which is comprised of (one or more) private enterprises and an administrative unit of the public sector, who establish the actual “public private partnership”. The partnership level constitutes the setting for the PPP process model, to be developed, as it contains the two partners cooperating in the partnership.

The model dimensions, which are the foundation for the development of the PPP process model, are incorporated into the partnership level.

The three model dimensions form the core of the PPP structure frame. They generate the processes, which need to be described in the PPP process model. The model dimensions are defined as (Fig. 2):
Phases;
Action levels;
Levels of process detail.

The dimension "phases" consists of the chronological sequence of "concept and tender phase" and "execution phase".

The dimension "action levels" distinguishes between constitutive, strategic and operational tasks within the PPP.

The "levels of process detail" covers the "main processes", which define the central process modules at a low level of detail, and the "elementary processes", which subdivide the main processes into individual activities and decisions at a high level of detail.

The PPP structure frame ensures that the processes within a PPP are interlinked in two ways, on the one hand in organizational terms to internal influencing factors (partnership level - partners and resources) and on the other hand in political terms to external influencing factors (global environment level - sovereign, private enterprise(s), resources, standards and ideals, interests and concerns).

**Figure 2** Two layers of a PPP process model
environment level - users, sovereign, legislation, employees). As such, the elementary processes can be clearly assigned to the relevant partner, and external influences on the processes can be captured.

5.2 The model layer - overall PPP process model

The overall process model of service provision PPP consists of three partial PPP process models and is derived by interlinking the model dimensions “phases” and “action levels” (Fig. 3).

During the concept and tender phase only operational tasks take place, which are explained within the system theory-based PPP tender and award process model. Thus, the PPP tender and award process model includes initialization, planning, tender and award of the PPP delivery form. It provides local authorities with a procedure for initiating the PPP, for evaluating the risks and the economic advantage, for the call for tender of the PPP services, and for the involvement of a private partner in the PPP. The PPP tender and award model plays a decisive role within the three partial process models, because it provides the formation of the long term partnership.

During the execution phase constitutive, strategic and operational tasks take place. The PPP performance model comprises the operational processes as well as the strategic planning of the service provision during the execution phase (Dreyer and Girmscheid, 2006). It is theory-based, and developed using structuration theory and principal agent theory.

On the strategic level the PPP performance process model encompasses guidelines and procedures for the strategic planning and controlling of an optimal development of maintenance and rehabilitation of the communal street network by organizing the coordination tasks (predictable and ad hoc tasks) (Dreyer and Girmscheid, 2006). This planning must be executed by both partners, who agree the strategic and operational objectives for communal street maintenance and rehabilitation. The partners use the strategic planning to decide on the maintenance and rehabilitation strategies which include operational measures and procedures. Furthermore they agree on the resources to be deployed.

On the operational level the PPP performance process model focuses on the execution of routine and coordination tasks (Dreyer and Girmscheid, 2006) as well as on output controlling, including the management of staff and/or subcontractors, the provision of resources and the planning, control and monitoring of the operational processes. The operational tasks within the PPP performance process model aim to ensure efficient processes by adopting and implementing the measures and procedures defined at the strategic level.

The PPP partnering model comprises the constitutive processes, which are needed to form and execute a fair and faithful partnership during the execution phase. The PPP partnering process model is theory-based, and developed using structuration theory and principal agent theory. The constitutive action level comprises the formulation of the general objectives of the partnership, including principles, standards and rules that aim at fair
and faithful treatment among the partners. The constitutive processes focus on ensuring the social legitimation of the partnership actions. It covers the "political leadership" of the cooperation.
Figure 3 The overall PPP process model with its three interlinked partial PPP process models for street maintenance and rehabilitation services
The formation of the relationship between the two partners on the constitutive level is a crucial assumption for ensuring efficiency. The constitutive level serves to create (Bresnen and Marshall, 2000):

- trust and
- mutual commitment.

The partnering model includes all procedures for adopting the constitutive rules and for achieving the constitutive objectives. Various tools can be used to ensure partnership cooperation and trust, for example:

- Conflict-solving mechanisms;
- Team building exercises and workshops;
- Continuous improvement process (CIP);
- Decision-making process; and/or
- Application of the developed PPP process model.

