



Government accountability within infrastructure public–private partnerships

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Abstract

Public–private partnerships (PPPs) have been widely used to deliver infrastructure projects. However, PPPs are being plagued with controversy as some of them were subjected to project overruns and/or poor operations. An underlying issue contributing to unsatisfactory performance of PPPs was a result of an ambiguous accountability of the government. Despite this, limited empirical research has been undertaken to identify the government's accountability within PPPs. Thus, a conceptual framework of the accountability of the government of PPPs is developed in this paper and then examined by conducting a case study of a Chinese PPP project. The findings indicate that the government's accountability in PPPs should shift to enhance the effectiveness of quality services and the efficiency of use of public resources for asset end-users and general population. This paper provides the governments embarking on PPPs with an insight into their accountability, ensuring Value for Money is delivered.

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1. Introduction

Governments across the world have extensively involved private entities for infrastructure development because of their limited public budgets (Glaister, 1999; Jones and Noble, 2008; Reeves, 2003; Liu et al., 2015a). This association between public and private sectors is normally referred to as public–private partnerships (PPPs). A variety of types of PPPs has been used in both developed and developing countries, in which partial or entire delivery of infrastructure projects are contracted to private *Special Purpose Vehicles* (SPVs) for designing, building, financing and/or operating and maintaining the public

assets/facilities while the governments retain ultimate accountability for a provision of the services.

With an introduction of private sector's resources or expertise in project delivery and management, it is expected by the governments in PPPs that a higher quality of the assets and their services would be secured via optimal cost and risk allocation (Savas, 2000; Roehrich et al., 2014; Jin and Zhang, 2011). Nonetheless, PPPs are currently being plagued with controversy (Love et al., 2015), particularly in the United Kingdom (UK) and Australia, whereby a number of unsuccessful cases that were subjected to substantial cost/schedule overruns and/or unsatisfactory operational performance have been reported (for example, Edinburgh Trams in the UK and Sothern Cross Railway Station and Latrobe Regional Hospital in Victoria, Australia) (Liu et al., 2016).

An underlying issue contributing to poor performance of PPPs was a result of obscure accountabilities within the cross-sector

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partnerships, especially that of the government (McAllister and Taylor, 2015). This view is supported by Grossi and Thomasson (2015), who identifies that an explicit understanding of the government’s accountability in PPPs is critical to the life-cycle performance of the projects and however it received limited attention in the literature. Against this contextual backdrop, this paper aims to empirically identify the accountability of the government within the context of PPPs.

2. Government accountability in PPPs

Accountability can be viewed as an answerability for performance (Romzek, 2000). The accountability system of public sector is traditionally underpinned by vertical relationships, such as elector–politician, politician–official and supervisor–subordinate relationship within the governments (Mulgan, 2000). The hybrid arrangements of infrastructure procurement, i.e., PPPs, entangle the traditional system of public-sector accountability owing to an involvement of private entities (Grossi and Thomasson, 2015). As PPPs encompass a sophisticated stakeholder network comprised of public and private sectors, the government has a complex accountability that is based on its triangular relationships with other groups of key stakeholders, e.g., private concessionaire and/or the public (Forrer et al., 2010).

Public authority, as addressed above, is ultimately accountable for a provision of asset services in a PPP project, regardless of what type of contractual arrangement has been selected (e.g., design-build-operate—DBO, design-build-operate-maintain—DBOM, design-build-finance-operate-maintain—DBFOM, or built-own-operate-transfer—BOOT). Hence, the government is pivotal for linking public sector to private entity throughout the life-cycle of a PPP project. Noteworthy, citizens delegate power and resources to the government for providing public services and thus public authority is deemed to be a representative of the public within PPPs (Hodge and Coghill, 2007). Noteworthy, Rwelamila et al. (2015) and Wibowo and Permana (2015) provide for a definition of “the public” within the context of PPPs and define it as an integration of asset end-user and general population.

