

MODELLING THE DRIVERS FOR PUBLIC-PRIVATE PARTNERSHIPS (PPP) PROVISION OF UNITED KINGDOM (UK) SOCIAL INFRASTRUCTURE

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As the devolved governments of the United Kingdom (UK) continue to develop innovations of Public-Private Partnerships (PPP) for social infrastructure provision, this research models the PPP drivers which support partnership-based procurement in the UK. Despite having provided much of the best-practice policy foundations globally, in the UK there has been extensive criticism of PPP for delivering poor Value for Money (VfM) to the tax-payer. Notwithstanding these criticisms, the regional UK governments have declared their committed to cross-sector partnering. This has transpired in a policy reformation encompassing an overhaul of the previous Private Finance Initiative (PFI), followed by the introduction of several nuanced models designed to function across the UK jurisdictional markets. Accordingly, the purpose of this research is to investigate the drivers of PPP which support these frameworks as a credible mechanism for future social infrastructure provision. Following an extensive interrogation of existing scholastic literature, this research identified three themes which were comprised of 20 key drivers for further scrutiny and empirical investigation. Building on previous research by McErlane *et al.*, (2016), this research employed survey questionnaires to sample key PPP stakeholder organisations. From a sample of 73 organisations, this research utilised Confirmatory Factor Analysis (CFA) to assess the hypothesis derived from literature and therein distil the key constructs in an effort to develop the PPP drivers' model. In doing so, the findings confirmed that PPP drivers fundamentally are encapsulated in three key components, specifically: 'improved productivity and efficiencies', 'financial mechanism and the associated benefits of private finance' and 'wider efficiencies offered to governments'. Given the status of the UK in terms of global practice, these findings make a valuable contribution both domestically and internationally. Furthermore, as private-sector participation in infrastructure provision continues to gather momentum in the current socio-economic climate, this research offers much-needed clarity around the strategic merits of PPP for improved collaborative partnering.

Keywords: PPP, social infrastructure provision, Confirmatory Factor Analysis (CFA)

INTRODUCTION

Across the globe, Public-Private Partnerships (PPP) are being extolled as a vehicle to provide more and better infrastructure. Notwithstanding international traction, in the United Kingdom (UK), despite being a pioneer of PPP, mobilisation of these

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frameworks for the provision of social infrastructure has markedly declined in the wake of Value for Money (VfM) Concerns to the taxpayer. Even so, in spite of its tarnished reputation, the UK government has declared its commitment to cross-sectoral partnering arrangements and has subsequently stated that PPP will continue to be a credible mechanism for social infrastructure investment in the future where offering best VfM (HM Treasury, 2016). Against this backdrop, the devolved governments of the UK have developed nuanced PPP frameworks to replace the previous Private Finance Initiative (PFI) which was discredited and subsequently abandoned in 2012. Hence, the purpose of this investigation is:

- To provide a contemporary overview of PPP frameworks across UK jurisdictional markets;
- To consider the drivers of PPP which espouse these frameworks as a viable mechanism for social infrastructure procurement; and
- To empirically evaluate the PPP drivers for social infrastructure provision in the UK.

LITERATURE REVIEW

Contemporary Overview of UK PPP Social Infrastructure Frameworks

8. *England*

In England, in light of the austere policies implemented in response to the Global Financial Crisis (GFC), to lessen public-sector debt; George Osborne announced Private Finance 2 (PF2) to replace PFI in December 2012. One of the principal differences between PF2 and PFI has been the policy introduction of the public-sector as an equity co-investor. By directly investing into the project, it is anticipated this will cultivate greater stakeholder collaboration reflected through an improved partnership between contractual stakeholders. Better objective alignment; greater transparency and information sharing; improved risk allocation and management; and joint decision-making, all potentially will enable the government to obtain a share of investment returns, reduce project costs and ultimately deliver better VfM. This investment will be managed by a central unit positioned within the Treasury and agreed on equal terms to the private-sector (HM Treasury, 2012). As well as co-investing, the previous PFI framework has been nuanced to reduce procurement timescales, circa 18 months. Soft services have also been removed from the contract to facilitate greater long-term flexibility, efficiency and transparency. This will equally remove the risk premium which had been previously attached to investments, thus ring-fencing excessive profits (HM Treasury, 2012).

