A Best Practice Framework of Output Specifications for PPP projects

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Abstract

Increasingly, the provision of infrastructure and municipal services is being undertaken by collaboration between the public and private sectors under the broad umbrella of PPP. When the public sector communicates its requirements to the private sector for the purposes of bid invitation, negotiation, payment administration and performance monitoring, output specifications are used instead of a set of prescriptive specifications. On one hand, output specifications need to provide room for innovations and flexibility for future changes. On the other hand, clarity and enforceability are important to fulfill their purposes. Based on previous research experience in developing a performance-based specification framework for specialist work contracting, a Best Practice Framework is proposed for specifying outputs of PPP projects. The proposed Framework embraces (1) Statements of client’s requirements; (2) Physical Asset requirements; (3) Service requirements, (4) Links to payment mechanism and performance evaluation; (5) Rectification; as well as (6) Change mechanism. Drawing lessons from reported case studies, positive recommendations and caveats against pitfalls have been included in the Best Practice Framework.

Key words: PPP projects, framework, output specifications
1. Introduction

With the increasing adoption of public and private partnerships in the provision of built assets and services, much research has been carried out with respect to how the project requirements should be communicated and how performance should be measured and thus achieving the objectives.

Usually, construction projects have their specifications written in either prescriptive or performance-based format, or a combination of both (Lam, et al. 2003). There has been a trend of shifting the procurement approach from a traditional (prescriptive) input-based specification which stipulates material and workmanship requirements to an output-based specification containing performance orientated requirements (Lam, et al. 2007). In other words, construction works are specified by what they should achieve and contractors are paid according to the performance of the completed assets. According to the Private Finance Panel’s practical guidance on PFI (Private Finance Initiative (a type of PPP projects prevailing in the UK), output specifications aim at defining services, not only requirements on the completed facilities (Private Finance Panel, 1996). This means, the focus is on what the facilities should serve in addition to the facilities and the construction work itself.

The benefits expected from the utilization of output specification are summarized in two areas below:

*Flexibility and Innovation*

The Private Finance Panel (1996) promoted the adoption of output specification because “outputs are only specifying what is required and give the service provider more freedom to decide how it is provided”. An output specification, acting as an important component in PFI contracts, gives more rooms for innovation and flexibility in service provision. The output specifications allow tenderers to propose any innovative solutions to the client as long as the alternatives help to achieve the requirements.

Similar opinions have been drawn from Akintoye and Beck (2009), who suggested that output specifications provided more room for private sector consortia to innovate and carry out flexible operation which would fully utilize their professional experience to find the most cost-effective solution. As such, the economic and financial benefits of PPP projects can be realized to achieve better value for money for public users.

*Risk transfer*

Apart from stating the client’s requirements on the facilities to be built and services to be provided, an output specification delineates responsibilities and sets out the framework for monitoring the quality of deliverables (Lam, et al. 2003). The risk of non-compliance, i.e., failure to meet the requirements, has been shifted to contractors. Contractors no longer have the excuse of only obeying what the client asks for. Instead, the end results are measured to assess the performance of the contractors and thus the payment due to them. Borun (2009) also pointed out that, under output specifications, contractors bear the responsibility and risk for deciding how they will provide the required services.
A successful and useful output specification requires the synergy of all project participants throughout the stages of a PPP project, from the procurement and construction phase through the long term operation and even until the handover point has been reached.

![Diagram of Workflow of Writing an Output Specification]

