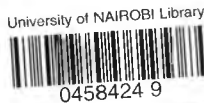


**CRITICAL REVIEW OF LITERATURE ON THE FACTORS
THAT DETERMINE THE EFFECTIVENESS OF PUBLIC PRIVATE
PARTNERSHIPS IN FINANCING PUBLIC INFRASTRUCTURE PROJECTS**

By

**Oluoch, Josephat Oluoch
D80/80023/07**



**An Independent Study Paper Submitted in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy (Finance Option)**

**School of Business
University of Nairobi.**

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Declaration

This independent study paper is my original work and has not been presented for a degree at the University of Nairobi or any other university.

Signature-----



Oluoch, Josephat Oluoch
D80/80023/07

Date-----

4/8/2009

This independent study paper has been submitted for examination with my approval as the University Supervisor.

Signature-----



Dr. Julius M Malombe

Date-----

5/8/09

Abstract

Since the 1980s, many governments have increasingly adopted public private partnerships (PPPs) to finance infrastructure in preference to the traditional methods that rely mainly on public finance. PPPs are contractual arrangements between public sector organizations and private sector investors for joint and collaborative provision of infrastructure projects and services. They aim to synergistically combine the strengths of these two respective sectors while minimizing on their inherent shortcomings in providing infrastructure facilities. Despite their rising popularity, it is not yet clear whether the use of PPPs in infrastructure financing provides value for public money. This value for money is realizable when there is optimal risk sharing between the partners and enhancement of time, quality and cost efficiency in implementing the infrastructure projects.

This paper critically reviews both theoretic and empirical literature on PPPs. The general and theoretic literature review evaluates the origins, theories, models as well as the global experience in the use of PPPs in financing infrastructure. This is done to ascertain the causes of the apparent paradigm shift in infrastructure financing and appraise the evolution milestones in the use of PPPs to finance infrastructure. The empirical literature review on the other hand involves critical appraisal of the studies on the factors behind the upsurge in the use of PPPs. It also involves evaluation of the critical success factors and inherent limitations of the use this new approach to finance infrastructure. This is crucial in order ascertain from empirical assessments the key factors that determine and enhance the effectiveness of PPPs in financing infrastructure, which is the basic objective of this study.

Three key findings emerge from the study. *Firstly*, the effectiveness of PPPs in financing infrastructure is contingent upon critical success factors. Literature identifies them as the project specific micro level factors and the general macro level factors common to all projects in the economy. *Secondly*, a project is unlikely to attain success on all the five main parameters of effectiveness i.e. flexibility and risk management as well as time, quality and cost efficiency. Project effectiveness therefore depends on the clarity in the ex ante specification of project outcomes and the adequacy of the planning, co-ordination and control of PPP efforts by the contracting parties. *Thirdly*, PPPs are mainly used to address public sector resource limitations by enhancing synergistic co-operation of the public and private sectors in the provision of infrastructure projects. Lastly, there are numerous models of PPPs ranging from short term, medium term, long term to permanent agreements. The most popular are those which optimally share projects risks between the public and the private partners.

In a nutshell, the effectiveness of PPPs in infrastructure financing is contingent upon explicit definition the expected project outcomes and management of the key success factors in the implementation environment. Establishing a central unit for regulation, co-ordination and implementation of PPP policies would help to boost their effectiveness as evidenced by the successful application in countries such as South Africa, India and Britain which have had fruitful experiences with infrastructure PPPs.

Dedication

This work and report is dedicated to my grandmother Prisca, for her continuous encouragement and inspiration in my studies.