The three partial PPP process models are interlinked interactively, by obtaining input from and providing output to each other. Both the PPP performance process model and the PPP partnering model need to be defined as an input for the contractual agreement almost within the PPP tender and award model.

### 5.3 Mechanisms of the PPP Tender and Award Process Model

Works relating to the service provision PPP are put out for tender and awarded in line with the statutory provisions of the relevant country. Based upon system theory (von Bertalanffy, 1973) and the principles of cybernetics (Ashby, 1956) the PPP tender and award process model can be broken down at first process level into (Fig. 4)

- six system-oriented, generic-chronological main processes and
- two cybernetic controlling processes, that control the main processes.

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<table>
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<th>player</th>
<th>administrative unit of the public sector</th>
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<td>external controlling: controlling of the entire concept and tender phase</td>
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<td>internal controlling: comparison of the targeted with the planned scope of work</td>
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**Internal controlling:**

- **Main Processes**
  - Initialization
  - System definition, inventory control, state of the network
  - Performance specification and contractual concept
  - Award process 1st phase
  - Award process 2nd phase
  - Award

**External controlling:**

- Value for money assessment
- 1st economic comparison
- 2nd economic comparison

*Figure 4 PPP tender and award process model (main processes)*
The first main process comprises the initialization of the PPP process. It starts with the idea of proving the PPP delivery form for the maintenance and the rehabilitation of the communal street network. Within the first main process the value for money assessment takes place. Only if the results of this assessment are positive, the PPP process progresses to the next main process. Otherwise, there has to be a verification of the assessment or the PPP process ends at this step.

In the second main process the public authority has to conduct an analysis of its actual situation in terms of street maintenance and rehabilitation by defining the street network system, which is concerned, by making an inventory control of the equipment and by determining the real state of the street network. Furthermore, the second main process comprises the first economic comparison (Girmscheid, 2006a), where the public authority has to establish its street maintenance and rehabilitation (PSC) costs and compare them with the costs of a potential private partner.

The third main process is the preparation of the award process; it consists of the preparation of the performance specification and the contractual concept. In addition to the purely operational works, the tasks at constitutive and strategic level also need to be defined in the contract as an important criterion for differentiating from simply outsourcing the street maintenance and rehabilitation works. Making the PPP partnering model an integral part of the contractual agreement enables optimal cooperation in partnership, which is crucial to achieve the efficiency of a service provision PPP.

The fourth and fifth main processes encompass the award process; because of the chosen selective procedure, the award consists of two steps. On the basis of the prequalification criteria, three to five appropriate bidders are evaluated in the first step, who can then submit their definite bids for the PPP in the second step.

The PPP tender and award process model is complete when the sixth main process is accomplished. Within the sixth main process the final economic comparison is executed (Girmscheid, 2006a). Only if the results are positive and the private service provision is less expensive than the public costs (PSC), the public authority is allowed to sign the PPP contract with the private partner.

In order to control the PPP tender and award process and to optimize efficiency and transparency within the model, there are two cybernetic controlling processes included, which encompass:

- external controlling and
- internal controlling.

External controlling focuses on controlling the entire concept and tender phase including the value for money assessment and the two economic comparisons.

Internal controlling focuses on reconciling the targeted with the planned scope of work. A complex performance specification for a long-term service provision PPP necessitates the guarantee that the
municipality will receive the scope (and quality) of works stipulated in the tender. The targeted scope of work is put out for tender by the local authority. The planned scope of work is the one which is offered by the private enterprises.

6. CONCLUSION

Because PPPs were implemented before they became the focus of research, PPP processes are largely unstructured. In order to be able to perform more previously public works within a PPP a structured, scientifically-based process model needs to be developed that can be used as recommendations for actions in practice.

This paper suggests a PPP process model for communal street maintenance and rehabilitation for a service provision PPP, (because pure street maintenance does not necessarily require prior investment by the private partner.)

In order to distinguish a service provision PPP from standard outsourcing of operational works and to ensure partnership cooperation within the service provision PPP, the tasks at constitutive and strategic as well as operational action level are transferred to the private partner. The PPP tender and award process model plays a key role. It ties the PPP partnership process model and the PPP performance process model in contractual terms into the PPP process. The overall PPP process model for communal street maintenance and rehabilitation enables the public sector to make efficient use of the delivery form PPP for previously public works.

7. REFERENCES

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