**Figure 1: Workflow of Writing an Output Specification**

2. **Client’s Requirements**

Astron (2004) and Lam, et al. (2007) opined that an output specification is essentially needed to act as a design brief for PPP projects and should form a core section of the Invitation to Negotiate document. These studies also revealed that an explicit output specification clearly stating what the authority wants to achieve is a key factor in a successful PPP project. This is very critical especially when taking performance measurement and monitoring into consideration. A good specification clearly states the client’s requirements and reduces the possibility of dispute in later operating stage (Akintoye and Beck, 2009). Meanwhile, a higher level of clarity increases certainty and reduces the risk of change following financial close (NAO, 2003).
Obviously, a good output specification is critical to a PFI project, but writing a clear and effective output specification is a very skillful and difficult job. The specification writer should have a detail mind presenting a comprehensive set of construction and service standards to the contractor. The writer should be equipped with a wide range of skills and knowledge in strategic policies and planning, project specific issues, design and build, facilities management and project finance (Astron, 2004). At the same time, the output specification should be general and not too prescriptive, leaving room for the contractors to provide innovative alternatives to accomplish the objectives and meet the client’s requirements.

In addition, different types of PFI projects have their special features, not only regarding the technicalities but also the presentation approach. The elements of a laboratory output specification would be more demanding than any other output specifications. (Borun, 2006). Therefore, it is unrealistic to have a standardized output specification which is valid for all types of PFI projects. Nevertheless, a broad framework can be applied.

In the following sections, fifteen general principles on writing a good output specification have been summarized, using examples to illustrate the key points being mentioned.

(1) An output specification should aim at giving the contractor an opportunity to offer their own solutions. Authorities are encouraged to state that they would welcome innovative alternatives (Private Finance Panel, 1996).

Example 1: Building Maintenance

“……Suppliers will be responsible for the maintenance……to a standard that permits service standards to be met……”

(2) Note that in the above example, there is not any defined requirement for a maintenance programme for the bidder to follow (Private Finance Panel, 1996). Any maintenance services, as long as they satisfy the authority, are welcomed. A technique for defining appropriate performance standards is to use the concept of "Equivalence", if the requirement is very similar or identical to some projects which have already been specified. Apart from that, the output specification for the project can also be set to equivalent preset standards (Private Finance Panel, 1996). Some typical examples adopted can be seen in: (i)“Waste Management Procurement Pack”: Key landfill diversion performance standards (August 2008); (ii) School Standards such as “The design development protocol for PFI scheme”, “School Standard Form PFI Agreements (non-BSF)” (August 2004), “Building school for the future standard document” (March 2005) (Ramsey, 2007).

(3) Output specification should be written by integration of the main PFI participants’ inputs. The outputs should be based on a good understanding and broad consideration of construction and service requirements and then integrated with life cycle considerations. This relies on an effective and efficient communication network with which the contractors, end users and all other interest groups exchange their opinions and experience.
Good output specification can help to avoid disputes over interpretation and subjectivity with reference to levels of service and standards (Akintoye and Beck, 2009). However, to provide a comprehensive output specification across different services without being too prescriptive is always easily said than done. A comprehensive output specification provides clear requirements to contractors for carrying out services that the client wanted. Meanwhile, it should not be too prescriptive, which makes writing good output specification a difficult job needing professional skills.

Example 2: Home care center – Furniture requirement in home care
“……Of a high standard capable of withstanding a high level of daily wear and tear……”

Service provider may misinterpret the requirement and provides furniture which is not robust enough (Akintoye and Beck, 2009).

As mentioned, the output specifications may refer to known standards and guidance. Care should be taken on enforceability of the standards; some of the standards are proven to be unenforceable as they were not specific enough. (CIPFA, 2007)

3. Payment Mechanism and Output specification

To avoid an absolutely fixed payment regime in a PFI project
In PFI projects, payment should contain an element that links to the services availability and performance. An absolutely fixed payment regime regardless of the availability, timeliness or quality of service delivery is not encouraged (Borun, 2002).

PFI projects usually make payments based on (1) Availability, (2) Periodic Unitary Charge (e.g., Monthly Unitary Payment, MUP) with adjustment or deductions for unavailability and non-performance, (3) Sharing of third-party revenues, (4) Indexation and (5) other approaches such as indirect non-financial incentives, Ratchet Mechanisms, individual event payment (e.g. variable payment for Singapore National Stadium on event days)

Clear indication of payment calculations in output specifications
An explicit formula demonstrating the payment mechanism will be helpful in reducing possible disputes between the authority and service provider.