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List of Abbreviations

BCR	-	Benefit Cost Ratio
BLOT	-	Build, Lease, Operate, and Transfer
BOO	-	Build Own Operate
BOT	-	Build, Operate, and Transfer
BOOT	-	Build Own Operate Transfer
BVA	-	Best Value Approach
CBA	-	Cost Benefit Analysis
CH	-	Casey Hospital
CSF	-	Critical Success Factors
DBFO	-	Design, Build, Finance and Operate
DBM	-	Design, Build and major Maintenance
DBO	-	Design, Build and Operate
DBT	-	Design, Built and Transfer
DBTO	-	Design, Build, Transfer, Operate
G24	-	Group of 24 Countries
GoK	-	Government of Kenya
HM	-	Her Majesty's
HMSO	-	Her Majesty's Stationery Office
IFC	-	International Finance Corporation
IRR	-	Internal Rate of Return
LDO	-	Lease Develop Operate
LSE	-	London School of Economics
LUOT	-	Lease-Upgrade-Operate Transfer
MC	-	Management Contract
MCA	-	Multi Criteria Analysis
NHS	-	National Health System
NPV	-	Net Present Value
OLS	-	Ordinary Least Squares (Regression Method)
OM	-	Operation and Maintenance
OPA	-	Option Pricing Approach
PFI	-	Private Finance Initiative
PPPs	-	Public Private Partnerships
PSB	-	Public Sector Benchmark
PSIRU	-	Public Services International Research Unit

PUO	-	Purchase Upgrade Operate
PUOT	-	Purchase, Upgrade, Operate Transfer
PVB	-	Present Value of Benefits
PVC	-	Present Value of Costs
PSC	-	Public Sector Comparator
SC	-	Service Contract
SIAP	-	Sustainable Infrastructure Action Plan
UK	-	United Kingdom
US	-	United States (of America)
VFM	-	Value for Money
WB	-	World Bank
ZIP	-	Zero-Inflated Poisson

CHAPTER ONE

1.0 INTRODUCTION

1.1. Background

Public private partnerships (PPPs) are contractual arrangements between public sector organizations and private sector investors for joint and collaborative provision and financing of public projects. They arise out of the realisation that although the public sector is responsible for the delivery of infrastructure projects, it often encounters financial and institutional limitations in availing such projects. Literature provides widespread evidence of a growing utilization of PPPs in the delivery of public infrastructure facilities and services to meet the numerous needs of modern economies (Perrot and Chatelus, 2000; Akintoye et al, 2003; Broadbent, Gill and Laughlin, 2003; Scally, 2004; Cohn, 2004; Vining et al, 2005; McKee, et al, 2006).

The public sector is a part of the state that deals with the delivery of goods and services by and for the government, whether national, regional or local/municipal (Lane, 1995). Its role in economic production is often shaped by the public policies of individual countries. In Kenya for instance, the sessional paper number 10 of 1965 outlines the role of the government in productive sectors of the economy. It underpins the need for state organisations to be used in the execution of development policies (GoK, 1965). The public sector in most countries incorporates such sub-sectors as the military, water and sewerage, telecommunications, energy, public roads, public transit, primary education and healthcare for the poor. The private sector on the other hand is the part of the economy that is run for private profit and is not controlled by the state (Carnevale, 2002). It is owned and controlled by private individuals and business organizations such as private and public limited companies.

In a PPP arrangement each of the partners aims to achieve specific objectives with the contractual help of the other. The PPP contracts aim at designing, planning, financing, constructing and/or operating infrastructure projects in various economic segments chiefly the transport, environment, education, energy and health sectors. The feasibility of PPPs depends on the inherent mutual costs and benefits for the contracting parties. These include timely, less risky, quality and cost effective infrastructure provision for the public sector on one hand and business opportunity and profitability for the private partners on the other. In spite of their growing popularity, their benefit as infrastructure financing vehicles would be evident only if they are shown to be more effective and efficient than the traditional approaches to financing infrastructural projects. This effectiveness and efficiency is measured by five key parameters (HM Treasury, 2003). These include the ability of the PPP

contracts to have inbuilt flexibility to respond to changes in environmental conditions over the contractual terms; the ability of the PPP contracts to transfer infrastructure risks to the private sector and the ability to enhance time, quality and cost efficiency among public infrastructure projects. An effective project is one that provides value for public money (HM Treasury, 2003).

HM Treasury (2003, p.124) defines value for money (VFM) as “the optimum combination of whole-life costs and quality (or fitness for purpose) to meet the user requirement”. This definition is broad such that value for money is viewed as a short-term as well as a long-term concept. In a summary, value for money is the ability of the PPP project to deliver high quality cost effective infrastructure project on a timely basis whose benefits are better than would otherwise accrue from a traditionally financed infrastructure project.

