

## **INFRASTRUCTURE DEVELOPMENT: A PUBLIC-PRIVATE PARTNERSHIP OPTION IN THE ATTAINMENT OF VALUE FOR MONEY**

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**ABSTRACT:** *Public-Private Partnerships (PPPs) are strategies employed in the provision and development of both social and economic infrastructure facilities in many countries of the world. It is a contractual arrangement between the public and private sector through which the expertise, skills, assets and financial resources of both the public and private sectors are allocated in such a manner that provides optimal service delivery and good value to the public. The major feature in the implementation and operation of PPPs in the development and provision of infrastructure facilities is the systematic evaluation and selection of development proposals that delivers value from the money invested in the transaction. Unlike the conventional procurement system, which is predominantly based on lowest cost to the public sector, hence value for money (VfM) is a measure that takes into account both the quantitative and qualitative outcomes in the project development life-cycle and operational life under PPPs. This paper is based on the concept of road infrastructure development and provision through PPPs in Nigeria which involved a critical study carried out by the researcher in the course of assessing the effectiveness and efficiency of the conceptual PPP framework in Nigeria. The study reviewed literature on the global classification of PPP infrastructure facilities, PPP models for infrastructure development, and value for money evaluations in PPP implementation for infrastructure development. The study reveals that PPP has been widely implemented in many countries for development and provision of infrastructure because PPP seeks better solution for problems like risk allocation; financial crunch; need for timely delivery of infrastructure project; lack of expertise; and quality requirements. Hence the value for money invested in the infrastructure development and provision.*

**KEYWORDS:** Infrastructure, Development, Public-Private Partnership, Value for Money

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### **INTRODUCTION**

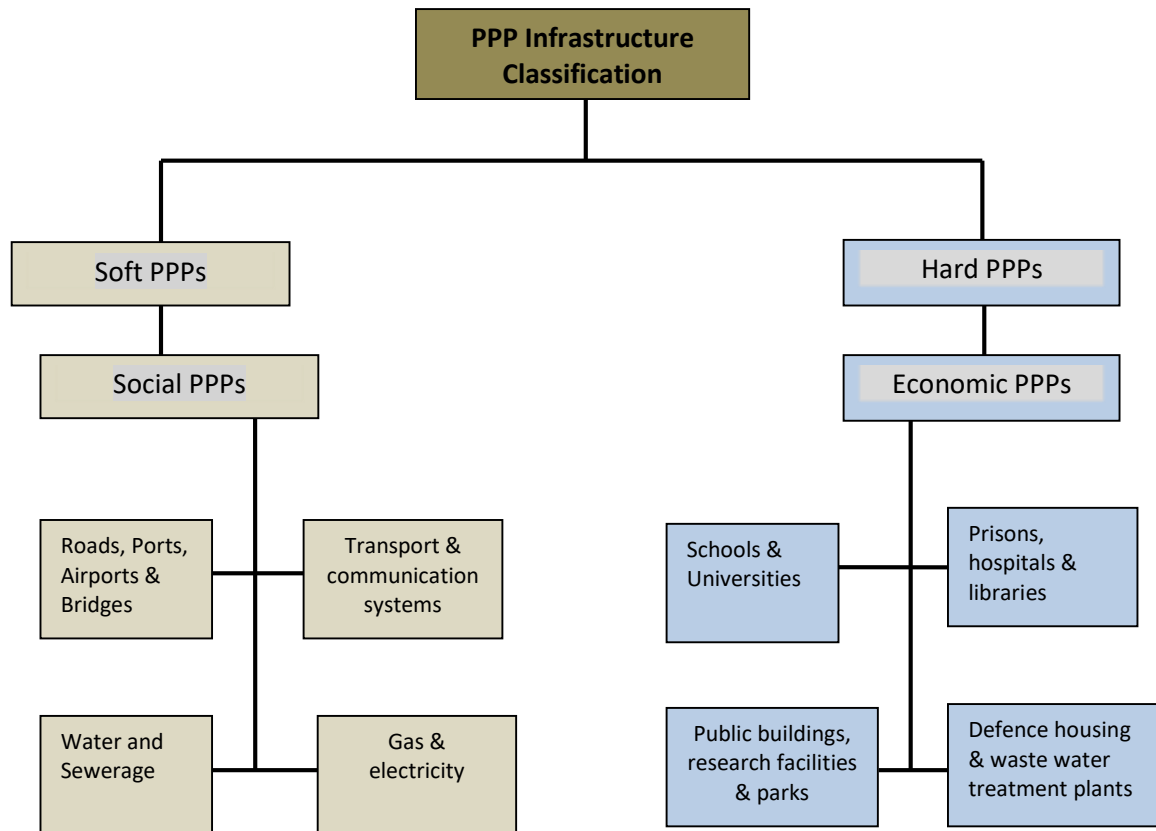
Public-Private Partnership (PPP) was first introduced as part of the Private Finance Initiative (PFI) in the United Kingdom in early 1990s. To this end, Public-Private Partnerships (PPPs) have come into wider implementation around the world by the public sector in the development and provision of both social and economic infrastructure. Regan, (2010) therefore described PPP as method of infrastructure procurement that employs a combination of private sector capital and management to deliver infrastructure facilities to, or on behalf of public sector. In practice according to Regan *et al.* (2015), PPPs are described as a specialised form of procurement that changes the responsibilities of the public sector from being the owner and manager of infrastructure to a buyer of infrastructure services from the private sector. However, in determining the best procurement method for the government in the development and provision of infrastructure facility, a comparison of the procurement options is undertaken at the project preparation phase of infrastructure development process. The criteria employed in the selection of the optimal and best procurement method is known as value for money (VfM).