In today's economic climate, HM Treasury (2012) regards banks no longer as a sustainable source of debt provision. Rather, going forward, suggested divergence from the conventional funders has been expressed through greater weight attached to institutional investor involvement. Traditionally, PFI projects have been circa 90:10 debt/equity ratios. However, by reducing the gearing ratio to 75:25, it is anticipated this recalibration will stimulate greater earlier activity in the markets, increasing competition and serving to reduce returns to levels which are more reasonable and politically defensible. Furthermore, and arguably more pertinent, this new leveraging arrangement will insulate traditionally risk averse institutional investors from construction risk exposure. By doing so, there will be less dependence on banks to provide lending capital, as well as freer, earlier and greater filtration of newer alternative financial sources, resultantly lowering prices on less restrictive terms (HM Treasury, 2012).

While PF2 has seemingly addressed many inherent issues of PFI, its arrival should be concomitant with several caveats. Lower gearing will likely increase transaction costs. Likewise, there are no guarantees institutional investors will necessarily want to be involved any earlier (Read, 2013). Moreover, despite having been introduced in 2012, the National Audit Office (2018) Identified that out of the six deals signed under PF2, institutional investors still have not invested into debt. Additionally, Solvency II; introduced to reconcile and codify solvency requirements against risk profiles, will possibly limit long-term investments (Mittnik, 2011). Banks, having historically undertaken the syndicated arranging responsibilities, has meant institutional investors do not possess the requisite due diligence skillsets; at least not on this scale (Read, 2013). It is therefore no surprise that since its introduction, PF2 activity has been muted and has subsequently been used for only a small number of projects. Poignantly, a pipeline of PF2 projects which was due to be announced in June of 2017 has been abandoned with the future of PF2 still uncertain (ConstructionNews.co.uk, 2017). A report published by the findings of the National Audit Office in March of 2018 (NAO, 2018) Highlighted outstanding concerns regarding PF2 as part of their investigation into UK P Fundamentally, these concerns relate to transparency and performance measurement, flexibility and the underlying motivations behind the utilisation of PF2.

9. Northern Ireland

Northern Ireland (NI) Has also developed its own Third-Party Development (3PD) Model which utilises a design, build, finance and maintenance contract; though, the 2015 proposed pathfinders are yet to achieve financial close (Education Authority, 2015) And it remains unclear if they are still in discussions. Notwithstanding the launch of 3PD, PPP in NI has been subjected to notable criticism and indeed the Executive has expressed little appetite for P A 2009 report disseminated by the then Northern Ireland Public Service Alliance (Hellowell, 2009) heavily criticised PFI in NI. This report, together with numerous other publishing's have culminated in PPP being a contentious topic amongst strategic decision-makers which has been reflected through sedate market activity.

10. Scotland

To replace PFI, Scotland has introduced the Non-Profit Distribution (NPD) Model. NDP was launched to be a more practical and viable alternative to PFI, and in 2015, the NPD framework delivered £0.46billion (bn) of capital projects. While NPD is effectively grounded in the foundations of PFI, it additionally includes measures to address many of the criticisms of its predecessor. NPD caps excessive private-sector gains; instead, profits are reinvested into the public domain. Moreover, the Special Purpose Vehicle (SPV) Board is steered by subordinated debt-holders, as well as a public Authority, charity or community representative. In this regard, NPD has been extolled for its capacity to collaboratively facilitate stakeholder engagement in the decision-making process (Asenova and Beck, 2015).