Flexibility relates to the ability of a project to adapt to both internal and external business changes over the normally long-term life of an infrastructure project including refinancing (Flyvbjerg et al, 2002). Cost efficiency on the other hand is realised if a PPP project is delivered at a lower cost than a comparable publicly financed one. For comparative purposes, cost benefit analysis (CBA) is used. This is an effort that involves comparison of the total explicit and implicit expected costs against the total expected benefits of one or more actions in a PPP set-up in order to determine the desirability of the option (Flyvbjerg et al, 2002).

A crucial infrastructure decision at inception of PPPs revolves around the choice by the public authority of an optimal PPP model for infrastructure financing given the wide variety of options available as indicated in subsection 2.4 and appendix 2. The VFM provided by this model in the resultant project must be established. Partners in the PPP arrangement must identify the determinants of such VFM in order to structure their contracts appropriately. The crucial challenge lies in the determination of its effectiveness in financing infrastructure projects given the contractual provisions and most importantly relative to other approaches to infrastructure financing especially the traditional model of procurement that relies mainly on public finance. This is an enormous challenge given the long term nature of PPP projects; the regulatory issues and the multiple PPP alternatives available at the disposal of the participating parties.

1.2. Conceptual Basis

The public sector and the private sector have varying characteristics which could be combined through PPP arrangements to enhance higher value for money in the financing and implementation of infrastructure projects. These enduring characteristics of either each of these sectors are discussed in the following subsections.

1.2.1. Characteristics of the Public Sector

Perrot and Chatelus (2000) indicate that the public sector is largely characterized by bureaucratic and hierarchical decision making and management systems. Accordingly, making decisions with regard to infrastructure projects may be lengthy and inflexible. This inevitably leads to long infrastructure delivery lead times. Besides, public finances in many countries are often sourced from elastic public revenue sources that are coupled with high public debt (Mayrdt, 2005). This greatly limits its ability to effectively fund such projects especially because of the numerous projects expected to be financed from these limited resources. In addition, social and public responsibility rather than the profit motive is the overriding concern of the public sector. This often leads to cost inefficiencies especially when such motives are pursued at a great cost relative to the inherent benefits. Further, public sector bureaucrats are often accused of ineptness in procurement and negotiation for public projects leading to contracts in favour of the infrastructure contractors and high project risks for the public sector (Perrot and Chatelus, 2000).

In addition, the public sector is perceived as less risky compared to the private sector. Procuring funds with the backing of the government may be done at a remarkably low cost of capital (McKee, Edwards and Atun, 2006). With this background, private firms are willing to enter into partnerships with the public sector. Furthermore, the public sector possesses the political and social legitimacy that may allow it to implement public programs including those characterized by heavy externalities like relocation of the populace to allow for the implementation of public infrastructure projects (Lane, 1995). It is this legitimacy that puts the government in a better position to manage such risks as public policy, legal, regulatory and political risks that are associated with infrastructure projects.

1.2.2. Characteristics of the Private Sector

According to Perrot and Chatelus (2000), the private sector pursues the profit motive and consequently is characterized by flexible and less bureaucratic decision structures that support the achievement of this objective. These decision structures are instrumental in facilitating timeliness and efficiency in implementation of projects. In addition, they are useful in enhancing better risk management than the public sector. This especially applies to the technical and operating risks of infrastructure projects that call for swift remedial actions to conform to changes in the implementation environment. Their involvement in public projects may however be limited by their relative inability to manage such macro level risks as political and public policy risks (Carnevale, 2002). This is because they are not involved in public policy making, which is largely

a role of public sector institution. Besides, they lack the political legitimacy to implement projects that have high negative externalities to the society. Appendix 9 provides a summary of the relative strengths and limitations of both the private and public sectors in providing infrastructure projects. PPPs aim at optimizing on the common strengths of these parties while overcoming the limitations of either through joint and collaborative provision of infrastructure projects.