Regan *et al.* (2015) noted that VFM was adopted for infrastructure procurement in the early 1980s and has since employed as a means of measuring the impact of international aid and assistance programs in infrastructure development and provision, it also serve as the spending programs of government agencies for audit purposes. In practice, VfM generally includes the formal cost benchmarking of PPP optimal options against the conventional procurement option on an infrastructure life-cycle cost basis over the term proposed for the PPP contract. In a related development, in view of this, Regan *et al.* (2015) noted that VFM analysis are conducted following a competitive auction process at the procurement stage of the project after the received of the bids for the infrastructure development. However, the procurement policy will require a qualitative comparison of the best bid in the proposed development which can be carried out through the Public Sector Comparator (PSC) in order to identify the best VfM for government in infrastructure development.

Similarly, Adamu *et al.* (2015) and Regan *et al.* (2015) noted that VfM enables government to measure the two key economic dimensions of infrastructure procurement. First, it requires government to undertake a detailed *ex ante* quantitative evaluation of the proposed project over its life-cycle in order to compare and select the best and optimal procurement option for the proposed development. Secondly, with the adjustment for risk and competitive neutrality, VfM provides a means for comparing the most efficient procurement mechanism with the proposals received from prospective contractors in a competitive bid process.

### **Infrastructure Facility**

Adamu *et al.* (2015) and Regan *et al.* (2015) described infrastructure as the hard and soft assets, networks and human capital that facilitate the functioning and the growth of both the economy and civil society in the world. Economic infrastructure are refer to the services produced by airports, roads, ports, railway systems, electricity and gas, water supplies, telecommunications, and waste management and recycling. Social infrastructure refers to services provided to develop human capital such as schools and universities, facilities for police services, court facilities and corrective services, the health sector, and public buildings. The cost of providing social infrastructure facility is mostly from the government budget while their provisions possess the characteristics of a public or merit good and services. Similarly, economic infrastructure facility may also be fully or partly financed from user charges, which enable the services to be outsourced to private providers on a stand-alone basis for the period of the contract. See figure 1 for the classification of economic and social infrastructure under PPPs.



**Figure 1: Global Classification of Infrastructure under PPP**

Infrastructure is an important national asset contributing to nation economy output capacity and productivity in the area economic and social development. Infrastructure investment is also linked to employment provision on a short or long-term basis; it also reduces private sector costs, productivity and growth (Weber & Alfen, 2010; Regan, 2004). The following were classified as the distinguishing features of infrastructure facilities:

- The investment is on a long-term and highly capital intensive
- Output quality standards and prices are generally regulated
- Long service intervals favour life cycle costing
- Assets generally form part of complex networks
- Output pricing of utilities such as electricity, gas and water have important impacts on the input cost structures of most sectors of the economy
- Assets are generally site and use specific
- Services are generally essential public goods
- Investment is subject to limited competition and economies of scale.
- The investment economics of infrastructure assets are well matched to the PPP method of procurement and analysis based on VFM principles.