According to Liu et al. (2015a), the scope of PPP research includes: (1) critical success factors; (2) roles and responsibilities of public sector; (3) selection of concessionaire; (4) risk identification and allocation; (5) cost and time performance under different types of PPP contracts; and (6) PPP project finance. Nevertheless, limited empirical research has been undertaken to interpret and explore the government’s accountability in PPPs from the perspectives of “end-user” and “general population” and, therefore, this study will fill this significant knowledge gap.

3. Conceptual framework of government accountability within PPPs

A study of “accountability” within PPPs is essentially an attempt to answer a question, “who is accountable for whom and for what?” (Grossi and Thomasson, 2015). With this in mind, exploring the accountability of the government involved

with a PPP should take a “standpoint” of identifying “for whom” and “for what” the government has to be accountable during the project’s whole life-cycle.

Government represents the public that involves “end-users” and “general population” within PPPs. In essence, the end-users of a PPP are those whom the project intends to directly serve; thus, it is essential for the government to ensure the expected quality service to be delivered to the asset users effectively (Grossi and Thomasson, 2015). By contrast, there is no direct relationship between general population and the service of the built asset; however, as taxpayers, general population may also be concerned with the efficiency of the project. This is because many PPPs still substantially consume public resources, especially those projects under such popular contractual arrangements as DB, DBO and DBOM, whereby the governments are responsible for financing them by spending public money (Majamaa et al., 2008; Yuan et al., 2010; Liu, 2016).

In summary, the government of PPPs is accountable for satisfying the asset end-users and general population by effectively providing an expected quality service and efficiently consuming public resources, respectively. In fact, effectiveness, efficiency and quality are of the key words of VfM, which emphasizes on strategically delivering public projects in a cost-efficient and quality-effective way to meet key stakeholders’ requirements for social benefits (Office of Government Commerce, 2002; Grimsey and Lewis, 2005). It is acknowledged that VfM acts as a strategic goal of PPPs over the project’s life-cycle. Bearing these perspectives in mind, a conceptual framework of the government’s accountability is proposed within the context of PPPs (see Fig. 1).

As illustrated by Fig. 1, the governments that embark on PPPs should take an accountability in ensuring and enhancing: (1) an effectiveness of quality service for asset end-users; (2) an efficiency of use of public resources; and (3) a life-cycle VfM. To examine this developed conceptual framework, a case study of a Chinese PPP project has been undertaken, which relied on multiple data sources.

4. Research approach and data

Case study is an in-depth examination of the contextual information of an individual sample. It possesses the nature of

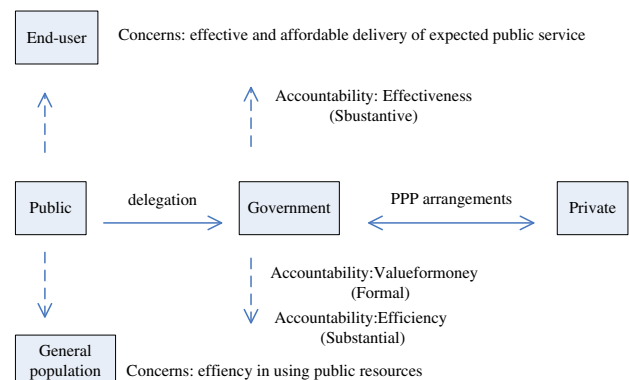


Fig. 1. Conceptual framework of government accountability within PPPs.

an exploration and is useful for uncovering a new topic from an original perspective (Hakim, 1987). Flyvbjerg (2006) argues that case study is suitable for all stages of a research project, cascading down from hypothesis proposition and testing to generalization of knowledge. The case project of Beijing Underground Line 4 was selected for this paper for the following reasons:

- The project has been considered by the Chinese central government as being successful; thus, it is useful for investigating what perspectives and criteria the government has applied to assess project success of PPPs.
- The project is currently in the operational stage; therefore, the analysis and discussions are launched for identify what has happened rather than what will happen and this can ensure a higher reliability of the case-study outcome.
- The private SPV primarily obtains profits from ticket income. With this, the analytical output of this case study will be more reliable as it is not necessary to consider ancillary income from affiliated commercial arrangements.
- Discussion on hierarchical agent–principal relationship can be simplified in this case project, since politician–official relationship is not distinct in China.