1.2.3. The Need for PPPs

The need for PPP finance in infrastructure is rooted in the philosophy of PPPs that emphasizes on optimizing the joint strengths of the collaborating public and private institutions, while reducing the effect of the individual weaknesses to enhance infrastructure projects (McKee, Edwards and Atun , 2006). In a nutshell, a well thought out and adequately structured PPP arrangement should efficiently and effectively achieve superior results than the traditional public sector infrastructure financing approaches. This is because the PPP approach strives to harness the wide range of managerial, commercial and technical skills of the private sector while benefiting from the low risk, socio-political goodwill and the lower cost of capital of the public sector. This combination is expected to enhance time, quality and cost efficiency of resultant projects. It should also lead to higher flexibility and better risk management among public infrastructure projects which are expected to culminate in flexibility and efficiency in project delivery (Lane, 1995). The PPP approach therefore is expected to eliminate the decision making and managerial bureaucracy associated with the public sector. It however positively draws from the good credit rating and general goodwill of the public sector to consolidate procurement of project finances while ensuring less resistance from the general public. The ultimate objective is to avail infrastructure projects through an approach that involves symbiotic sharing of expected risks and rewards of the PPP arrangement. This informs the rationale behind of PPPs in infrastructure financing.

1.2.4. Assessment of the Effectiveness of PPPs in Infrastructure Projects

An effective public infrastructure project is one that provides value for public money (HM Treasury, 2003). In the context of the PPP approach, a project would be considered effective if it offers higher value for money than the traditional approach to financing infrastructure. VFM is a function of five parameters as indicated under section 1.1 above. These are identified as project cost efficiency, implementation flexibility, risk transferability to the private sector, quality and timeliness in implementation.

The biggest challenge in determining the effectiveness of PPPs in financing infrastructure emanates from the fact that there are a multiple number of factors that have an impact on this VFM for such

contracts. As a consequence, the actual costs and benefits of PPP projects are almost certainly different from the estimations made ex ante (Flyvbjerg et al, 2002; Prud'homme, 2004 and Sadka, 2006). Identifying these factors is critical in assessing whether PPPs provide a higher VFM than the traditional approaches to funding infrastructure. These multiple factors and the resultant interrelationships that depict the conceptual basis of PPPs in infrastructure are described and summarized in the appendix 1.

VFM is a central theme in the appraisal of the effectiveness of PPPs in financing infrastructure projects. This paper investigates the methods available in the evaluation of VFM provided by the PPP approach to financing public infrastructure projects. These appraisal methods and their derivatives are comprehensively discussed in chapter two, section 2.4 of this paper. Regardless of the approach used to evaluate a PPP contract, comparisons must be made against the traditional approach to financing public infrastructure projects through some benchmark tool like the public sector comparator (PSC) that is used in appraising PPP projects in England (HM Treasury, 1999). PSC is a hypothetical risk-adjusted costing methodology employed by the public sector as a supplier, to an output specification produced as part of a PPP procurement exercise (HM Treasury, 1999). A PSC composite index compares operating costs for private and public sector operation of a facility given the expected service delivery and performance levels.

In a nutshell, the evaluation of the effectiveness of PPPs and the investigation of the factors that influence such effectiveness is critical because it is still not clear if this emerging approach to infrastructure funding can lead to infrastructure project quality enhancement, benefit optimization, cost minimization, delivery flexibility and optimal risk sharing between the public and private sectors. This dilemma is reflected in the problem statement below.

1.3. Problem Statement

Since the 1980s many governments have gradually shifted from the traditional methods of financing infrastructure using public resources and have instead increasingly opted for the use of PPPs. Questions have however arisen as to whether PPPs are more effective than the traditional methods in providing VFM in terms of the ability to enhance infrastructure project risk management and implementation flexibility as well as time, quality and cost efficiency.