### Infrastructure Procurement Models

Globally, partnership approach to infrastructure development and maintenance has continued to grow tremendously as a result of the financial constraint being experienced by the public sectors in the provision of require infrastructure. In practice according to Lubi & Majid (2013),

most governments adopt PPP principles as a matter of ideological persuasion by utilizing private sector expertise to lever greater efficiency and change management, then boost economic growth. Because according to Muralidhar & Koteswara (2013), Public-Private Partnerships (PPPs) provides an opportunity for private sector participation in financing, designing, construction, operating and maintenance of public sector programmes and projects. Hence the main objective of PPP in infrastructure development is to create a structure that is bankable and to minimize the stakeholder's risk by allocating certain risks to parties that can better manage the risks.

Cui *et al.*, (2010), described Public-Private Partnerships as an agreement between a public agency (Federal, State and Local Governments) and a private sector in a contractual manner. Furthermore Cui *et al* (2010) stated that the PPP arrangement involves bringing in creative skills and management efficiency from business practice and reducing government risk involvement in the development and provision of public services by using private companies for an effective approach in enhancing project productivity. For example by providing a right-of-way and the right to collect user fees by the public sector while the private partner also provides financing, technological innovation, and on-going service or infrastructure. Similarly, Lubis & Majid, (2013) stated that the World Bank also gave a broad definition of Public-Private Partnership as a procurement strategy covering management and operating contracts, lease/*affermage*, concessions and joint ventures as well as partial divestiture of public assets. Bult-Spiering & Dewulf (2006) and Ibrahim *et al.* (2006) stated that practices such as Joint Venture (JVs) and Build-Own-Transfer (BOT) strategies and its several variants, which hitherto do not qualify as Public-Private Partnerships have evolved to involve some of the core features of partnerships such as shared authority and responsibility, joint investment, sharing liability/risk-taking and mutual benefits, and are now accordingly considered as such. The partnership variants are commonly used in the global construction industry in procuring infrastructure facilities which are classified as: Develop and Construct; Package Deal; Turn-Key; Management Contracting; Construction Management; Design-Build-Operate; Build-Own-Operate; Build-Own-Operate-Transfer; Lease and Operate Contract; Buy-Build-Operate; Build-Own-Operate-Transfer; and Design-Build-Operate-Finance (Babatunde *et al.* 2010; Akintoye & Beck, 2009; Ojo *et al.* 2011; Adamu *et al.*, 2015). Meanwhile, the primary objective of PPPs is to facilitate the economic delivery of high-quality public facilities and services by the private sector over an extended period of time at a cost that represents value for money, whilst at the same time transferring an appropriate level of risk to the private sector (Lane & Gardiner, 2003; Ibrahim *et al.* 2006; Haran *et al.* 2013). Figure 3 shows a typical structure of Public-Private Partnerships for infrastructure development where an independent legal vehicle is created known as Special Purpose Vehicle (SPV) to raise and as well manage the required funds for the project. According to Accounting Standards Board (2008), a Special Purpose Vehicle (SPV) is established to ring-fence the project and/or the finance for the asset.

According to Cui *et al* (2010), PPP has a long history in many countries of the world, but became more popular worldwide in the 1980s. Furthermore Cui & Lindly (2010) cited in Cui *et al* (2010) opined that the United Kingdom and Australia are widely recognized as forerunners of PFI in the world that have been employing the PFI strategies in various sectors of facility development since the 1980s. In a related development according to Cui & Lindly (2010), in the United State of America due to an increasing funding shortfall in the transportation sector, more and more states have started to embrace PPPs in the development and maintenance of transportation infrastructure in the US.

According to BPD (2009), Public-Private Partnerships (PPPs) has four key characteristics which includes;

- Involvement in an efficacious sharing of risks between public and private sector;
- Providing public services;
- Offering value for money; and
- Long term partnership over many years.

PPP arrangement involves competitive tendering and the successful bidder (or franchisee) is selected on the basis of the value for money (VfM) outcome for the government. VfM is determined using both quantitative and qualitative criteria (Smyth & Edkins, 2007). Quantitative analysis involves a comparison of private bids with a risk-weighted model often referred to as the “public sector comparator” (PSC) after adjustment for competitive neutrality, risk transfer, and retention (European Commission, 2003). The qualitative test looks at the bidding consortium’s capabilities and track record, the innovation and new technology brought to the delivery solution, and a comprehensive public interest test.