One of main difficulties in a study of PPPs is data collection, owing to commercial confidentiality (Sands, 2006). To deal with this issue, multiple data sources have been applied for this case study. For instance, semi-structured interviews were conducted with all senior managers of the public authority and SPV of the project, e.g., procurement director, project manager, construction manager, operation manager and asset/facility manager. Each interview was ranged from 90 to 120 min with a permission of digitally recording it. Further, a total of 40 interviews with the passengers of Beijing Underground Line 4 were undertaken at four transfer stations during October 2015. Ten passengers at each station were randomly selected and all of them are regular users and residents of the Line 4 and Beijing city. Such interviews were unstructured and had been organised as conversations. In addition to interviews, official documentary sources, such as the reports issued by the *National Development and Reform Commission* (NDRC) and *Beijing Development and Reform Commission* (BJDRC) and the central government as well as the seminar and case brochures of the consultancies, were reviewed and analysed to objectively understand the outputs and outcomes of the selected case project.

5. Case study: Beijing Underground Line 4

Beijing Underground Line 4 is a project with a contract value of RMB¥15.3 billion and a concession period up to 30 years. Its construction was initiated in August 2004 and completed in February 2009. The “Line 4” has been being operated since September 2009 and this is the first PPP project in China. According to the report of the NDRC (2015), Beijing Underground Line 4 was officially acknowledged as a successful project. Therefore, this case study is focused on

testing the developed conceptual framework (Fig. 1) by examining for whom and for what the government should be accountable for within the context of a successful PPP.

5.1. Effectiveness: delivery of transport service

A critical component embedded into the developed conceptual framework is in regard to “a delivery of an effective and quality public service to end-users”. With this issue, the case study starts from interpreting how the transport service of Beijing Underground Line 4 has been provided for passengers.

The operation of the first underground line in Beijing can be dated back to the 1970s. There were only two lines within Beijing’s underground system before the year 2000, both of which are operated by a state-owned enterprise, Beijing Subway Company (BJSC). To alleviate an increasing traffic congestion, a business case of additional underground lines was completed in 2001, suggesting that PPP would be an effective and efficient way for reducing Beijing government’s financial burden of infrastructure development. As a result, an SPV comprised of Beijing Infrastructure Investment Company (BIIC) and Beijing MTR (BJMTR) was formed in 2006 to be responsible for delivering the Line 4 project of the Beijing underground system, while the public authority would act as a governor for controlling and monitoring the operational outputs (i.e., transport service).

The underground Line 4 in Beijing city is 28.2 km in length, incorporating a total of 24 stations. An *ex-ante* evaluation of the project indicated that the forecasted passenger flow volume (PFV) would achieve 884,000 per day in 2034. However, it was reported by the NDRC (2015) that the mean daily passenger flow volume has reached one million since 2014. This implies that the expected transport service in terms of “quantity” (i.e., profit) has been realized. Although no official data on the service effectiveness of the Line 4 had been published by the government, passengers’ positive feedbacks and high satisfaction have attracted the attention of the popular press. To empirically explore effectiveness of service of the case project, interviews were conducted with the passengers. Most interviewees (n = 36) stated that Beijing Underground Line 4 is convenient and comfortable for them to commute and they considered its service to be more quality than other lines in Beijing. For example, an interviewee who uses the Line 4 regularly stated:

“... The apartments in Beijing city centre are too expensive, so I live in Daxing (i.e., a suburb of Beijing city), but work in Zhong Guan Cun. It took me around 2 hours to get to work before the Line 4 was operated. Now I spend 1 hour to get to work and this line comforts me as well ...”

