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# VALUE FOR MONEY ASSESSMENT FOR PROCURING INFRASTRUCTURE PROJECTS: A REVIEW OF THE PRACTICES IN GLOBAL MARKETS

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Governments worldwide are grappling with their constrained budgets to deliver their much-needed infrastructure, which is exacerbated by the COVID-19 pandemic. As such, public-private partnerships (PPPs), with the private sector's investment and ingenuity, would appear to be a popular alternative. Value for money (VfM) assessment has been acknowledged as the major criterion to evaluate PPPs against traditional public sector procurement. Faced with different domestic demands (e.g., ageing infrastructure, population boom, and financing shortage), governments tend to place different emphases when undertaking the VfM assessment. Hence, it is important that governments compare and contrast their practice with similar and disparate bodies to engender the best possible result. This study draws on the state of the practices in three of the most developed PPP markets (i.e., the United Kingdom (UK), Australia and China) to provide a cross-continental comparison on their VfM assessment. The results show that: (1) These global markets use a public sector comparator (PSC) as the benchmark in VfM assessment where the net present value of a PPP is compared against a hypothetical PSC; (2) Ambiguous qualitative assessment is conducted only against PPPs to strengthen their policy development; (3) Australia's priority is in service provision whereas that of the UK and China is project finance and production; (4) All markets are seeking an amelioration of existing controversial VfM assessments so that purported VfM relates to project lifecycles. Using grey literature and their empirical evidence, a pathway is then proposed in the context of the UK to make headways towards a sensible selection of procurement approaches for its future infrastructure interventions. Accordingly, the contributions of this study are twofold: (1) it reviews examples of differing global practices in VfM assessment; (2) it provides foundations for a theoretical framework to be developed and examined so that governments can make better-informed decisions on procuring their projects.

Keywords: PPP; state-of-the-practices; value for money; assessment

## INTRODUCTION

The concept of 'Public Private Partnerships (PPPs)' is not new. It is widely accepted that PPP gained its momentum in the 1990s in the United Kingdom (UK) where they took the form of Private Finance Initiative (PFI) and subsequent Private Finance 2 (PF2). Proponents cite their abilities in easing governments' budget constraints, transferring risks to the private sector, and curbing delays and cost overruns. Since then, more than 700 projects of this nature (tallying around £56 billion capital investment) have been enacted in the UK (HM Treasury, 2021). While PPPs are increasingly adopted elsewhere around the globe, UK announced in 2018 that no new PF2 projects would emerge due to their less-than-satisfactory performance (e.g.,

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significant fiscal risk) (HM Treasury, 2021). Although this does not mean PPP has come to its end in the UK, it has certainly questioned the value for money (VfM) assessment that justified the use of PFI in these projects. VfM assessment is conducted by comparing the net present value of a PPP option and that of a traditional procurement approach. The simple way of quantifying costs and benefits has made it an indispensable component in the public procurement process. Nevertheless, the methodology enshrined in VfM assessment has been criticised as being deeply flawed and un-rigorous (Shaoul, 2005). Since 2020, Covid-19 has posed a major challenge in the public delivery of infrastructure, more private finance will understandably be exploited to meet the urgent demand for public services. In this sense, governments, especially those experiencing ‘failures’ with PPPs, need to be equipped with an instrument that can help select an appropriate procurement method. Therefore, this paper provides a timely comparative analysis of state-of-practices of VfM assessment in the global market, which aims to inform the UK’s future use of PPP contracts. To our knowledge, related studies, such as Grimsey and Lewis (2005) and Morillos and Amekudzi (2008) are limited and do not reflect the most recent situation. A fresh approach, through these findings, would enable decision-makers to garner an understanding of how VfM assessment can be better utilised.