Tenders for infrastructure development under PPP are generally conducted on the following basis;

- The private provision of an asset for government use on a take-or-pay basis (for example, the provision of a serviced hospital bed or a primary school building);
- The private delivery of services to or on behalf of government (for example, a convention centre or public transport system); and
- Private provision of an asset on a market-risk user-pays basis (for example, a toll road).

According to Regan *et al.* (2011) payment methods in PPPs for infrastructure development has two components: a base fee calculated by reference to quantitative service provision under the contract and an incentive fee calculated by reference to service delivery that exceeds key performance indicators. Furthermore, Regan *et al.* (2011) noted that PPP are generally bid on the basis of the fee to the government or the user-pays tariffs. However, bid criteria and non-conforming bids may also include up-front payments to the government. Project delivery failure can result in an abatement of fees or the imposition of financial penalties. At the end of the contract period in accordance with the contract agreement, the asset is reverted to the government as the public investor in the development (Regan *et al.* 2011).

Table 1 shows a typical Public-Private Partnership Strategies for infrastructure development. These development strategies were further categorised into four groups to include; (i) *affermage* contracts also known as management or lease PPPs; (ii) concession PPPs; (iii) greenfield PPPs; and (iv) availability-based PPPs (Best Practice Document, 2009). These development strategies were developed using simple terms for clarity and understanding of the concepts behind each strategy (Kwak *et al.*, 2009, FMW, 2013, Adamu *et al.* 2015).

**Table 1: Typical Infrastructure Models.**

S/N	Project Finance Model	Description
1	Design-Build (DB) or Turnkey Contract	The private sector designs and builds infrastructure to meet public sector performance specifications, often for a fixed price. The cost of overruns is transferred to the private sector.
2	Service Provision Contract	A private operator, under contract, operates a publicly owned asset for a specified period. The ownership of the asset remains with the public entity.
3	Management Contract:	A private entity contracts to manage a Government owned entity and manages the marketing and provision of a service.
4	Lease and Operate Contract:	A private operator contracts to lease and assume all management and operation of Government owned facility and associated services, and may invest further in developing the service and provide the service for a fixed term.
5	Design-Build-Operate-	The private sector designs finance and constructs a new facility under a long term lease and operates the facility during the term of the lease. The private partner transfers the new facility to the public sector at the end of the lease term.
6	Design-Build-Operate-Finance (DBFO):	A private entity receives a franchise to finance, design, build and operate a facility (and to charge user fees) for a specified period, after which ownership is transferred back to the public sector.
7	Buy-Build-Operate (BBO):	The transfer of a public asset to private or quasi-public entity usually under contract that the assets are to be upgraded and operated for a specified period of time. Public control is exercised through the contract at the time of transfer.
8	Build-Own-Operate (BOO):	The private sector finances, builds, owns and operates a facility or service in perpetuity. The public constraints are stated in the original agreement and through on-going regulatory obligations.
9	Build-Own-Operate-Transfer (BOOT)	This is an extended version of the BOT model where the private sector builds, owns and operates a facility for a specified period as agreed in the contract and then transfers to the public.
10	Operating License	A private sector receives a license or rights to build and operate a public service, usually for a specified period. Similar to BBO arrangement.
11	Finance Only	A private entity, usually a financial services company, funds a project directly or uses a mechanism such as long term lease or bond issue.



Investment in road infrastructure development according to WEF (2012) and Haran *et al* (2013) is classified into two groups; (i) brownfield investment; where the road infrastructure is already been built the investment under this arrangement is for the maintenance and operation of the road infrastructure as efficiently as possible in meeting the client and end users' satisfactions; and (ii) greenfield investment; where the road infrastructure has not been built, this is a whole life-cycle investment on road infrastructure.

Although in recent time, road infrastructure projects are procured globally through any of the following two major Public-Private Partnership procurement strategies; Design-Build (D-B) and Concession arrangement. Figure 2 depicts the types of Public-Private Partnership Agreement and sources of finance for infrastructure development.



