

Experience on a PPP-based High Speed Road Maintenance Project in Hong Kong

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Abstract

There is a growing trend for governments worldwide to explore new routes for procuring infrastructure facilities, such as various forms of Public-Private Partnerships (PPP), due to restricted fiscal budgets and an increasing demand for infrastructure facilities. Many practitioners and researchers believe that PPP can harness flexibility, encourage innovation, enhance productivity, allow better risk allocation, increase value-for-money, and improve cost-effectiveness by involving the private sector in the provision of public services. A Work Department of the HKSAR Government (the Department) has recently introduced the concept of PPP into their road maintenance programmes – the High Speed Road Maintenance Contract. The project is an interesting challenge to relevant public authority as the form of contract, project organisation, risk allocation and points of responsibility are totally novel. Most of the infrastructure projects using PPP approach are of much larger scale and are in the form of PFI so that the private sector is responsible for financing, constructing and maintaining the road network. The experience gained from this project, and especially its success would improve our understanding on whether PPP is suitable for similar road maintenance projects around the world. Before investigation of the success level of the new project, it is important to study the view and standpoint of the stakeholders on the issue of PPP as the human factor is believed to be a crucial contributor to the success of PPP. The paper begins by outlining the nature of the PPP high speed road maintenance project. As there is potential for the Department to extend the use of PPP approach to other road maintenance projects, a questionnaire survey conducted with other potential stakeholders of future PPP projects of a similar kind are presented to examine the effectiveness of the new PPP contract from their perspective.

Keywords: Public-private partnerships, high speed road maintenance, questionnaire survey

1. Introduction

Public-private partnership (PPP) is becoming an increasingly popular option of project delivery for governments. In view of the restricted fiscal budgets and the growing demand for infrastructure facilities, governments worldwide are striving to explore the use of private sectors' resources and particularly to involve private finance in the construction of facilities for the purpose of providing services. Many practitioners and researchers believe that PPP can harness flexibility, encourage innovation, enhance productivity, allow better risk allocation, increase value-for-money, and improve cost-effectiveness by involving the private sector in the provision of public services. It is also believed that PPP can improve project procurement environments and the relationship between project participants by changing the traditional adversarial scenario to cooperative partnerships [1].

The idea of PPP is not new to Hong Kong. Since the late 1960s, Hong Kong has gained valuable experiences from the successful development of five large-scale tunnel projects using the Build-Own-Transfer (BOT) arrangement [2]. In 2003, the HKSAR Government (the Government) has set up a clear goal in developing the city into a society with "big market, small government" [3]. This new principle of governance is supported by the idea that government should "steer more and row less" and that the role of government should be "proactive market enabler" [4]. In response to that, the Government has begun to explore different options of private sector participation. Several guidelines were published aiming to encourage the use of the private sector in serving the community. The Chief Secretary for Administration, Donald Tsang pointed out in the foreword of the guidelines that it is the responsibility of the Government to make the best use of both the public and private sectors so as to ensure that government activities do not dominate the market and would not absorb more of the gross domestic product than is optimal for economic success. With the help of the private sector, the Government can then focus its limited resources on identified priorities. [5]. In addition to new infrastructure projects, the Government is also being proactive in examining existing activities to determine whether they can be provided by the private sector, and the use of PPP would be explored for both traditional and innovative projects [6]. By moving tasks into the private sector, the Government believed that employment and business opportunities can be developed and expanded in ways that are simply not possible within the public sector [7]. In this paper, the effectiveness of PPP is examined through a pilot PPP maintenance project in Hong Kong.

2. Case Study in Hong Kong

Aligning with the government direction, a Work Department of the HKSAR Government (the Department) has introduced the concept of PPP into their maintenance contracts and a trial project, the High Speed Road Maintenance Contract was started last year based on the PPP approach. Being different from Private Finance Initiatives (PFI) – the most common form of PPP, this project involves no financial investment from the private sector. While many people equate PPP to PFI after its introduction by the British Conservative Government in 1992 [8], PPP actually has a much broader scope. It is defined as a cooperative venture between the public and

private sectors for the delivery of a public service through appropriate allocation of resources, risks and rewards [9]. The ultimate objective of PPP is the joint realization of commercial and social benefits between the two parties [10].