Another passenger interviewee possessed a similar point of view and she expressed that ‘convenience’, ‘time saving’ and ‘comfort’ are the ‘keywords’ of the Line 4. In fact, the finding of an interview with the senior operation manager of the BJMTR further indicates that the service of the Line 4 is better

than other lines of Beijing Underground due to the higher standards determined by the government. He stated:

“The standards of building, operation and maintenance of the Line 4 are higher than others. This is because the government emphasize an effective quality service for passengers in this project... So the Line 4 would bring you an absolutely different feeling when you step into its stations or trains... modern, clean, comfortable and convenient for inter-transfer...”

The measurement for effectiveness in project evaluation relates to an achievement of the expected objective (i.e., project outcome) (Mandl et al., 2008). The project summary of the Line 4 proffers that an expected outcome is to provide passengers with a convenient and comfortable transport service. As derived from the interviews, this expectation has been achieved because the majority of the interviewees have recognized the service of the Line 4 in terms of quality, convenience and comfort. This argument is supported by the NDRC (2015) and BJDRC (2015), both of which state that very few complaints and negative feedbacks coming from the passengers since the operation of the Line 4. Based on the empirical evidence of the interviews and objective information of the report, it can be identified that the service of the Line 4 has been delivered in an effective way. Thus, as a project governor, the government should be accountable for ensuring the effectiveness of expected quality service to asset end users over the project’s whole life.

5.2. Efficiency: use of public resources

Beijing Underground Line 4, as mentioned above, had a contract value of RMB¥15.3 billion, in which ¥300 million had

been spent for the project’s inception works (e.g., business case, feasibility study, briefing and planning), which were completed by the government. In essence, the contract of the Line 4 project was divided into two parts, Part A and Part B. Part A related to design and construction, which accounted for 70% of the total investment (i.e., RMB¥10.7 billion) and was financed and completed by BIIC (i.e., a state-owned but market-oriented enterprise). By contrast, Part B was associated with the operation and facility maintenance (FM), accounting for 30% of the total investment (i.e., RMB¥4.6 billion). This part was financed and delivered by BJMTR. Fig. 2 illustrates the structure and risk allocation of the Line 4 project.

According to the programme evaluation theory, efficiency can be represented by the output–input ratio, which implies that “the greater the output for a given input or the lower input for a given output, the more efficient the activity is” (Mandl et al., 2008, p.3). Considering this viewpoint, the criteria used for measuring the efficiency of the use of public resource can be represented by Eq. (1).

$$E^{PR} = \frac{Output}{Input} \tag{1}$$

where E^{PR} represents the efficiency of use of public resources; *Output* denotes the output value and benefit of the project; and *Input* stands for the project’s total inputs.

As illustrated by Fig. 2, the total money invested from the government for the Line 4 are approximately RMB¥11 billion, which was lower than the public spending of other new underground lines in Beijing underground system because of an introduction of the private-sector finance (NDRC, 2015). This determines that the input of the government within the Line 4 project is comparatively low.