### **What Are PPPs and VfM?**

To date, there is not a unifying definition of PPPs as governments assume different priorities and intentions (Muleya *et al.*, 2020). Cherkos and Jha (2021) report that emerging markets embrace PPPs mainly for economic and financial stimuli, compared with developed countries’ pursuit of service quality. As a consequence, various approaches such as PFI, build-operate-transfer (BOT), concession and franchise, have been generated to accommodate multiple types of assets (e.g., new or existing), functions borne by private sectors, and payment sources (e.g., users or governments) (The World Bank, 2017). PFI is defined by HM Treasury (2021) as ‘a long-term contract between a private party and a government entity where the private sector designs, builds, finances and operates a public asset and related services.’ Australia perceives PPPs as ‘a long-term contract between the public and private sectors where government pays the private sector to deliver infrastructure and related services on behalf, or in support, of government’s broader service responsibilities’ (Department of Infrastructure and Regional Development, 2008). China, on the other hand, seeks to build a long-term partnership where private entities design, build, operate and maintain the infrastructure while the government supervises its price and quality. These definitions reinforce the perception that a ‘one-size-fits-all’ approach to PPPs may be problematic. However, evaluating cross-experiences could promote best practices in different settings.

The idea of VfM is widely used, ranging from daily life (e.g., buying a phone) to professional trade (e.g., selecting a best practice procurement approach). Yet in the latter, the concept of VfM is not clear-cut because of problems such as stakeholders, measurement, attribution, and stability (McKevitt, 2015). One of the most cited definitions of VfM is that it ‘is the optimum combination of whole-of-life costs and quality (or fitness for purpose) of the product or service to meet the users’ requirement.’ (Morillos and Amekudzi, 2008). On the other hand, the ‘3Es’ (economy, efficiency, and effectiveness) plus a recent fourth ‘equity’ are commonly used as proxies for VfM (Jackson, 2012). Ismail (2013) affirms that VfM depends on realising technical innovation through competitive tendering. In other words, commentators consider VfM to be a function of multi-attributes. Among them, Ng *et*

*al.*, (2012) and Cui *et al.*, (2019) have identified that cost effectiveness is the most fundamental driver. This to some extent explains why cost is given overriding attention in VfM assessment.

### **Why is VfM Assessment Important?**

Typically, VfM assessment can be classified into ex-ante assessment and ex-post assessment. The mainstream role of the former is to determine a procurement route between different alternatives at the initial decision-making stage. The latter is often entangled with performance measurement to target whether VfM has been realised via the selected method (Liu *et al.*, 2018). Some organisations, such as the UK's National Audit Office, have institutionalised VfM assessment into the scrutiny of government spending, thus triggering the alignment of both assessments (Heald, 2003). Given the lump-sum capital investment, unsuccessful infrastructure delivery will not only result in the financial vulnerability of stakeholders but the loss of overall social welfare of the society. As such, according to Shi *et al.*, (2020) VfM assessment has formed a major research area in PPP related studies. In practice, it has become a legal procedure in the procurement process of some countries (e.g., UK, Australia and China) if PPPs are being considered. A number of other countries are also proposing and implementing their own VfM frameworks.

The pervasive use of VfM assessment in project evaluation requires the methodology itself to be sound and reliable, which would otherwise challenge the validity of the decision. Current questions in the VfM debate include, inter alia: what is a suitable discount rate? And should the same discount rate be used for evaluating PPPs and traditional procurement? Jomo *et al.*, (2016) confirm that discounting PPP costs at a higher discount rate renders a lower, more attractive net present equivalent, and thus may bring a disproportionate advantage to the PPP option. Another polemic is the balance of risk allocation between two contractual parties. There are cases where undue risks have bankrupted the PPP provider. With a contract valid up to 30 years, an exhaustive and accurate prediction of risks and their valuation is hardly possible. More importantly, VfM assessment relies heavily on a hypothetical construction of a public sector comparator (PSC), evading an 'apple-to-apple' comparison. Therefore, the concern is that VfM assessment is compromised as a bureaucratic tool to legitimate a pre-conceived mindset (i.e., that PPPs are better). Cases have been seen worldwide (e.g., the UK, the EU, Australia, and the United States) that PPPs have, retrospectively, been shown to be more expensive than the traditional alternatives (Hodge and Greve, 2007; Leigland, 2018). If headway is to be made against these problems, after decades of PPP evolution, it is necessary to conduct a state-of-the-practice study of global markets to extract best practices.