This study therefore investigates the factors that determine the effectiveness of PPPs in financing public infrastructure projects. This is particularly critical given the emerging paradigm shift in the funding of such projects and the lack of consensus on whether infrastructure projects financed under the framework of PPPs provide higher VFM compared to the traditional financing

approaches. The following three related but distinct questions are examined in an effort to address this problem:

- i. What are the factors that explain the evolving paradigm shift from the reliance on public sector finance to the use of PPPs in financing infrastructure projects?
- ii. What are the critical success factors that determine the effectiveness of projects financed through the use of PPPs?
- iii. What are the methods used for appraising the effectiveness of PPPs in financing public infrastructure projects?

1.5. Significance of the Study

Effectiveness of PPPs in infrastructure financing and related issues is critical to any PPP contracting process. This paper focuses on the clarification of the factors behind growing popularity of PPPs in infrastructure financing as well as the identification and appraisal of the factors that have an impact on the effectiveness of PPPs in financing public infrastructure projects. It not only evaluates the PPP the appraisal techniques and models, but it also analyses the challenges and factors that influence such effectiveness. Accordingly, the paper is important to a wide variety of stakeholders in such projects.

To the governments and public sector authorities and their bureaucrats, the paper lays out the factors that have an impact on the effectiveness of PPPs in infrastructure financing. It also evaluates a variety of models, both theoretical as well as empirically tested, which are used in informing infrastructure-PPP appraisal decisions and procedures and assessment of their effectiveness as infrastructure financing approaches. The paper draws from appraisal experiences across the world for developed, developing and emerging economies. This cocktail of views and the benefit of empirical hindsight can help various governmental authorities customize their appraisal of PPP contracts and projects as benchmarked to best experiences similar to their own conditions. The most influential techniques deriving from literature is the use of PSC and CBA in project evaluation of effectiveness. Key also is the identification of micro and macro level factors to consider as drivers of value for money among PPP projects.

To the market regulators, the findings from literature review might be crucial in informing changes in PPP projects evaluation policies, procurement procedures and contracting processes. The critical concepts arising out of the study include PPP project value for money; PPP valuation models and considerations as well as well as the challenges in the appraisal process. These concepts are critical to the regulators in informing assessment policy. In addition, experiences across many countries

indicate a trend where governments are increasingly setting up policy frameworks and guidelines for implementation of PPP infrastructure projects. Evaluation of such guidelines would help regulators develop their own suitable for unique operating environments.

To scholars and other researchers, the paper not only summarizes the literature on the effectiveness and inherent challenges of PPP-financed infrastructure projects' appraisal, but it also bridges the gap between theory and practice of PPP-project evaluation by analyzing the various appraisal models with their related strengths and weaknesses. This is critical in identifying empirical gaps which form the foundation for recommending areas for further research in the context of appraisal of the factors that enhance the effectiveness of PPP financed infrastructure projects. The paper also lays out the current theoretical and empirical perspectives on evaluation of the effectiveness of PPPs in financing infrastructure projects. It would help in stimulating studies in areas such as the impact of consideration of social and environmental externalities in the appraisal of PPP financed infrastructure projects.

1.6. Organization of the Paper

After the foregoing chapter one that dwelled on introduction to the research problem and the background thereon, the rest of this paper is organized into three subsequent chapters. Chapter two involves appraisal of theoretical literature including the evaluation of the historical perspectives; evolution of PPP knowledge and PPP theories. It further presents the theoretical literature gaps including the latest perspectives in this area of inquiry. This is then followed by a critical review and evaluation of empirical literature in chapter three which sheds light on the research questions posed in subsection 1.4 above. Chapter four is the concluding part where the key findings and knowledge gaps are presented. The findings shown in chapter four and the ensuing literature gaps are used to make suggestions for further research in the realm of PPPs in infrastructure financing.

CHAPTER TWO

2.0. GENERAL AND THEORETICAL LITERATURE REVIEW

2.1. Introduction

Irrespective of the philosophy behind the involvement of the private sector in infrastructure financing, PPPs are increasingly being used in the delivering infrastructure projects. Fundamental questions that concern stakeholders in the partnerships between the public and private sectors involved in public infrastructure projects include: what are the origins of and philosophy behind PPPs in public infrastructure? How has the application of PPPs in financing infrastructure evolved since the initial application? What are the theories behind and models involved in the use of PPPs? What are the latest theoretical perspectives on the use of PPPs in financing infrastructure? This chapter undertakes general and theoretical literature review in a bid to shed light on these questions.