Example 3: Singapore National Stadium (Lee, 2005)
“Adjusted Monthly Unitary Payment (AMUP)
= UP/12 + Variable Payment - Availability Deductions - Performance Deductions”

In Service Failure Deductions, two aspects should be borne in mind, i.e., the magnitude of failure deduction and its relationship with service priority category (PartnershipUK, 2005). The amount to be deducted should always be stated according to their priority of importance, which is provided in the output specifications. Example 4 shows such a priority table with ascending level of monetary deductions per core session of use of a school building.

Example 4: UK School Project

<table>
<thead>
<tr>
<th>Service Priority Category</th>
<th>Service Failure Deduction (£) per</th>
</tr>
</thead>
</table>

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Core Session

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Low</td>
<td>£5</td>
</tr>
<tr>
<td>Medium</td>
<td>£10</td>
</tr>
<tr>
<td>High</td>
<td>£20</td>
</tr>
<tr>
<td>Super</td>
<td>£50</td>
</tr>
</tbody>
</table>

Source: PartnershipUK, (2005)

(9) Sinking Fund Provision
Sometimes, a sinking fund provision might be required by the authority in restricting the usage of service providers’ money. Under the provision, services providers have to set aside a portion of their income such that they are financially capable to meet their future liabilities, i.e. facilities maintenance and services enhancement.

(10) To avoid setting KPIs which diminish the incentive to improve performance. All requirements should be specific enough to preclude the possibility of a lower service standard being provided by the contractor.

Example 5: Home care center – Vehicle for the elderly
“……Electronic tail gate to enable access for passengers in wheelchairs……”

In Example 5, a service provider may seek the loopholes or circumvent the requirements, only delivering the cheapest option available (Akintoye and Beck, 2009). The electronic tail gate as installed required a higher level of manual operation by the driver than anticipated. Although it seems that the contractor has provided the output, the quality of the services has not been met. Specification of the degree of automation would be necessary in this case.

(11) Avoid the vicious circle due to payment deduction
Akintoye and Beck (2009) stated that deduction payment would result in a vicious circle in that FM budget has been constrained, resulting in even poorer performance. In some projects, the KPIs will be deemed as a disincentive element by contractors (PartnershipUK, 2006). The concern is that a contractor will consider whether his action will result in under-performance as reflected by KPIs, thereby triggering performance deduction. Hence, they would prefer not to take the risk of improving performance either. Consequently, the conservative attitude leads to a vicious circle of deteriorating performance.

4. Performance Measurement

(12) The payment to contractor relies upon their service where availability is the basic criterion. Some services are not always needed to be available round the clock, thus an authority should state explicitly clear the periods over which availability is required (Sue and Swelt, 2006). In addition, an indiscriminate availability requirement is not necessary, since demand for various services should not be the same. The demand on emergency service, such as hospital emergency treatment, is always needed to be standing by, whilst a school is not necessary to be available throughout 24 hours.

Example 6 shows a clear time span of availability requirement:
“… School will be required between the hours of 8a.m. and 6p.m. …”
When dealing with payment matter related to unavailability, several conditions should be examined and included in the output specifications as the following scenarios show:

Scenario 1: Service is unavailable: No payment should be made for the period or a pre-agreed deduction should be effected.

Example 7: A PFI school project
Table 2: Availability Priority and Area Failure Deduction