Scotland has also developed the Scottish-Futures-Trust (SFT) Hub initiative. The SFT Hub resembles other 'PFI-lite' schemes such as the Building Schools for the Future (BSF) And Local Improvement Finance Trust (LIFT) Programmes, so much so, according to Asenova and Beck (2015), hub guidance documentation specifically acknowledges the parallels between itself and other existing arrangements in the UK. The first hub project was undertaken in August of 2009 for the provision of social infrastructure in the south-east region of Scotland. The project was valued at £64million (mn) and comprised the provision of health and education facilities. Akin

to other PPP programmes, it is a 20-year joint-venture (JV) Partnership between a private partner and public-sector cohort encompassing the SFT, local councils and other public-sector bodies within the region. The hub initiatives key objectives are to: improve local services through public-private joint service provision; deliver a sustained programme of community infrastructure investment through public-private collaboration; provide a sustainable and effective procurement model for public bodies; and develop a best-practice framework (Scottish Government, 2006). A local HubCo is given the mandate to design, build, finance and manage a portfolio of projects; however, through greater flexibility and community inclusion, it is argued, the hub will be better positioned to deliver enhanced investment impact than that on offer through conventional procurement channels (Scottish Government, 2006). Over its initial 10 years, it is expected the hub will channel £2bn of investment into social infrastructure (SFT, 2016). Notwithstanding these changes in Scotland, as early as 2010, Wamuziri (2010) Raised concerns over the timescales and costs incurred to bring projects to financial close in this nascent PPP modality. Moreover, concerns have been raised regarding competition and excessive profits closely reflecting many of the inherent criticisms of PFI (McCall, 2017).

11. Wales

Just as all other regions have reformed their PPP frameworks, so too has the Welsh Assembly. In 2017, the Mutual Investment Model (MIM) was announced as a successor to PFI. Much like PFI, this is a design, build, finance and management contract between the public and private-sectors, though there are distinctions within this framework from PFI. The MIM now has a requirement whereby during the development of the facilities, the private-sector cohort will create apprenticeships and traineeships by which to benefit the community (Welsh Government, 2017). Currently, MIM is available for both social and economic infrastructure development, and it is actively being considered for three projects, namely; the Velindre Cancer Centre in Cardiff, the A465, and the 21st Century Schools Programme, which collectively comprise around £1bn of investment (Welsh Government, 2017).

Drivers for Public-Private Partnerships Social Infrastructure Provision

Having provided an overview into the current state of UK PPP, the research will now undertake an extensive exploration of literature to identify the drivers which espouse PPP as a viable mechanism for social infrastructure provision.² Fundamentally, the decision to adopt PPP is predicated on VfM. According to World Bank *et al.*, (2016), PPP can provide better VfM as well as more and better infrastructure through three principal avenues: as a financial mechanism and the associated benefits of private finance; improved productivity and efficiencies; and the wider efficiencies offered to governments. Beginning with the financial advantages of PPP, this can be dichotomised into access to alternative sources of capital and access to cash. PPP offers an alternative financing vehicle for infrastructure provision. By channelling private financing into infrastructure, PPP can expedite infrastructure provision strategies and accelerate capital investment pipelines (Demirag *et al.*, 2015). PPP utilises project financing arrangements comprising private debt and equity. Advantageously, the public-sector can avail of social infrastructure while repayments

² Drivers were broadly identified from all PPP related sources including journal articles, government documentation, and industry reports and guidance documentation. However, by having organisations which are or have been active in the UK PPP market evaluate these drivers, this will produce findings which are pertinent to the UK.

of this service are accounted for systematically over the operational phase. In this regard, repayments do not immediately compromise government budgets and for this reason, PPP is particularly attractive in times of fiscal consolidation as alternative sources of capital enables infrastructure development continuity in times of constrained public budgets (Hare, 2013). Though ultimately the government still pays the cost, the government is afforded the opportunity to repay the capital in smaller payments and thus PPP in the main is favourably kept off capital balance sheets. Use of private financing can also offer governments' greater flexibility in that it mobilises alternative sources of capital, frees up public-sector resources that can be deployed elsewhere and can be used to compliment publicly funded programmes (Della Croce *et al.*, 2015). Notably however, the benefits derived from private financing should be concomitant with several caveats. Governments must be mindful of accumulating debt imposed by PPP and the long-term outgoings as a result (Gardner and Wright, 2011). Also, the efficiencies accrued from the project performance should outweigh the additional costs of private financing, and therefore should be chosen premised on better VfM over alternative financial mechanisms.