2.1 Problems in Traditional Term Contract

The traditional high speed road maintenance project is in the form of a term contract. Staff from the Department are responsible for general road inspection to identify defects on the road which require work to be carried out. Work orders are then issued by the Department to the contractor for carrying out the corresponding maintenance work. There is full time supervision on the contractor to ensure the quality of work. Upon completion of the work order, the amount of work done by the contractor is measured and payment is given to the contractor according to the agreed rates stated in the contract. The traditional system of the maintenance project is considered as insufficient, since the amount of maintenance work to be carried out is budget driven instead of as-needed. In addition, it is time consuming and tedious to deal with the large amount of work orders. A great amount of resources is also required for carrying out the measurement, estimation, accounting work as well as inspection and full time supervision. There is no room for innovation in the traditional term contract as the method of work is specified in the contract and little flexibility is allowed. Maintenance work is also considered to be inefficient in the traditional term contract. Long and complicated procedures are required to be gone through from the time of defect identification or receiving complaints to issuance of work order.

2.2 The MOM Contract

As a result of the deficiency in the traditional system of road maintenance and in response to the Government announced policy, the Department has taken a step towards PPP. It aims to improve the efficiency, performance and cost-effectiveness of high speed road maintenance project through involving private sector resources and enhancing cooperation between the two parties. To test the successfulness of PPP in high speed road maintenance project, a new project based on the PPP approach was started in 2004 by the Department using the western network of the high speed roads as a trial. By drawing upon the experience learnt from the trial project, other high speed road maintenance projects may also adopt a PPP approach on completion of its existing term contract.

The new high speed road PPP contract has taken the form of a Management, Operation and Maintenance (MOM) Contract and is a performance-based maintenance contract. In this project, the contractor is responsible for providing scheduled road maintenance services including road inspection, planning, design and supervision for repair and minor improvements of roads and highway structures, as well as for handling complaints from the public during the 4 years contract period. The management and maintenance works required to be carried out by the contractor are grouped under 3 main work orders which were issued at the beginning of the contract period. The major work items in the work orders are highlighted in Table 1 below.

Table 1: Major work items covered in the three work orders issued at the beginning of the contract

Work Order 1	Work Order 2	Work Order 3
<ol style="list-style-type: none"> 1. Provide network manager 2. Maintain road markings and road studs 3. Maintain road drainage system 4. Conduct routine maintenance inspections for slope and undertake maintenance works 	<ol style="list-style-type: none"> 1. Conduct road safety inspection and undertake general road maintenance works 2. Conduct road detailed inspection and undertake general road maintenance works 3. Conduct structural inspection and undertake structural maintenance works 	<ol style="list-style-type: none"> 1. Maintain vegetation 2. Sweeping road by mechanical sweeper 3. Picking up litter 4. Cleansing traffic signs and the like 5. Cleansing carriageway 6. Maintain road network in hygienic condition 7. Operate calls receiving centre 8. Provide electronic maintenance management system

However, only 65% of routine maintenance works are covered under the PPP part. The rest of the non-scheduled, unplanned works are carried out according to the traditional work orders system. The contractor is entitled to a lump sum payment for the PPP component. Monthly audits would be carried out by the client's representative to determine the level of payment that the contractor can receive according to the predefined performance yardsticks. Samples are selected for audit is carried out on a random basis and 24 hours' notice would be given to the contractor before the audit. In addition to monthly audit, with no advance notice given to the contractor, the Department's staff would also continuously carry out road defects inspection on the road network. Default notice would be issued to the contractor on identification of any defects and a fixed sum of money would be deducted from the contractor. It is believed that the performance-based payment system can allow greater flexibility, encourage innovation, enhance efficiency and improve cost-effectiveness of work by allowing concurrent engineering of functions, use of new materials and techniques [11]. The performance standard of the contractor is measured by a set of benchmarks in different areas of works as specified in the contract. For example for road markings, a continuous road marking line with more than a certain percentage loss of paint in any given section length would be counted as a defect. The lump sum payment entitled by the contractor would be adjusted according to the number of defects discovered by the client's representative in the audits. Table 2 illustrates the differences between PPP and traditional approach in the high speed road maintenance contract.