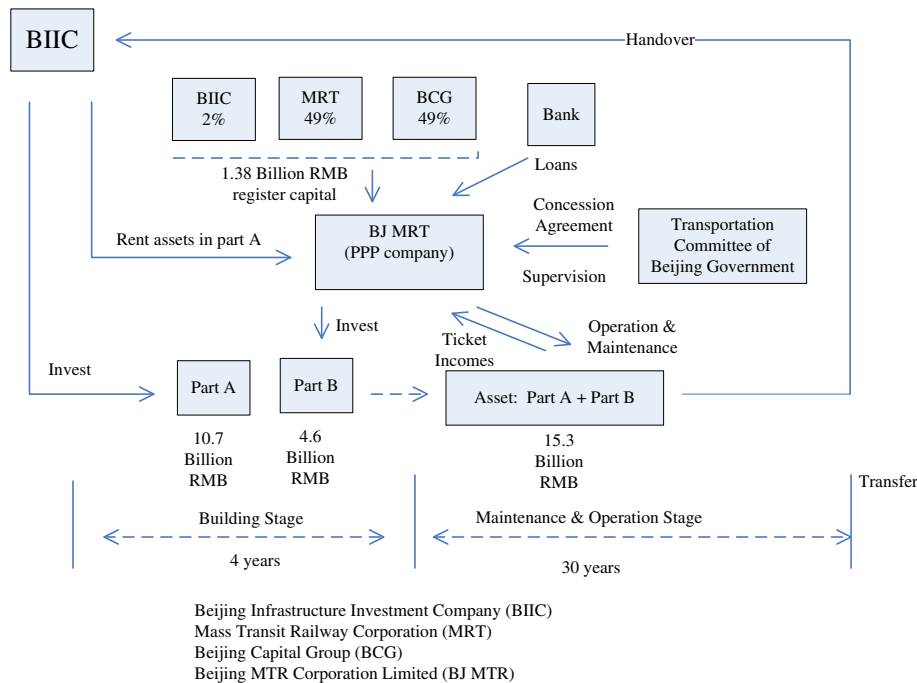


Fig. 2. Project structure and risk allocation of Beijing Underground Line 4. Adapted from NDRC (2015).

Mandl et al. (2008) suggest that output value of public service should be determined by evaluating whether the pre-defined key performance indicators (KPIs) have been met. The Line 4 project relied on ticket income; therefore, an important KPI implemented by the government for measuring the output is articulated to the ridership, i.e., PFV. Table 1 indicates the forecasted PFV of the Line 4, which implies that the daily PFV of the project was estimated to achieve 588,000, 818,000 and 884,000 in 2010, 2015 and 2034 respectively. However, the PFV of the underground Line 4 reached one million in 2014 and is maintaining an increasing trend. According to Liu et al. (2014), the output of a PPP should be evaluated by not only “quantity” but also “quality”. It has been demonstrated that the quality of the operational output of the Line 4 is higher than other underground lines of Beijing city. Hence, the output value of the case project (i.e., Line 4) is impressive.

Compared with other underground lines in Beijing, the Line 4 has a lower input but a higher output and thus its value of E^{PR} as indicated by Eq. (1) are comparatively high. With this finding, it is reliable to conclude that the government involved with Beijing Underground Line 4 had efficiently used public resources to procure the asset. This conclusion is supported by the a report of Beijing Development and Reform Commission BJDRC (2015), which stated that the success of the Line 4 project was a result of an appropriate procurement approach that was an optimal combination between public money and private-sector finance and expertise.

During the development process of the Line 4 project, a sequence of actions had been taken by the government to maximize efficiency of public resource utilization for general population under PPPs. For instance, a new and robust political mechanism within China’s constitution was developed prior to the project’s initiation. This enabled a stable macro-environment where the project is implemented (e.g., political, economic and social) (NDRC, 2015; BJDRC, 2015).

An optimal risk application, additionally, was conducted for a purpose of enhancing main concessionaire’s satisfaction, which has been identified as one of key factors critical to output performance of PPPs (Liu et al., 2015a, 2015b). Essentially, Beijing Underground Line 4 is referred to as a demand-based PPP, whereby the demand risk of the project is shared between the government and the contracted SPV. With this, a special ticket mechanism was designed and launched for the involved parties to share profit and risks. Specifically, the government and BJMTR agreed a rate of return on investment (ROI) (i.e., 7–8%) through multiple negotiations to determine an expected ticket income. Then, a pre-defined ticket price was finalised by both parties using the identified ticket income and the forecasted PFV. The calculation approach of the real ticket

income of the Line 4 project is represented by Eqs. (2), (3) and (4) below.

$$ETI = Investment^I \times ROI \tag{2}$$

$$ETP^P = \frac{ETI}{FPFV} \tag{3}$$

$$RTI = ETP^P \times RPFV \tag{4}$$

Here ETI represents the expected ticket income; $Investment^I$ stands for the initial investment; ETP^P denotes the pre-defined ticket price; $FPFV$ is the forecasted passenger flow volume; and RTI and $RPFV$ represent the real ticket income and real passenger flow volume respectively.