<table>
<thead>
<tr>
<th>Availability Priority</th>
<th>Area Types</th>
<th>*Area Failure Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kiln room, laundry, habitat areas, minor stores etc</td>
<td>£10</td>
</tr>
<tr>
<td>2</td>
<td>Infrastructure areas and offices, meeting room, car parking, medical room, some stores</td>
<td>£20</td>
</tr>
<tr>
<td>3</td>
<td>Less student orientated areas such as staff resource areas, reception plus changing areas, central stores, other sports areas; long jump pits, running track etc</td>
<td>£30</td>
</tr>
<tr>
<td>4</td>
<td>Generally non-teaching but important support areas such as learning resource spaces, library, careers, group rooms, dining and social, pupil resource areas.</td>
<td>£35</td>
</tr>
<tr>
<td>5</td>
<td>General teaching spaces such as maths, English, humanities - areas that are more easily interchangeable in an unavailability situation. Also pupil and disabled toilets, external pitches.</td>
<td>£45</td>
</tr>
<tr>
<td>6</td>
<td>Specialist spaces which are difficult to replace such as science, music, technology, hall, specialist sports areas, special needs suites and provision.</td>
<td>£55</td>
</tr>
</tbody>
</table>

Source: PartnershipUK, (2005) *(£ per Core Session)*

Scenario 2: Service is unavailable but Authority still uses that service: Deduction of payment up to a certain amount (e.g. 50%) will be effected.

Scenario 3: Service is unavailable but since this is due to incidents beyond the control of the contractor, the service is deemed to be available (despite unavailability strictly against the measured criteria)

Example 8 shows clear distinction in a PFI School Project:
“IT equipment is to be provided by the LEA in a school PFI project. Lack of equipment in computer rooms should not determine unavailability of the area as the equipment is not being provided by the contractor”   Source: Sue and Swelt (2006)

5. Performance Monitoring

Robinson and Scott (2008) suggested that output specifications should state how and by which party monitoring will be conducted. Many researches conclude that at least one of the following monitoring methods should be adopted in output specifications for PFI projects: (1) Customer satisfaction survey, (2) Performance reporting (e.g. monthly audit from contractor himself or external adviser), (3) Fault reporting (e.g. number of monthly complaints from users) and (4) Other project-specific monitoring.
regimes. Table 3 shows an example of monitoring methods and frequencies adopted for school projects in the UK.

**Example 9: PFI school projects**

<table>
<thead>
<tr>
<th>Monitoring Method</th>
<th>Description/Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>School/the Contractor reports to Helpdesk, Helpdesk Records</td>
</tr>
<tr>
<td>2</td>
<td>Comparison with agreed Method Statements</td>
</tr>
<tr>
<td>3</td>
<td>Comparison against agreed benchmark</td>
</tr>
<tr>
<td>4</td>
<td>Contractor’s self-monitoring (in accordance with the Performance Monitoring Program)</td>
</tr>
<tr>
<td>5</td>
<td>Analysis of information contained in the Contractor’s duty rosters and other operational records</td>
</tr>
<tr>
<td>6</td>
<td>User satisfaction surveys</td>
</tr>
<tr>
<td>7</td>
<td>Review/reports by statutory bodies</td>
</tr>
<tr>
<td>8</td>
<td>School/LEA/DFES audit (analysis of complaints, random visits, validation checks of the Contractor data, deliberate testing etc)</td>
</tr>
</tbody>
</table>

Source: PartnershipUK, (2005)

*Monitoring frequencies can be classified as daily, weekly, monthly, semi-annually and annually.

However, potential pitfalls of some monitoring methods have been noted as follows:

1. Akintoye and Beck (2009) observed that user satisfaction survey was not linked to the payment mechanism in some of the PFIs. This undermines the enforceability of user satisfaction survey in their role of monitoring. Services providers may pay less attention or even ignore the survey which brings no harm to their payment.

2. Meanwhile, Borun (2002) as well as Akintoye and Beck (2009) pointed out that in many projects, contractors are doing self-monitoring, which was not rigorous enough, and hence eventually resulted in deteriorating service quality.

*Example 10 shows such a finding from a court service contract:*  
“*The contract also required Consul to produce self-monitoring reports … However, Consul had not regularly marked the services as required…”*

Source: Borun (2002), *PFI: The Laganside Courts, NAO*

Akintoye and Beck (2009) suggested the use of external advisers for service monitoring, basically to examine whether the facilities management services being provided complied with the contractual requirements.