## **RESEARCH METHOD**

Part of a wider study, the work presented here is a comparative analysis of three differing national approaches to VfM assessment. The three countries - UK, Australia, and China - have different economic and institutional characteristics that to some extent underlies their approaches to VfM assessment. However, benefiting from their experiences (favourable and unfavourable), meaningful takeaways can be generated for future best practice in VfM. In the literature, the UK and Australia are considered mature PPP markets in terms of their complexity and volume of projects (Grasman *et al.*, 2014). Despite its very different economic regime, China's PPP market, since official adoption in 2014, has grown to be the world's largest (currently c.£16 trillion - 28 times larger than the UK's) and Perera *et al.*, (2019) have equated

its maturity to that of the UK and Australia. The comparative analysis was undertaken in three steps, first, grey literature from three PPP units (i.e., HM Treasury, Department of Infrastructure and Regional Development, and Minister of Finance) was retrieved as the data source. Second, in the presence of absent information in the grey literature, pertinent academic publications were also exploited as a complement. Third, the analysis focused on different perspectives as represented by governments and the general public. Specifically, the governmental focus is on providing a cost-effective product/service whilst the other perspective concerns the wider benefits that accrue to the end-users. Both governments and end-users' interpretations of VfM were considered when framing the analysis because the core of PPPs is providing equivalent services at a less cost or better services at the same cost (Dixon *et al.*, 2005; Grimsey and Lewis, 2005). In other words, the general public's perception of service should be accounted for.

## FINDINGS

### What do 'VfM' and VfM Assessment Mean?

As the pioneer of PPPs, the UK is grappling with their assessment. Specifically, the UK has replaced the PSC model developed in 1999 with a project level assessment in 2004 and 2006, withdrawn the quantitative assessment in 2012, and re-invigorated PSC in 2020 (HM Treasury, 2020). In contrast, Australia maintains its 2008 version while China updated its 2015-practice in 2016. In addition to the UK's definition of VfM within these documents, Australia specifies 'VfM is a combination of the service outcome to be delivered by the private sector, together with the degree of risk transfer and financial implications for government.' Although China does not have an explicit VfM definition, it emphasises the improvement of service quality and operation efficiency, or reduced project cost over the project lifecycle.

It should be noted that here VfM is considered in the context of a comparison between PPPs and traditional procurement. Other forms of procurement may fall into a wider evaluation. For example, Australia enacts a 'procurement options analysis' that can evaluate PPPs against construct-only, design and construct, alliance contracting etc. in areas such as objectives, policy context, agency capability, and market. For PPPs to qualify as a potential VfM alternative, each country has a shortlisting mechanism, shown in Table 1. Despite the \$50 million restriction in Australia, small projects that present measurable risk transfer, whole-of-life costing, innovation, measurable outputs, asset utilisation, better integration and competitive process may also qualify for PPPs. Compared with the conditions required in the UK, in Australia and China projects with certain characteristics can be identified and draw a visual profile for governments. If the listed thresholds are met, a VfM assessment is then undertaken between PPPs and the traditional procurement approach.

Table 1: Projects that may be suitable for PPPs

Countries	Conditions
UK	Non-IT/ICT projects; Capital investment over £20 million
Australia	Capital investment over \$50 million (≈£27.5 million)
China	Projects characterised with flexible price adjustment, high degree of market openness, high capital expenditure and stable demand.