Another area where PPP has been extolled for its wherewithal to provide more and better social infrastructure derives from its streamlined efficiencies and effectiveness. In essence, better efficiencies fall under the categories of: cost management; lifecycle management; reliability and effectiveness; innovation, and risk management (World Bank *et al.*, 2016). PPP harmonises what has traditionally been heterogeneous projects phases into a single long-term bundled solution. This holistic perspective theoretically enables the development of an optimal integrated solution for the duration of the contract which should translate to better investment impact than traditionally procured facilities. Conceptually, this is reflected through an overall improved quality of the service, expedited provision of the facility, enhanced operational efficiencies and improved maintainability over the lifecycle (PwC, 2015). This bundled and integrated solution design in principle is permitted using an output specification which grants the private-sector greater space to innovate, design an optimal solution and utilise better technological resources (World Bank *et al.*, 2016). It is also noteworthy, the private-sector is not subjected to the same bureaucratic constraints, social pressures and business frameworks as the public-sector is. Accordingly, the private-sector has greater flexibility to innovate and manage costs. These benefits are underpinned by the usage of the performance based payments to guarantee these efficiencies (NAO, 2018).

Others have argued that PPP offers superior risk management efficiencies. Advocates of PPP claim that the disparity between public and private funding options can be offset through savings derived from effective risk management and risk transfer. Being long-term complex arrangements, PPP and infrastructure provision more broadly, is invariably exposed to significant risks. Ideologically, within the PPP framework, risks and responsibilities are transferred to the party best able to manage them (Pretorius *et al.*, 2008). This allows the public-sector to divert construction, financing and operating risks away from the state and onto private organisations. In return, risks are quantified, priced and managed through sound private-sector risk management practices. The optimal transfer of risk; rather than total, in theory, can produce enhanced VfM above and beyond that if the project stages were disentangled and contracted unilaterally. Furthermore, bearing the risk of construction, there is a strong incentivisation for the asset to be provided on-time and within budget (NAO, 2018). Finally, PPP has been touted as a viable mechanism for infrastructure

investment premised on the overall efficiencies afforded to the government. PPP ensures that there is an up-front commitment to the provision of the infrastructure. The funds allocated to the operations and maintenance of the facility and service are ring-fenced as part of future budgets and thereby safeguards the reliability of the asset and service (HM Treasury, 2012). Furthermore, PPP may pave the way for efficiencies to be adopted and imported into future infrastructure provision as well as ensures transparency premised on the large number of organisations involved (World Bank *et al.*, 2016).

METHODOLOGY

Considered a new discipline relative to others, Knight and Ruddock (2008) explain there are consequently no pre-defined approaches to research methodologies intrinsic to the built environment. Embracing contributions from social and human sciences as well as a diversity of domains including art, law, economics, sociology, statistics and philosophy, historically, positivist quantitative studies have dominated the built environment. However, advocates of interpretivism have argued over the importance of understanding social phenomena as opposed to explaining it. An outcome of this has been that research patterns have shifted, and over time, the built environment has displayed increased interest in qualitative research, and more recently, mixed-methods approaches (Knight and Ruddock, 2008). Notwithstanding these transitional research trends, fundamentally, a methodological design is contingent upon the research objectives and must therefore be reflective of the research's intent.