Table 2: Comparison between PPP and traditional term contract

	Traditional	PPP
Form of contract	Maintenance term contract	Management, operation & maintenance contract
Terms of payment	Schedule of rates	Lump sum
Payment mechanism	Work-based (payment according to amount of work done)	Performance-based (reduction of monthly sum if performance standard not reached)
Specification	Method specification	Performance specification
Quality control	Full time supervision	Inspections & monthly audits
Road defects inspection	By staff of the Department	By the contractor
Time to carry out maintenance work	On receiving work order from the client	Immediately after identification of defects
Duties of client	Estimation, measurement, issuance of work orders, road inspections, full time supervision, programming of maintenance works	Audits and ad hoc Inspections
Duties of contractor	Maintenance work according to work orders	Road inspections, operation of call receiving center and electronic maintenance management center, planning and programming of works, general road maintenance
Documentation	Work orders (by client)	Work programme, report of finished work (by the contractor) Inspection records & site audit checklists (by client)
Types of work covered	All types of maintenance work	Routine & scheduled maintenance works
Relationship	Principal – agent	Peer – peer

2.3 A New Form of PPP

The new maintenance project is a great challenge for the Department as the form of contract, project organization, risk allocation and points of responsibility, etc. are all novel to the Department. No other similar project has ever been carried out before. Most of the overseas maintenance projects using PPP approach are of much larger scale and are in the form of PFI, which means the private sector is responsible for financing and constructing the new roads together with the subsequent maintenance of the road network. For example in Singapore, according to the PPP Handbook for public consultation [12], PPP is a form of “best sourcing” that mainly used in cooperation with the private sector to deliver services that require the development of new physical assets. Some of the staff in the Department also believed that the optimal and ideal form of PPP project should be one which starts from the capital works and

continues with the maintenance works. This can encourage the contractor to uplift the construction quality so as to save its future maintenance cost. The contractor can then be paid on the “user pays” principle through the operation of toll roads. However, this kind of PPP in highways schemes may be difficult to be carried out in Hong Kong. It is because the road network in Hong Kong is almost fully developed, and very few new roads will be constructed in the near future. For the renovation of old roads or other road improvement works, it is difficult to convince the contractor to finance the work and be paid back through operating the toll roads without a good business case. Like other BOT-type projects, there would be practical, social and cultural difficulties as it is a radical policy change to charge on a user-pays basis for services that traditionally had been provided free of charge by the government [13].

3. Research Methodology

At the time of the research, the high speed road maintenance project using the PPP approach has only been implemented for less than a year. Therefore, not much data can be collected for evaluating the cost effectiveness of the project and the performance of the contractor under PPP. However, as there is potential for other road maintenance projects to migrate to PPP, views of other staff within the Department as well as other contractors should also be collected to uncover their views on the new PPP approach. It is believed that their opinion would be more objective and without bias as they have not been involved in the PPP project. In addition, since the human factor would also be a crucial criterion for the success of PPP, it is important to study the attitude and perspective of other stakeholders towards the new approach. This may be helpful in developing a PPP culture among the stakeholders within the organizations.

A questionnaire survey had been conducted with some potential stakeholders of future PPP projects to examine the effectiveness of the new PPP contract from their perspective. They include different levels of staff from the Department in various groups of maintenance projects (including both high speed road and local road) as well as contractors who have been involved in traditional term contract. A total of 33 respondents completed the questionnaire, of which 26 were from the Department and 7 were representing the maintenance contractors. The profile of the respondents is shown in Table 3.

Table 3: Designations of respondents

The Department	
Engineer or Technical Officer	12
Inspector of Works	6
Work Supervisor	8
Contractor	
Manager	2
Site Agent	5

The questionnaire consists of 17 statements regarding the cost and effectiveness of the PPP contract. To improve the understanding of the respondents, a brief introduction to the new PPP approach was provided to them as a preamble to the questionnaire. Depending on their level of understanding, questions were explained in greater detail and reasons for their answers were sought through face-to-face or telephone survey.

4. Questionnaire Findings

The results of the questionnaire show that the respondents from the contractor group generally have more positive views on the effectiveness of PPP while the responses from the Department's staff are more diverse. Many of them might have had some reservations in answering the questions. In this paper, only part of the questionnaire findings (in the aspects of time, cost and quality) are presented.