(15) **Rectification Priority and Monitoring Frequencies**

Rectification is the remedies after service failure and is closely related to the availability and the performance standard required to be achieved, hence affecting the level of payment contractor will eventually receive. The rectification category should be clearly identified and the period allowed for restoring the services has to be specified accordingly.

PartnershipUK (2005) provides a good example in output specifications on rectification. It classifies 3 levels of priority, in descending orders with respect to their urgency, including Emergency, Urgent and Routine.

The description should be clear and flexible, and leave room for the contractor to tackle problems
using their own solutions. The rectification period should be reasonable and explicit to minimize potential disputes on payment calculation.

Example 11: Table 4: Rectification Specification

<table>
<thead>
<tr>
<th>Priority Category</th>
<th>Description</th>
<th>Rectification Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>Matters of an acute nature that impinge upon the health and safety of the users</td>
<td>Within 30 minutes</td>
</tr>
<tr>
<td>Urgent</td>
<td>Matters that impinge upon the operational function of the school including the operation of the Helpdesk service</td>
<td>Before commencement of the subsequent Core Session</td>
</tr>
</tbody>
</table>
| Routine           | Matters adversely affecting the user’s enjoyment of the school or otherwise of an administrative or routine nature | Within 10 Core Sessions’  

Source: PartnershipUK (2005)

6. Changes

PFI projects usually last for a long operating life ranging from 20 to 30 years or even longer, and thus, changes are very likely to occur during operation. It is highly recommendable that considerations on expected change of the service requirements and other related issues be given in output specifications. The specifications also need to state that the contractor should continue to provide contracted service in case of change, except due to law change (Infrastructure Australia, 2008). Negotiations should then be invoked to achieve a fair deal.

Example 13: Street lighting project

“… Demographic projections may suggest that the Authority is quite likely to require new units to be brought into the scope of the Contract as housing increases in the area…”


A mechanism for adopting change is desirable. HM Treasury (2007) suggested that output specifications should be flexible in dealing with changes in delivering the service (e.g. by introducing new technology) without formally consulting the Authority.

7. A Best Practice Framework

Having discussed the desirable and undesirable features of an output specification, it is imperative that the specifier has a framework for use as a guiding checklist in this important task. From a comprehensive study of currently available templates held out as best practice in their respective specialities (e.g., PartnershipUK, National Health Service, Partnership for Schools, Partnerships Victoria, etc.), a framework has been developed, as shown in Table 5. Whilst the format of output

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1 This includes the Core Session in which the Service Performance Shortfall was recorded.
specifications can vary according to different work agencies’ preferences, a list of common essential headings should be structured with an appropriate hierarchy of presentation. It is also recognized that different types of PPP/PFI projects entail different levels of technical details to be included. Therefore, only an example based on a school project is depicted. It is expected that users of this framework would provide the contents on a project-specific basis, yet covering the essential elements as depicted.

The proposed framework comprises of 2 themes and 2 levels. Theme I is a performance-based specification on the physical asset construction (in case the client wishes to include design and building works in the PPP package), which can be sub-divided into sections such as (i) Scope, (ii) Design Parameters, (iii) Structural Performance, (iv) Architectural Performance, (v) Electrical and Mechanical Performance, (vi) Special Installation Performance, and (vii) External Works and Landscaping Performance. Theme II contains the client’s requirements on the service components. Generic requirements can be specified in Level 1 under the headings of (1) Scope, (2) Service Requirements; (2) Service Monitoring; (3) Availability, (4) Links to Payment Mechanism, (5) Rectification Requirements and (6) Change mechanism. Particular project types may need expansion of Level 1 generic requirements into more specific issues (e.g., in the school project sample shown in Table 5, vandalism damage can be distinguished into those committed during school hours and outside school hours, for which responsibilities fall on different parties). Whilst Level 1 and Level 2 can be combined for stand-alone projects, keeping them separate would be beneficial for projects of similar nature but say at different locations (e.g., fire stations). In cases when the clients wish to continue use of the facilities after hand-over, the conditions can be specified with terms such as residual life, condition survey and as-built documentation.