From the critical literature review, it was identified that the justification to utilise PPP for future social infrastructure provision is comprised of 20 drivers which fall into three themes. Seeking to measure multiple variables of existing knowledge and confirm their relationships as per literature, this research is confirmatory in nature. Hence, this study adopted a deductive epistemologically positivist and ontologically objectivist stance. Conducive to this methodological stance, a quantitative design enables research to gather large amounts of data regarding multiple variables which can be generalised and evaluated (Bryman and Bell, 2015). In order to conduct the quantitative research design, the research adopted quantitative electronic survey questionnaires. Questionnaires facilitate a standardised, systematic and simple approach to generating large datasets suitable for statistical analysis which are representative of a population. In studies similar to this which have modelled saliency or importance, quantitative survey questionnaire approaches have been the predominant research design, for example, Chou and Pramudawardhani (2015) employed survey questionnaires to assess critical success factors (CSF) in PPP projects. Equally, Tang and Shen (2013) utilised survey questionnaires to evaluate effectiveness and efficiency factors for analysing stakeholder needs at the briefing stage of PPP projects.

Adopting the PPP stakeholder identification framework developed by McErlane *et al.*, (2016), stakeholders were deemed to be the Authority, Construction Contractors (BuildCo), Service Providers (FMCo), Equity Shareholders and Debt Funders. To determine a population in the absence of a comprehensive or centralised UK PPP stakeholder database, the research sourced stakeholder information from two sources, namely: HM Treasury (2015) PPP summary data; and Infrastructure Journal (IJ, 2017) Online database. In total, a population of 516 organisations was established. To extract a sample from this population, accounting for stakeholder groupings, a stratified probability sampling approach was conducted to identify participants at a

95% confidence level and 5% margin of error in accordance with Bryman and Bell (2015). Strata size was determined on a pro-rata basis and a systematic random sampling protocol was implemented. Ultimately, a sample of 220 organisations was invited. Surveys were distributed via the SurveyMonkey platform and analysis was carried out using SPSS. Designed to gather opinions of the 20 drivers, participants were requested to evaluate the salience of these variables using closed-ended questions by means of a five-point Likert frequency scale. Kendall's Coefficient of Concordance (W) was opted for to measure statistical degrees of concordance among stakeholder groups and the null hypothesis for Kendall's W is:

12. H_0 = there is no significant degree of agreement among participants, and responses are independent of each other ($H_0 = 0$); and
13. H_1 = there is a statistically significant degree of agreement among participants ($H_1 \neq 0$).

Proceeding this, a Confirmatory Factor Analysis (CFA) was undertaken to test the theoretical findings from literature. CFA enables research to statistically compare a relationship pattern or an a priori hypothesis by statistically testing the relationship between observed variables and their underlying latent constructs. The research tested the accuracy and reliability of the CFA sample through the application of the Kaiser-Meyer-Olkin (KMO) Measure of sample adequacy and Bartlett's test of sphericity. The CFA stipulated an Eigenvalue of one, adopted an Oblimin rotation method and values below 0.4 were suppressed.

FINDINGS

In total, the research received 73 completed and useable responses, equating to a 33% response rate. This was considered robust, surpassing similar research such as Kwawu *et al.*, (2010) who elicited a 20% response rate and Li *et al.*, (2005) who received a 12.2% response rate. Of the 73 completed responses, 18 (24.7%) were received from the public-sector and 55 (75.3%) from the private-sector. According to stakeholder group, in order of size, 24.7% were elicited from the Authority, 23.3% by FMCo, 21.9% by BuildCo and Equity Shareholders equally, and 8.2% by Debt Funders.

To determine levels of statistical agreement, the research conducted the Kendall's Coefficient of Concordance test. From the Kendall's W test, a value of 0.223 was determined. Despite an absence of conclusive agreement pertaining to the codification values spanning zero to one, generally it is considered, a value above 0.20 indicates fair levels of agreement (Legendre, 2010). Furthermore, a P value of 0.00 ($P = 0.00$) was determined³. This signifies the null hypothesis (H_0) should be rejected and the alternative hypothesis (H_1) should be accepted. By doing so, this value confirms there were significant levels of agreement among stakeholder respondents in regard to the PPP drivers. Having satisfied Kendall's W, the research proceeded to the CFA.