4.1 Effectiveness of Contractor-led Inspection

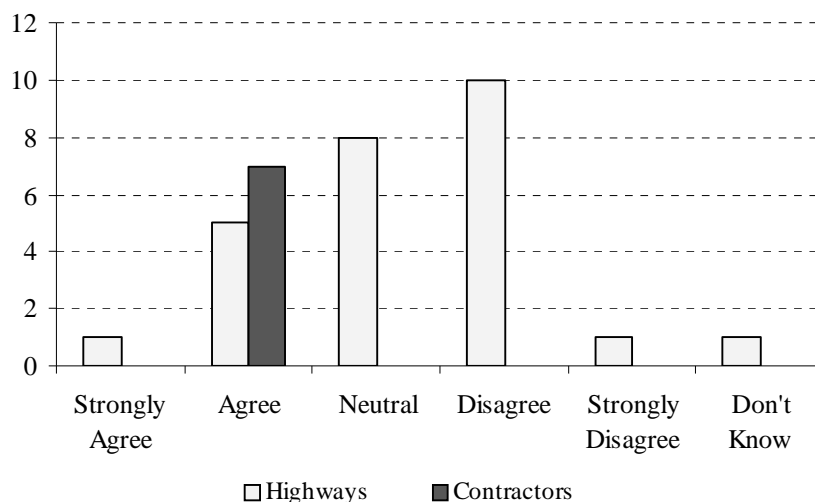


Figure 1: Effectiveness of contractor-led inspection in identifying defects

As shown in Figure 1, all respondents from the contractor group agreed that inspection carried out by the contractor is more effective in identifying defects than that carried out by the client representative. They claimed that the contractor can take the initiative to work and more resources can be devoted for full-time inspection. It was believed that payment reduction on defects discovered is also an important factor driving the contractor to more effective inspection. On the contrary, most respondents from the Department (11 out of 26) disagreed with the statement. They thought that the contractors in Hong Kong do not have self-discipline and supervision is required to monitor their work. There is also large percentage of the Department's staff (8 out of 26) expressing neutral view on the statement. They thought that the effectiveness of inspection depends on many factors including the tender cost, audit requirement, individual

initiatives, human resources input, as well as qualification, training and experience of the inspectors. Some staff of the Department agreed that contractor-led inspection would be more effective. They believed that the contractor would have more resources and can have a dedicated team to take charge of inspection, whereas in a traditional term contract, there is not enough staff from the Department for the inspection work and the inspectors are always tied up with other duties at the same time. In addition, any unrectified defects would contribute to payment reduction. Thus the contractor would devote more effort in the inspection work.

4.2 Efficiency of Maintenance Work

Regarding the efficiency of maintenance work, nearly all respondents from the contractor group agreed that work carried out through PPP approach is more efficient than traditional term contracts. It is because work can be carried out directly without waiting for the issuance of work order. The majority of respondents from the Department also agreed with the improved efficiency due to the streamlined procedures and better programming of work. Time can be saved in preparing work orders which are tedious and time consuming to prepare. Some respondents had negative opinions on the efficiency of the work. They believed that the contractor would tend to leave the work until a later stage during Cyclic Lane Closure (CLC), while in the past, staff of the Department can issue work orders to instruct the contractor to finish the urgent work immediately. They thought that there is limited control on the contractor in the PPP contract.

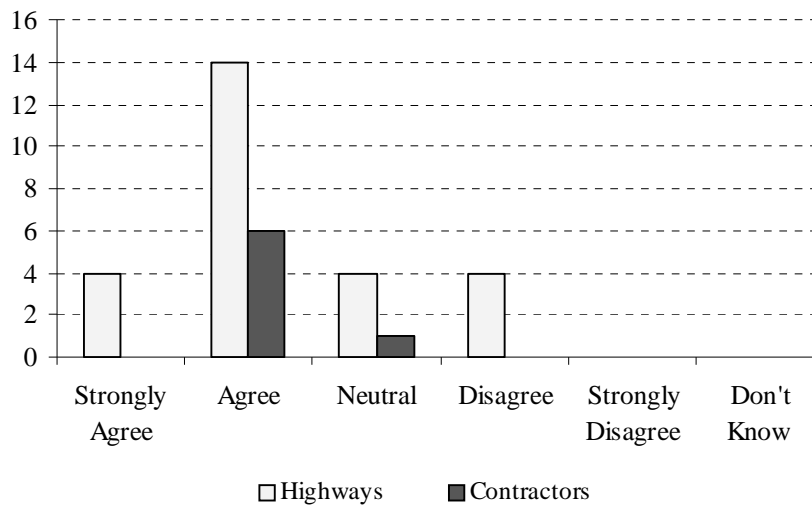


Figure 2: Efficiency of maintenance work carried out through PPP approach when compared with traditional term contracts

4.3 Amount of Documentation

For the amount of documentation, most respondents from the contractor group claimed that the amount of documents the contractor has to deal with has greatly increased. The contractor has to

submit their programme and completion report to the client. On the contrary, most respondents from the Department (12 out of 26) agreed that the amount of documentation can be reduced in PPP contract due to the great reduction in amount of work orders. There would no longer be estimation, measurement and checking of work completion. However, some respondents argued that there would be additional documents like default notice, inspection report and audit report resulting in a similar overall amount of documentation.