### When Does VfM Assessment Take Place?

The UK performs a three-stage (programme level, project level and procurement level) VfM assessment, which happens during the annual budgeting round, outline

business case (OBC) and post-OBC to financial close, respectively. In the latest Green Book 2020, these stages have been restructured as the longlist and shortlist appraisal stage. Australia and China conduct the assessment after the investment decision is made and before the request for proposal is launched. In addition, China requires a mid-term assessment 3~5 years after the project is in operation to check if the initial VfM is attained, which initiates academic exploration of a life-cycle assessment (Liu *et al.*, 2018). There are also differences in the order of quantitative assessment (i.e., PSC) and qualitative assessment. Australia and China proceed with the quantitative assessment followed by a qualitative assessment. This emphasises the importance of the qualitative assessment, particularly when the PSC is close to the bidders' lowest price. The UK, however, has shifted from an identical practice to the opposite procedure, where critical success factors and other qualitative issues are assessed first, followed by a PSC calculation. A potential problem with this approach could be that the earlier qualitative assessment is not well interpreted (Coulson, 2008) and repeats the suitability test where projects amenable to PPPs are preliminarily screened. This is exacerbated by evidence concluding that UK's PSC guidance is biased towards PPPs (Pollock *et al.*, 2007). Similarly, China originally used a qualitative assessment certified by a group of experts, with the quantitative assessment being at the discretion of responsible agencies. The transformation to its current practice may again corroborate Coulson's (2008) concern on qualitative VfM. The implication is that the UK should perhaps consider the general process prevailing in Australia and China and thus avoid unnecessary duplication.

### **Traditional VfM (Quantitative)**

As mentioned above, PSC represents a hypothetical scenario where the public sector designs, builds and operates the project and the cost difference between a PSC and a PPP demonstrates VfM. Currently, components of PSC are not detailed in UK's Green Book 2020. Drawing on relevant literature and practices in Australia and China, a PSC comprises raw PSC (i.e., the construction and operation costs associated with delivering the output specifications over a period), competitive neutrality, transferred risk and retained risk. This benchmarking cost can be revisited when consulting private sectors to illuminate potential market capability before the formal tendering. In Australia, it is then compared against the bidders' price to quantify VfM. In China, a PPP value consisting of the cost the government is to bear in the PPP scenario is calculated for comparison. As it is undertaken at the pre-tender stage, this PPP value is akin to a shadow bid value. Except for the PSC comparison against a PPP, an additional comparison between the value of a PPP version of 'do the minimum' and a normal PPP is required in the UK. Furthermore, the comparison can be as wide to include 'Business as Usual', 'do the minimum option', 'PPP', and another viable alternative if no outsourcing or insourcing change exists. In this case, it is a cost-benefit analysis similar to the step at the investment decision stage.

The importance of selecting a discount rate that underpins the net present value calculation is recognised. China proposes the same discount rate that is based on local governments' bond yields (e.g., a road project procured in 2019 in Fujian used 4.08%) in a PSC and a P It also suggests that, if there are multiple discount rates available, the minimum discount rate should be used as this avoids the debate that a higher discount rate underestimates the value of a P The single discount rate also explains the lack of a sensitivity analysis (which are common in the UK and Australia) to trial the impact of different discount rates on decision-making. In Australia's social infrastructure, the PPP side discount rate is adjusted to reward the private sector for assuming the

transferred risks. For example, a risk premium is added to the risk-free discount rate based on the percentage of risk sharing. Although this practice has its roots in the capital asset model, the presumption that governments can really transfer risks to the private sector can be disputed. For economic infrastructure, the project rate and risk-free rate are used in a PSC and a PPP, respectively. In the UK, a 'social time preference rate' of 3.5% is applied for all possible options at the shortlist stage.