Figure 2: Public-Private Partnership Arrangement and Sources of Finance

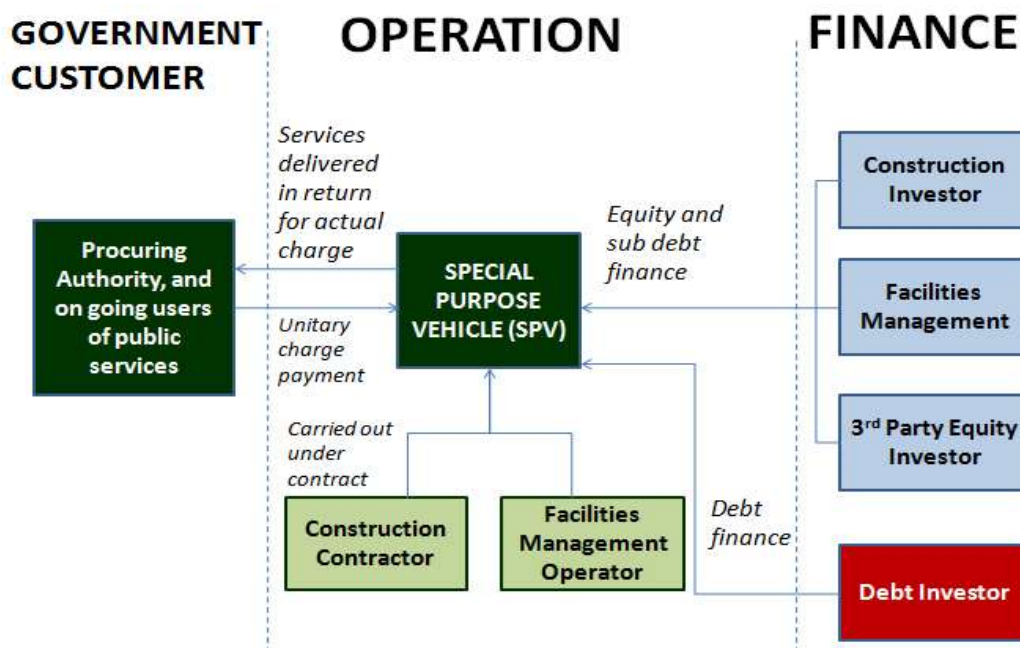


Figure 3: Typical PPP SPV Activity Structure

Value for Money Assessment in Infrastructure Development

Value for Money is a mechanism that allows investors in infrastructure to ascertain whether the expected service delivery is designed to appropriately meet the service specification while achieving a reasonable return on investment in the services (Infrastructure Australia, 2008). In view of this, Smyth & Edkins, (2007) noted that PPP arrangement involves competitive tendering and the successful bidder (or franchisee) is selected on the basis of the value for money (VfM) outcome for the public sector. VfM is therefore determined using both quantitative and qualitative criteria. Quantitative analysis involves a comparison of private bids with a risk-weighted model often referred to as the “public sector comparator” (PSC) after adjustment for competitive neutrality, risk transfer, and retention (European Commission, 2003). The qualitative test looks at the bidding consortium’s capabilities and track record, the innovation and new technology brought to the delivery solution, and a comprehensive public interest test.

Regan *et al.* (2015) therefore noted that VfM has assumed a greater important tool for measuring procurement solutions in infrastructure development, because VfM is a critical determinant in determining whether PPP is the optimal procurement method for a proposed infrastructure development which can be achieved through a comparison of a PPP model with a conventional procurement method. In a related development, Delmon, (2009) noted that VfM is implied by creating a rigorous project implementation process and a competitive bid market while in some cases, PPP policy may require the use of Public Sector Comparator (PSC) for both the procurement and contractor selection processes. Therefore according to Regal *et al.* (2015), Value for Money (VfM) in Public–Private Partnership (PPP) projects are gained through the engagement of private sector skill, efficiency, effectiveness, and economy through the appropriate allocation of risks in the proposed infrastructure development. Therefore the assessment of the potential to secure VfM is a key element in the assessment process of PPP model in the procurement. The conclusions on VfM potential will inform the public sector on whether to proceed with the PPP procurement and the form of PPP to be employed for the proposed infrastructure development. (ADB 2012, Public–Private Partnership Operational Plan 2012–2020). Infrastructure Australia (2008) therefore concluded that the assessment of value for money (VfM) in PPP should encompass all aspects of the project proposal including both quantitative and qualitative elements.