An underlying and changing variable of the ticket mechanism aforementioned is the PFV, as the RPFV (real passenger flow volume) could be significantly varied from the FPFV (forecasted passenger flow volume). As a result of this variation, the RTI (real ticket income) might deviate substantially from the ETI (expected ticket income), which would be able to bring substantial impacts on the profits of the involved parties. To solve this issue, a “sub-mechanism”, namely “gain-pain” share, was proposed by Beijing government to optimally to allocate the demand risk of the project. A total of three clauses were synergized with this mechanism, including:

- BJMTR is allowed to claim for an extra subsidy or abandon the project if the real PFV is 80% lower than the forecasted PFV within three successive years;
- The government is able to share an extra 50–60% of profit derived from the ticket income if the real PFV is higher than the forecasted PFV; and,
- A concession income tax rate of 15% as comparatively lower than the regular rate (i.e., 25%) was provided for the concessionaire within the concession period of the project.

The ticket mechanism represented by Eq. (4) indicates that the concessionaire of Beijing Underground Line 4 is paid from the income calculated by using the pre-defined ticket price and real PFV. In order to enhance efficiency in using public money and key stakeholders’ satisfaction, a review mechanism for the ticket income was devised by the government. Under this mechanism, a comparison needs to be conducted annually, and the government will fill the entire gap as long as the RTI (real ticket income) is lower than the expected income. By contrast, the government and the private-sector entity receive extra revenues (i.e., 70% and 30% respectively) if the RTI is higher.

Considering an increasing PFV and additional 30% share of the price gap indicates that the project of Beijing Underground Line 4 is undoubtedly profitable for BJMTR. However, there has been a criticism raised from the academia that too much public money and resource had been spent by the government to incentivize the private entities, for example, the income tax privilege. To interpret and understand this issue, interviews

Table 1
Forecasting of passenger flow volume (measurement unit: persons per day).

KPI	Year 2010	Year 2015	Year 2034
Forecasted PFV	588,000	818,000	884,000

Source: NDRC (2015).

were undertaken with the managers of the involved public authority and the SPV of the Line 4. For example, an interviewee from BJMTR stated:

“I don't think public resources have been used too much to support the implementation of the project, because the total input of the Line 4 project is still comparatively low though extra money was spent to complement the private company, like the concession income tax rate. However, these did benefit the project by substantially enhancing the output value, which in turn increase the government's revenue.”

An interviewed manager who was from the government also proffered that:

“... I agreed that we spent extra money to attract private sector to participate in this project and however this incentivized their performance and then improve the output value... compared with other underground lines in Beijing, the Line 4 has a lower input but higher output and outcome... so we are efficient in using public resources...”

No interviewee, essentially, did consider that the government had spent too much public resources to support an implementation of the project because of a superior output. Nonetheless, some interviewees acknowledged that there is a “room” for improving the efficiency of use of public resource. For example, the public money accounts for 2% of BJMTR's leverage initiated for the Line 4 project and this is possible to be lowered.

5.3. Value for money: project strategy

The business case study of Beijing Underground Line 4 suggested that an introduction of PPP would be able to alleviate the government's increasing financial burden and enhance the project's output and outcome (NDRC, 2015). The Office of Government Commerce (2002) of the UK suggests that an optimum combination of whole life cost and quality to satisfying key stakeholders' needs, which is referred to Value for Money (VfM), is a strategic goal of using PPPs for delivering public projects. The Treasury Taskforce of the UK (1998) supports this view and proffers that PPPs are applied only if they can provide better VfM than other conventional procurement approaches.