For better risk management, all three countries uniformly price risks that governments are exposed to in PSC. In the process, risks are identified, and their probabilities and ramifications are multiplied. Point estimate and Monte Carlo simulation are recommended as techniques for risk quantification in the UK and Australia. The UK additionally suggests decision trees and real options for a follow-up decision as the project progresses. Instead of instructing these techniques, China promotes the use of scenario analysis in cases where the consequences of risks can be measured but not their probabilities; a percentage method when both consequences and probability are hard to estimate; and probability x impact method when both can be calculated. Risk valuation is ultimately split into retained risks and transferred risks to prepare for the risk sharing that exists in PPPs. In order to avoid the illusion that a large project can be created with a small amount of investment, the UK has 'hard-wired' an optimum bias adjustment that predicated on experience in public funded infrastructure. However, it is not clear how this concern is addressed in PPPs. For example, can a lower optimum bias percentage be applied to a PPP bid since private sectors are considered to have expertise? Moreover, empirical data reveal that 'change of scope' and 'client requirement' lead to project cost fluctuations (Love *et al.*, 2019). Similarly, transaction costs, which can be as high as 20% of the capital investment in PPPs are not clearly addressed. Such omissions can sow the seeds in which overestimation of a PSC and underestimation of a PPP prosper.

### Public VfM (Qualitative)

In light of the extensive criticism of the UK's PSC practice (e.g., Shaoul, 2005 and Pollock *et al.*, 2007), the former quantitative assessment became dormant in 2012. As previously mentioned, despite the resurgence of PSC in 2020, its components and how it is operated are elusive. However, a new form of qualitative assessment at the longlist stage can reveal the social value of a project intervention. Table 2 outlines the qualitative factors that are considered in each of the three countries.

Table 2: Qualitative factors in VfM assessment

Countries	Timing	Factors
UK	Before quantitative assessment	Measurable objectives and outputs; risk allocation and management; operational flexibility; equity, efficiency and accountability; innovation; contract duration and residual value; incentives and monitoring; The Market; timescale; skills and resources.
Australia	In conjunction with or after quantitative assessment	Service delivery and operational requirements; interface/relationship and project management; design considerations.
China	After quantitative assessment	Life-cycle integration; risk identification and allocation; performance and innovation; competitiveness; governments' capabilities; financeability; asset correlation in the bundled contract.

As can be seen, governments in the UK and China may not be fully equipped with PPP knowledge as they relate to skills, resources and capabilities and appeal for risk

management, innovation and the power of the market. This concurs with Spackman (2002) and Sun *et al.*, (2021) exemplifying that financial constraint skews the ideology to PPP forms of procurement in the UK and China. Consequently, a large number of projects are made possible by leveraging up limited budgets to meet immediate infrastructure demands. The concomitant risk is an uplifting public debt level and jeopardising of the long-term VfM (Ball *et al.*, 2001). In practice, a red flag was waved by China's SASAC regarding local state-owned companies (i.e., the main representative of the private sector in Chinese PPPs)' debt risk. The UK and Australia have a similar affordability analysis to avoid using PPPs as a way of off-balance sheet avoidance. Service, however, is augmented in Australia's qualitative assessment through combined consideration of project management and prescient design inclusion. The ensuing result is its better performance at least in terms of cost and time (Raisbeck *et al.*, 2010). In summary, the qualitative assessment reflects their policy orientation in a specific spectrum and is subject to methodological weaknesses.

The emphasis on 'service' does not make the qualitative assessment in Australia 'a panacea'. Compared with the UK and China, not only is the number of factors considered confined but also their assessment is unclear. As simply as it can be, a series of questions on the factors in Table 2 have to be answered by the procuring team in the UK to pass the evaluation. In stark contrast, China implements a relatively robust qualitative assessment. Specially, an even number (more than nine) of experts in the fields of finance, accounting, regional development and construction etc. are summoned to rate the weight and score of each factor using criteria set by the local PPP unit. A total of 20% of the weight is assigned to the 'supplementary factors' that are not outlined in Table 2 to accommodate the project characteristics. 60 is agreed as the threshold between 'fail' and 'pass'. However, a weighted average of over 80 can waive the need for the PSC, instigating pressure on the panel's independence and professionalism. Issues that are common to each country are that (i) factors are appraised purely against the PPP option (and not against its traditional procurement alternative); and (ii) the criteria are generic and not sector sensitive. It is worth discussing on a carefully and rigorously designed qualitative assessment to minimise bias and subjectivity if indeed the qualitative VfM is on the agenda. Another approach could lead to a programme- or sector- level VfM. For instance, functionality, resilience, environment, distribution, and social inclusion that are valued by end-users in transport infrastructure.