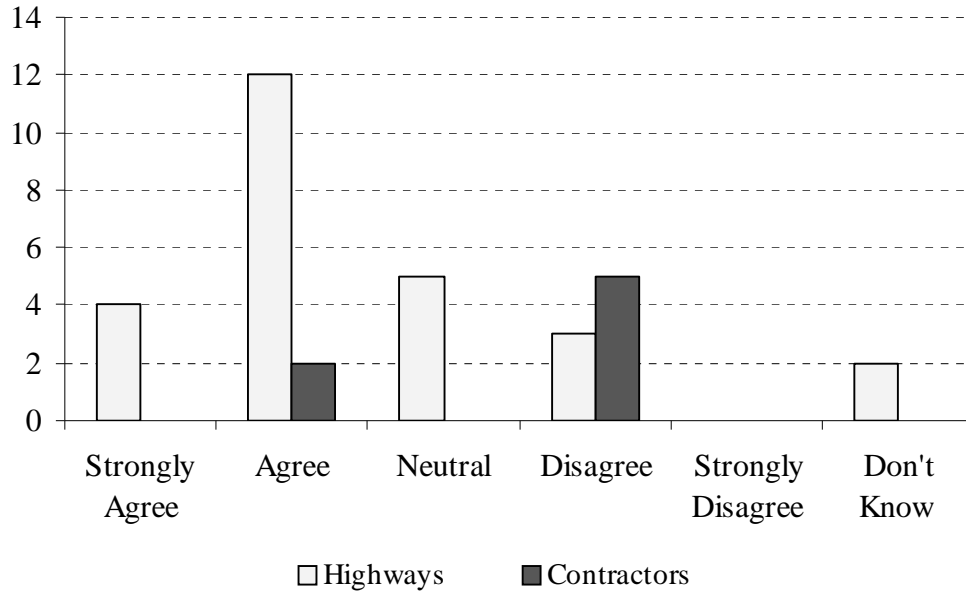


Figure 3: Potential of reducing the amount of documentation

4.4 Amount of Administrative Work

4 out of 7 respondents from the contractors believed that the amount of administrative work would be more than the past as the scope of work of the contractor has increased. Most respondents from the Department believed that the amount of administrative work can be reduced due to streamlined procedures and better communication. They no longer need to prepare or sign work orders for works under the scope of PPP.

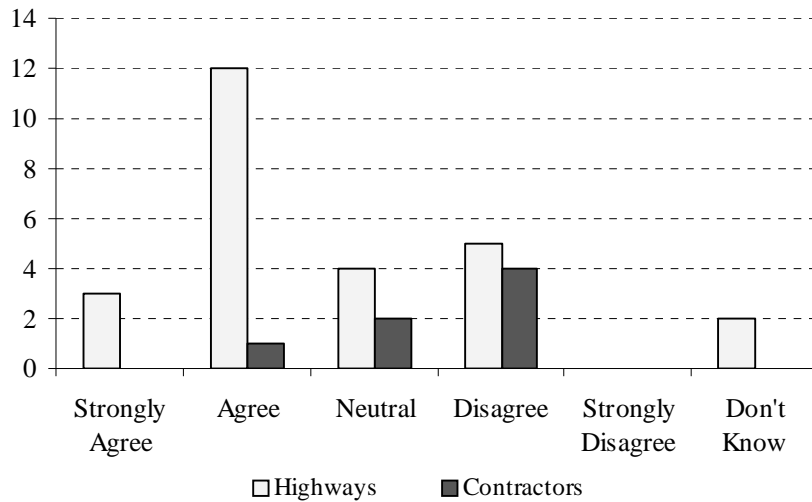


Figure 4: Potential of reducing the amount of administrative work

4.5 Staff Cost of the Department

As shown in Figure 5, most respondents from the two groups also agreed that staff cost of the Department can be reduced. It is because most of the work has been taken up by the contractor, including inspection, coordination and planning. There is no longer full-time supervision on the contractor and thus the number of supervisor can be reduced. Besides, preparation of work orders, estimation, measurement and accounting work can also be reduced. Some respondents argued that staff cost of Department depends on the contractor's performance. It would require more audits if the performance of the contractor is poor.