In some countries, according to Regan *et al.* (2015) PPP policy may endorse VfM principles without providing specific criteria to determine how VfM will be calculated. The reasons for this may be that government needs to fast-track projects or the government’s fiscal position limits public investment options. The informal assessment of VfM uses systematic approaches to the procurement process that embeds VfM principles in project evaluation and procurement methodologies. In jurisdictions where a formal VfM process is not required, a comprehensive procurement process that embeds VfM principles may achieve a similar outcome. The elements of a VfM procurement process include a detailed feasibility or procurement options analysis, a pre-qualification procedure, competitive dialogue, technical and administrative requirements that incorporate quantitative and qualitative performance benchmarks, and adoption of a gateway system that prescribes the stages through which a project must pass before it is finally approved. This approach according to Delmon (2009) is a holistic assessment of the project delivery and the marginal benefits provided by private investment and the competitive procurement process used”. A PPP policy that adopts one or more of these principles has a greater likelihood of achieving VFM outcomes for government than PPP policy that does not. However, informal VFM methods do not provide government with sufficient data with which to improve infrastructure procurement process, document lessons learnt, raise the skill levels



in line agencies and optimise risk transfer with future projects. These outcomes can only be achieved with adoption of a formal approach to VFM assessment for this reason, many countries employ a competitive bid market in enhancing VFM outcomes. The competitive bid market approach is based on the assumption that private infrastructure procurement delivers projects at lower cost and in shorter periods of time than traditional public procurement methods and represent a better VFM option for government. Competition between private contractors in a well-managed bid market is considered the one of the drivers of VFM with PPPs (Ismail *et al.*, 2011). VFM is more likely to be produced by a competitive procurement process over one that is not.

However, competitive bidding alone does not ensure VFM outcomes. When this option is chosen, the government will generally prepare an output specification, consult widely with the market ahead of the bid, make an allocation of project risks and proceed with a competitive bidding process. This is the practice adopted with many concessions and BOT contracts and it relies on a competitive bid market to deliver a better outcome for government than could be achieved with traditional procurement, which is widely accepted as the benchmark for measuring procurement performance. Unlike a PPP, a traditional contract based on an input specification is an adversarial contract and contractor selection employs criteria heavily weighted toward lowest cost. Policies that use competitive bid markets rely on bidder depth, transaction flow, risk transfer, and rigorous management of the bid process. Procurement method is also important and policies may require a minimum number of bidders, pre-qualification, open or closed bids, and competitive dialogue during negotiations. In some jurisdictions, a best and final offer may be requested from short-listed bidders although this may contribute to hold-up delays and rapid escalation of bid costs if not carefully managed. Experience in a number of OECD countries suggests that VFM outcomes are determined by the efficiency with which government manages the competitive bid process, an appropriate risk allocation strategy, and post-selection negotiations to ensure achievement of the best VFM outcome (Delmon 2009). Most international PPP policy frameworks now require competitive bidding for PPP infrastructure development in order to achieve VfM. As a result of this according to Regan *et al.* (2015), many countries result to competitive bid market to enhance VfM outcomes. The competitive bid market is based on the assumption that privately financed infrastructure are delivered at lower cost and in shorter periods as against the public financed infrastructure development. Ismail *et al* (2011) noted that competition between private contractors in a well-managed bid market is considered one of the drivers of VfM with PPPs. Furthermore, RICS (2013) noted a VfM assessment is often called for at all stages of project's life cycle, which include the project feasibility study, project delivery, and post-project evaluation.

In order to accurately assess VfM in what is very much an idiosyncratic procurement setting, RICS (2013) noted that the whole process requires that the nature of the infrastructure be identified as part of the PPP scheme which are capable of being priced on a whole-of-life, long-term basis with the value of the infrastructure sufficiently large to ensure that the procurement costs are not disproportionate in the development.

## CONCLUSION

This study examined the concept of infrastructure development through Public-Private Partnership as an option in the attainment of value for money invested in the infrastructure.

The adoption of PPP strategy has been instrumental to reducing the financial burden on government in response to the increase demand for more infrastructure coupled with the bad state of the existing infrastructure facilities in many countries of the world this is to allow the public sector to be the facilitator and framework regulator while the private sector are involved in the funding, construction and management of infrastructure which have been hampered by the inefficient and ineffective PPP framework most especially in the developing countries.