VfM, within PPPs, is normally determined by using *Public Sector Comparator*, which is comparison between the cost of the proposed PPP and the benchmark cost estimated through the use of traditional procurement (Grimsey and Lewis, 2005). According to Ballingall (2015), nothing will be good “VfM” if the assessment is relied completely on a cost comparison. Thereby, both financial and non-financial perspectives should be considered when investigating VfM within the context of PPPs (European Investment Bank, 2011).

It is noted from Fig. 2 that approximately 30% of total investment of the Line 4 was under BJMTR's finance, which constituted a debt of a commercial bank. Moreover, the

construction process of the Line 4 project was effective and efficient and therefore no overrun was reported by the contractor (NDRC, 2015). In other words, more than RMB ¥4.6 billion had been saved from the government's public budget. To maximize the output value and ensure long-term success, the government identified the demand-based PPP with a DBFOM contract (i.e., design–build–finance–operate–maintain) as the most appropriate model for the Line 4 project, whereby the project's costs and risks in terms of operation and maintenance had been substantially transferred to the private-sector entity. As a consequence, the total financial inputs from the government within the Line 4 project were significantly lower than other Beijing underground lines that were delivered by using pure public procurement.

As discussed above, a “gain/pain-sharing” mechanism has been implemented by the government to help BJMTR offset operational risks and incentivize its performance. It was criticized by researchers that this mechanism is a “double blade sword”, which is risky to trigger contingency for the government. In fact, both the involved parties of Beijing Underground Line 4 project have been being benefited from such an innovative mechanism. This is because BJMTR has paid effort to continuously improve and enhance the project's outputs (e.g., physical quality, service quality and FM quality) in order to pursue an additional 30% profit, which in turn has provided the government with an extra 70% profit within the framework of the mechanism (BJDRC, 2015). Hence, a “win–win” objective was realized, which is a keyword of VfM (Akintoye et al., 2003). Furthermore, according to the service agreement, the built asset and facility of the Line 4 project will be handed back to the public authority with a high residual value (RI) and good conditions that have been agreed by both parties. These pre-defined requirements will future proof the asset by maintaining a good life-cycle VfM.

The interpretation for Beijing Underground Line 4 above indicates that the project has achieved an outstanding performance in both financial and non-financial perspectives. Fig. 3 above

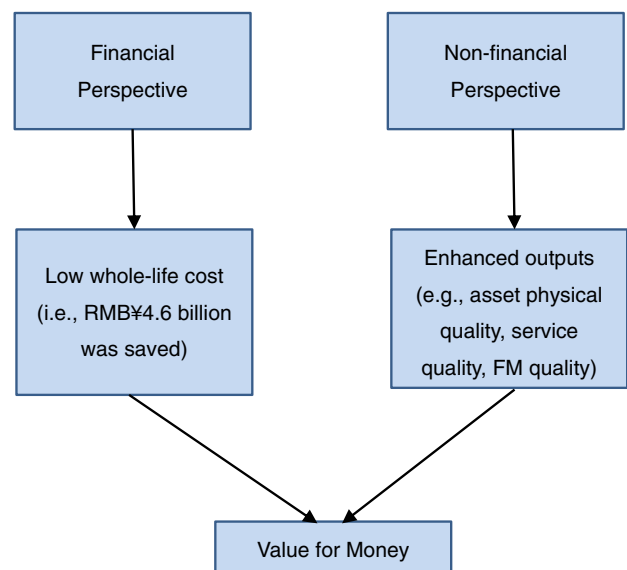


Fig. 3. Finding of an analysis of VfM of Beijing Underground Line 4 project.

illustrates the relevant findings. In summary, VfM has been essentially addressed in the Line 4 and it plays as a strategic goal during the project’s life-cycle.

6. Findings and discussion

A case of Beijing Underground Line 4 has been conducted and a series of empirical findings can be derived and summarised by analysing the textural narratives compiled. Fig. 4 illustrates the key findings of the case study, which can essentially answer the research questions raised, “For whom and for what the government is accountable for within a PPP?”