## CONCLUSIONS

PPPs have been globally adopted to deliver infrastructure and/ or public services in lieu of traditional public sector procurement. They are however, plagued with controversy as to whether the purported advantages materialise over project life cycles. Failures of this nature have led to the suspension of PFI and PF2 in the UK, which inevitably maligned the already controversial VfM assessment that rationalises PPPs. To this end, it is imperative that best practices are extracted to safeguard the public purse when the UK prepares for other forms of PPPs and the details of VfM assessment is lacking. The intention of this paper is not to conclude on the superiority of one practice over another. On the contrary, it aims to call for a sober consideration of global practice and argues for a calibration in the existing procurement approach.

The UK, Australia and China are selected for the cross-country comparison as they represent sophisticated PPP markets around the world. This is a delimitation of the study, as there are undoubtedly other national approaches to be considered and this

could form the basis of further work. Furthermore, these three countries have different economic and institutional regimes. Nevertheless, we believe that their similarities and differences are informative. It is clear that the maximisation of social value is not treated as it should be in the long-term sense. Specifically, UK and China converge on the financial stimulus that drives the use of PPPs while Australia is service-oriented. Contrary to the stereotype, it shows China is exerting the power of the market on PPP infrastructure delivery. In terms of the concept of VfM, the UK focuses on quality and whole-of-life cost while Australia seeks service, risk transfer and cost, and China heeds cost, service quality and operational efficiency. Consequently, PSC serves as a reliable tool in Australia and China for comparing the net present value of two options. The trajectory of PSC in the UK is a recurrence between adoption, replacement, withdrawal, and re-adoption. Yet, the current version remains vague on its components and how it operates. Other issues such as optimum bias and transaction costs are touched upon but are not clearly calculated especially in PPPs. Considering the potential manipulation of PSC, the spotlight has shifted to the qualitative assessment. Both Australia and China conduct the assessment after the PSC comparison, while the UK undertakes the opposite. The concrete steps take the form of questions in the UK and a weighted average in China capitalising on experts' experiences. Australia, on the other hand, proposes a few qualitative factors without providing 'how'. The results further reveal that China has a direct and simple way on both types of assessment but has its 'weakness' in a lack of a sensitivity analysis whilst the UK is enigmatic on PSC and Australia falls short on qualitative assessment.

Recommendations are generated from the comparison for calibration in the face of what has been called 'sleight of hand' (Pollock *et al.*, 2002) in justifying PPPs. The global market has a consensus that cost is not the sole determinant of VfM. Thus, as the procuring body, a government-wide definition of VfM which integrates government-side consideration and taxpayers-side benefits is urgent. The ready prototype then sets the tone for VfM assessment particularly how qualitative assessment is employed. Hints are that quantitative assessment and qualitative assessment (which often uses a quantitative scoring system) are transferable and ultimately yield a solid decision. It should be noted that the initial qualitative VfM assessment should be applied to both PPPs and the traditional procurement if the intention is to curb a pre-determined mindset and maximise overall social welfare. To avoid manipulation, the criteria for pre- and post-delivery evaluation of VfM should be aligned and consistent. To do so, governments need to take on the call for accumulating data in the format required in VfM assessment and disclosing information for transparency. In the absence of any current standard process, the pathway can be an initial option analysis approach for screening potential PPPs, followed by concurrent quantitative and qualitative VfM assessment. In order for the recommendations to be better implemented, this paper channels avenues for future research. On the one hand, the diagnosis of VfM assessment could extend to a wider territory and compare the practice within and across these emerging and mature economies. On the other, although briefly mentioned in the findings, the other direction could lead to the analysis of macro institutional characteristics that condition the variances in how VfM assessment is conducted.

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