This paper examined concept of infrastructure development and the various objectives of Public-Private Partnership (PPP). This study also examined the classification of both the social and economic infrastructure facilities as well as the various PPP procurement models in order to identify the challenges impacting on the effectiveness and efficiency of PPP framework; this was followed with the assessment of value for money in infrastructure development. The findings of the study revealed a contradictory opinion concerning the efficiency, effectiveness and overall VfM, because measuring VfM is blurred by complexity of VfM tests. Similarly, the study also reveals that the VfM concept is widely debated and in absence of a legally distinctive definition of VfM, it therefore becomes difficult to quantify the VfM outcome. Assessing the constituent of VfM is not an exact science because VfM has numerous conceptual derivations which are dependent on the context of PPP. The findings further revealed that VfM is subjective because the deficiency of benchmarking available data and the time taken to undertake value testing are key barrier to VfM assessment as a result of ; (i) poor project preparation management process, (ii) inadequate project bankable feasibility study, (iii) unbalanced risk allocation and regulation, and (iv) lack of enabling project environment.

The study therefore concluded that the PPPs have proven to be an effective and efficient means of infrastructure development and delivery in many countries of the world as a result of this, PPPs will continue to occupy a pivotal role in addressing infrastructure development challenges in construction industry. To this end, PPP should therefore be considered alongside a more expansive suite of development and investment strategies.

## REFERENCES

- Adamu, M., Lowe, J. & Manase, D. (2015) "Conceptual Framework for Public-Private Financed Road Infrastructure Development in Nigeria" *International Journal of Engineering Research and Technology*, 4(8), pp.586-590.
- Akintoye, A. & Beck, M.(2009). *Introduction Perspectives on PPP: RICS Research, Policy, Finance and Management for Public-Private Partnerships*, ed. West Sussex, Blackwell.
- Babatunde, S.O., Opawale, A. & Ujadugbe, I.C. (2010) "An Appraisal of Project Procurement Methods in the Nigerian Construction Industry". *Civil Engineering Dimension*, 12(1), pp.1-7.
- Bult-Spiering, M. & Dewulf, G. (2006) "Strategic Issues in the Public-Private-Partnership: An International Perspective. Blackwell, Oxford.
- Cui, Q, Sharma, D.,Farajian, M., Perez, M. & Lindly, J. (2010) "Feasibility Study Guideline for Public-Private Partnership Projects" UTCA, Alabama.
- Cui, Q. & Lindly, J.K. (2010) "Evaluation of Public-Private Partnership Proposals" University Transportation Center for Alabama Report, pp.730-941.
- European Commission, (2003) "Guidelines for Successful Public-Private-Partnership". European Commission, Brussels.

- Haran, M., Adair, A., Berry, J., Cord, M., Mc Greal, Smyth, C., Kashyap, A. & Hutchison, N. (2013). The Global Infrastructure Challenge: The Role of PPP in a New Financial and Economic Paradigm, [www.rics.org/research](http://www.rics.org/research)
- Ibrahim, A.O, Price, A.D.F. & Dainty, A.R.J. (2006) “The Analysis and Allocation of Risks in Public-Private Partnerships in Infrastructure projects in Nigeria”, Journal of Financial Management and Construction, 11(3), pp.149-163.
- Lane, M. & Gardiner, J. (2003) “Risk Management and Insurance issues. In: Public Partnerships – a review of key issues, European Construction Institute, pp. 61-70.
- Lubis, H. A. & Majid, N.N. (2013) “Developing a Standardized Assessment for PPP Infrastructure Project”, Proceedings of the Eastern Asia Society for Transport Studies, Vol.9
- Ojo, S.O., Aina, O. & Adeyemi, A.Y. (2011) “A Comparative Analysis of the Performance of Traditional Contracting and Design-Build Procurements and Implications for the Engineering Practice on Client Objectives in Nigeria”, Journal of Civil Engineering and Management, 17(2), pp.227-233.
- Regan, M. & Smith, J. (2011) “Infrastructure Procurement: Learning from Private-Public Partnership Experiences (Down Under)”. Journal of Environment and Planning, 29, pp.363-378.
- Regan, M., Smith, J. & Love, E.D. (2015) “Project Finance for Public-Private Partnerships: Evidence from Australia” Proceedings of the 2ne International Conference on Public-Private Partnerships, Austin, Texas, U.S.A.
- Smyth, H. & Edkins, A. (2007) “Relationship Management in the Management of PFI/PPP Projects in the UK” International Journal of Project Management, **25**pp.232-240.
- World Economic Forum (2012) “Strategic Infrastructure: Steps to Prioritize and Deliver Infrastructure Effectively and Efficiently”. September Edition, PwC.