Beijing Underground Line 4 has been reported as a project that achieved success. Based on Fig. 4, it can be identified that the government involved with a successful PPP is accountable for contributing to establish a robust and effective political system and mechanisms to ensure effectiveness of quality service and efficiency of use of public resource are delivered to end-users and general population within the context of a VfM strategy. This identification empirically proves and supports the rationale of the developed conceptual framework (Fig. 1).

An implication that can be found throughout the case study of the Line 4 project is that the success of a PPP is dependent upon not only the performance of the private entity, but also the government’s contribution. With a demarcation of the public into asset end-users and general population, the governments within PPPs will have to face a more intensive challenge in project evaluation and they should pay attention to measure if their accountabilities have been implemented well throughout the projects’ life-cycle. According to the developed and tested conceptual framework, the public authority that embarks on a PPP should devise and implement KPIs in terms of both effectiveness of quality service and efficiency of use of public resource. In fact, the performance measures relating to public resource utilization received limited attention in the industry and however they are significant for ensuring that VfM is delivered to key stakeholders and future proofing PPP projects.

7. Conclusion

PPPs have been widely used to deliver infrastructure projects and provide for public services. However, poor performance of

some projects has resulted in a controversy of PPPs, and an underlying issue identified is an ambiguous accountability of the public sector. Government, as a representative of the public in PPPs, is accountable for the initiation and governing, and private entity is responsible for the project’s delivery. A review of the literature suggests that the public is divided into asset end users and general population. While end-users concentrate on the effective delivery of the quality services, general population are concerned with whether public resources are used in an efficient way within PPPs. Nonetheless, very limited research has been undertaken to explore and identify the government’s accountability within PPPs from a perspective in terms of end-users and general population.

To contribute to the literature, a conceptual framework of government accountability in PPPs has been developed on the basis of an in-depth literature review and was examined by a case study of Beijing Underground Line 4. Empirical evidence derived from the selected case project indicated that the governments within PPPs need to be accountable for ensuring and enhancing not only effectiveness of quality service for asset end-users, but also efficiency of use of public resource for general population, through an emphasis of VfM. With this finding, the public authorities embarking on PPPs should devise performance measures for evaluating whether its accountabilities are implemented well to enable the project to achieve life-cycle success.

This paper is significant for ameliorating the performance of PPPs and future proofing the projects’ performance over their life-cycles. It also provides the governments an insight to the accountability in PPPs which can secure VfM. However, the research output of this paper is relied on a study of a transportation infrastructure project in China, where the PPP market is considered to be immature. For that matter, the conceptual framework that has been developed might have to be further tested against PPPs implemented in mature markets. Future research will be a comparative study between Chinese and Australian or UK’s PPPs.

Conflict of interest

There is no conflict of interest.

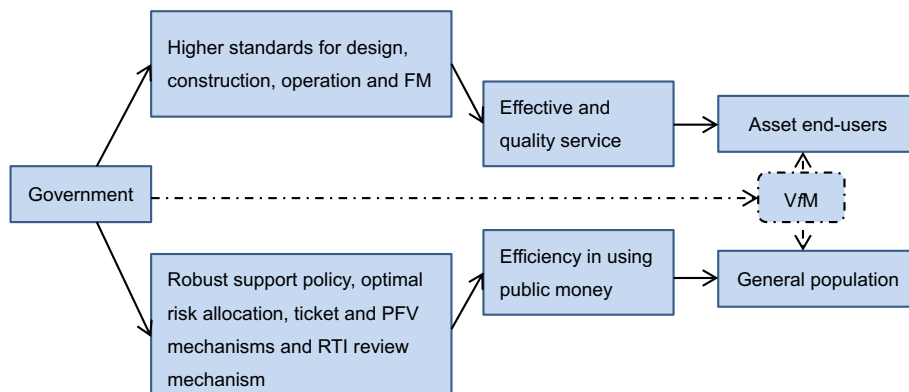


Fig. 4. Key findings of the case study of the Line 4 project.

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