Prior to the CFA, to safeguard the reliability and accuracy, the KMO and Bartlett's test of sphericity were applied to test the suitability of the sample size. Premised on the suggestions of Kaiser (1974), the value of 0.910 is considered very satisfactory for CFA. Likewise, the P value = 0.00 indicates the R matrix is not an identity matrix and is highly significant ($P < 0.05$). Together, these tests show the datasets are highly

³ Actual value for Kendall's W is 0.0018528.

appropriate for CFA. Having satisfied these antecedent conditions, the research proceeded to the CFA. Predicated on the responses gathered from the questionnaires, table 1 shows a summary of the CFA and contains the Eigenvalue, percentage of total variance explained, as well as the variables which constitute each component predicated on the findings of the pattern matrix. Three constructs were determined which were above an Eigenvalue of one, and in total, these constructs accounted for 67.52% of the variance. The drivers of 'expedited project delivery' and 'improved financial viability' fell below the 0.4 threshold and were suppressed. Components were named according to the highest loading drivers together with the findings of the literature review.

Table 1: Drivers for PPP Provision of UK Social Infrastructure

Component Name	Driver and Loading Value	% of Variance	Eigenvalue
Improved productivity and efficiencies	Better risk management (0.895); Improved maintainability (0.880); Improved service quality (0.811); Integrated solution design (0.731); Enhanced operational efficiency (0.654); Shared risk and responsibilities (0.618); Better Value for Money (0.579); incentivised private-sector performance (0.555); Transfer of service provision responsibility from public to private-sector (0.516)	55.341	11.068
Financial mechanism and the associated benefits of private finance	Frees up public sector resources to be deployed elsewhere (0.876); Private financing of public services negating budgetary constraints (0.671); Off-balance sheet accounting (0.532); Private-sector efficiencies through superior management skills and resources (0.523); Private-sector innovation and technological improvement in services (0.490); Reduced whole-life costs (0.405)	6.353	1.271
Wider efficiencies offered to governments	Social infrastructure is too complex to be delivered by the public sector (0.723); Reduced project costs (0.448); Circumnavigates bureaucracy (0.410)	5.822	1.164

Research has shown that PPP offers an integrated solution design. Moreover, the private-sector typically is more efficient than the public-sector; hence, component one parallels many of the findings from literature and was labelled 'improved productivity and efficiencies'. In total, it explained 55.34% of the variance and comprised nine drivers with 'better risk management' being the foremost loading variable. Component loading ranged from 0.895 to 0.516 and the three highest loading variables were: 'better risk management' (0.895); 'improved maintainability' (0.880); and 'improved service quality' (0.811). Component two was constituted from six PPP drivers and the loading values spanned 0.876 to 0.405. The three foremost loading variables were: 'frees up public-sector resources to be deployed elsewhere' (0.876); 'private financing of public services negating budgetary constraints' (0.671); and 'off-balance sheet accounting' (0.532). With many of these drivers replicating the literature review, this component was named 'financial mechanism and the associated benefits of private finance'. Finally, component three described 5.82% of the total variance and was branded 'wider efficiencies offered to governments' on the basis that the loading variables pertain to those which were identified in literature. This component captured three PPP drivers and ranged from 0.723 to 0.410. The three highest loading variables were: 'social infrastructure is too complex to be delivered by the private-sector' (0.723); 'reduced project costs' (0.448); and 'circumnavigates bureaucracy' (0.410).

CONCLUSIONS

This research has deliberated on the drivers for the utilisation of PPP for social infrastructure provision in the UK. This investigation, through the application of CFA has empirically evaluated these drivers. In doing so, it has reviewed and provided a contemporary overview of PPP frameworks across the jurisdictional markets of the UK. In addition to this, a critical literature review was undertaken to identify three themes which collapsed into 20 drivers which support the usage of PPP for social infrastructure provision. With this list, this research conducted a CFA and therein empirically confirmed three themes which reflected the findings of the literature review. Thus, this research has several implications: firstly, it offers insights into the drivers for PPP in the UK across the key stakeholder groups. Secondly, as collaboration continues to be promulgated to improve project performance, this research offers clarity around strategic merits which partnerships can align under. Finally, considered to be one of the most mature and transparent markets, this research will have implications both domestically and internationally.

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