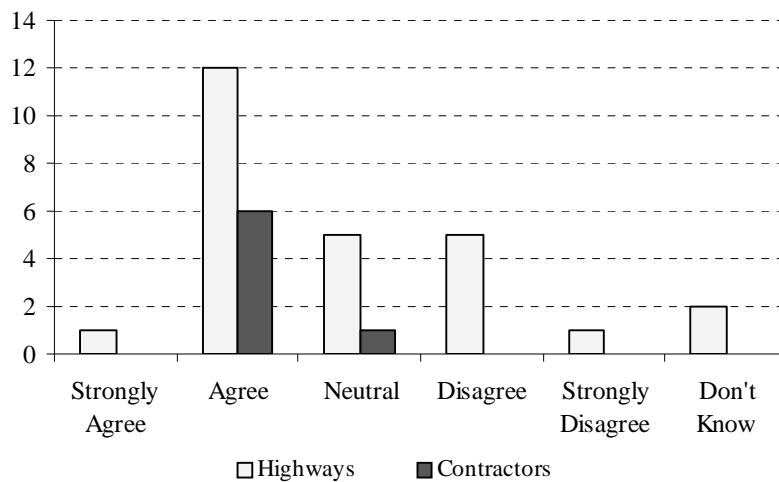


Figure 5: Potential of reducing the staff cost of the Department

4.6 Overall Cost Effectiveness

As shown in Figure 6, many respondents from the contractor group (5 out of 7) and the Department group (11 out of 26) believed that PPP would be more cost effective than a traditional term contract in the long run. Some staff of the Department surveyed postulated that the overall cost effectiveness depends on the tender price, the conditions of contract as well as the contractor's performance. More resources are required if the contractor is not good.

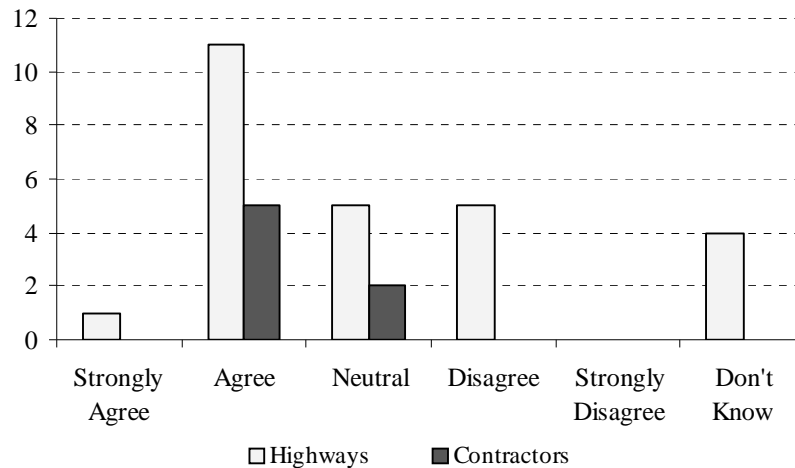


Figure 6: Overall effectiveness of PPP when compared with traditional term contract

5. Conclusion

The idea of PPP has been widely adopted in many countries over the world. It has mainly been used in large-scale capital or infrastructure projects in the form of PFI. The Department of Hong Kong has extended the use of PPP to their maintenance contracts. A new project, the high speed road maintenance contract was launched in 2004 using the PPP approach. It is a form of MOM contract with the contractor being responsible for the management and maintenance of the high speed road as well as operation of the call receiving centre throughout the four years contract period.

To study the potential for future development of PPP in other maintenance projects, a questionnaire survey was conducted to study the perspectives of potential stakeholders of future PPP projects on the effectiveness of the new PPP contract. The results from the survey indicate that most respondents supported the use of the PPP approach and agreed that it would be more cost-effective than the traditional term contract. They believed that the new approach can help by bringing in operational efficiencies, cost savings and better output performance.

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