Within the proposed framework, references to tables depicted in the earlier sections of this paper are meant to indicate the possible format that can be adopted, but by no means restrict innovative ways of specifying as long as clarity is observed and measurement is practicable. As increased use is made of such framework, it is expected that standardization can be achieved whilst bringing in best practice for avoiding pitfalls.
<table>
<thead>
<tr>
<th>Theme I: DESIGN AND CONSTRUCTION REQUIREMENTS</th>
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<tbody>
<tr>
<td><strong>Section</strong></td>
</tr>
<tr>
<td><strong>Theme I</strong></td>
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<tr>
<td><strong>Theme II:</strong></td>
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<tr>
<td><strong>Issues</strong></td>
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<tr>
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<td>3</td>
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<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td><strong>Level 2: Details for Particular Project Types (e.g. PFI School)</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>
**b. Quality assurance**
- Continuous improvement and implement systems to facilitate objectives
- Quality assurance standard (in accordance with ISO 9001)
- Health and Safety

**Methods:**
- a. By number of monthly user complaints
- b. By monthly audit from contractor itself (e.g., Table 3)

**Prioritization of Availability Criteria**
- a. Low
- b. Medium
- c. High
- d. Super

**3 Service Reporting System:**
- a. Helpdesk Facility:
  - Report building faults and service delivery shortfalls and requests
  - Reporting mechanism
- b. Complaints: Response requirements
  - Complaints on services: Mitigation procedures
  - Complaints on staff: Compliance procedures

**Monitoring Frequencies:**
Various services with different frequencies (e.g., Table 3)

**Responsible Duration:**
- e.g. Vandalism: 8a.m. to 5 p.m.
- Authority responsible for maintenance:
  - Outside the period, it is the service provider’s obligation

**Service Failure Deductions:**
Magnitude of the deductions varies in the 4 categories (e.g., Table 1)

**Temporary Rectification:**
- a. Emergency: 30 minutes
- b. Urgent: Before start of subsequent Core Session
- c. Routine: 2 Core Sessions (e.g., Table 4)

**Asset conditions at hand-over (if applicable):**
- a. Residual design life
- b. Condition survey report
- c. Recommendations on maintenance after hand-over
- d. Latest as-built documentation

**4 Communications with Authority**
- a. Risk allocation on extra cost arising from the contract
- b. Meeting report requirements

**Monitoring Reports:**
Frequency and contents

**Unavailability Scenarios:**
- a. Unavailable
- b. Unavailable but still used
- c. Unavailable, which is out of control

**Service Payment:**
- a. Area based payment
- b. Service based payment

**Temporary Rectification:**
- a. Emergency: 30 mins
- b. Urgent: 4 Core Sessions
- Routine: 10 Core Sessions

**5 Integration with School Policies and Operations:**
Scope of services integration
- Health and Safety;
- Quality Assurance;
- Environmental Management;
- Contingency Planning.

**Performance Standards:**
- The Educational (School Premises) Regulations 1999, UK

**Payment:**
- a. Unavailable
- b. Unavailable but still used
- c. Unavailable, which is out of control

**Payment linking to Indexation**
8. Conclusion

In light of the trend of adopting output specifications as the basis of measurement, monitoring and payment for PFI projects, attention should be paid in doing them right to pave the way for success. Various aspects such as client’s requirements; asset and service requirements, payment mechanism, performance evaluation and change mechanism should be deliberated carefully before incorporation. Potential pitfalls such as those outlined in this paper are to be avoided. It is crucial to make the output specification explicit, enforceable and flexible such that service requirements can be fulfilled in the most cost efficient manner. Hence, a best practice framework has been developed through a comprehensive study of existing templates in various specialities. Together with established guidelines published in Australia, the UK, Singapore and South Africa, etc., it is hoped that the framework can enhance the quality of output specifications for the betterment of PPP projects. In the course of developing this framework, the need to include proper change handling mechanism in output specifications has been noted and further research is necessary.

Acknowledgement

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