2.2. Genesis and Evolution of PPPs in Financing Infrastructure

Records indicate that co-operation between the public and private sector in infrastructure facilitation date back to early civilizations. For instance Grimsey and Lewis (2004) provide evidence that the Old London Bridge on River Thames in the UK which opened in 1209 was built under a toll concession granted by King Henry II to Peter of Colechurch, an officer of the Church of St. Mary Colechurch. This is a classic example of co-operation between the state and a non state organisation. Further evidence is provided by Perrot and Chatelus (2000) who establish that private partnerships in France predate the French revolution of 1789. These revelations are consistent with those of Kiser and Kane (2001) who document many instances where states in the pre-revolutionary Europe granted ownership rights in terms of tokens of authority to private parties for raising resources for the state. Despite these insights, these co-operations were non-structured and distinctly different from PPPs as they are known in modern economies.

Structured co-operations between the public and private sector became more evident in mid 19th century. In France, Perrot and Chatelus (2000) provide evidence of infrastructure concessions, a form of PPP, as being dominant since the 1850s in urban development projects, sanitation and sewer projects and highway-building and operation. It is noteworthy however that these endeavours were still not strictly PPPs as known in their present form. Winch (2000) notes that the involvement of a private company in the public infrastructure during this era was largely either as a supplier contracted to provide an asset or service financed and funded by the public authority or as a provider of finances to the public authorities but not both.

In the modern era, scholars like Broadbent, Gill and Laughlin (2003) and Wolmer (2004) attribute the emergence of PPPs to policy and political changes in UK in the early 1980s. These changes led to a new approach to public management aptly named new public management. This approach consciously involved the private sector in financing and developing public projects. They show that in 1992 the UK government, through the Chancellor of Exchequer, announced the introduction of the private finance initiative (PFI) as a method of providing financial support for public-private partnerships. This was the first systematic program aimed at encouraging public-private partnerships. In this 1992 program, the main focus was on reducing the public sector borrowing requirement for financing infrastructure. It not only aimed to transfer the responsibility for the provision and management of public services to private firms, but also to promote long term relationships between the industry and their clients that could bring innovation and cost reductions. It is from this formative stage that PPPs are now widely used in infrastructure financing the world over.

Despite their growing popularity, the philosophy behind them is still debatable. Scholars like Mayrdt (2005) and Adams, Young and Zhihong (2006) argue that the use of PPPs in financing infrastructure arose out of the need to reduce the burden on public finance in the delivery of public services. The public sector often has many projects to finance, yet public financial resources both from public revenue and public debt are limited. Accordingly, this school of thought presupposes that the emergence of PPPs as important methods of infrastructure financing arose largely out of the limitations of the traditional public methods of financing infrastructure. In this context, PPPs should supplement and compliment public financial resources.

Other scholars like Broadbent, Gill and Laughlin (2003); Akintoye et al (2003) and Prud'homme (2004) view PPPs from a broader perspective that goes beyond the shortcomings of public finance. They believe that PPP initiatives help combine the strengths of both the government and the private sector leading to a more effective facilitation of infrastructure projects than traditional approaches. The government is perceived to possess strong politico-legal position, good credit rating and low risk perception while the private sector may provide cost efficiency, time efficiency and flexibility in infrastructure development. The description of Akintoye et al (2003, p.463) of the rationale of PPPs as "the combination of the resources of the public and private sectors, in the quest for more efficient service provision" best captures the postulations of this school of thought. In a nutshell, this approach views the use of PPPs as a symbiotic relationship between the private and public sectors that help governments meet infrastructure provision objectives while helping the private sector achieve *profitability*.

Across the opinion divide in the debate over the philosophy behind PPPs are scholars like Cohn (2004) and Hearne (2006) who relate the rise of PPPs to neo-liberal political thinking as a means of promoting economic development. This is a political movement that espouses economic involvement of the private sector in public governance and policy formation and public service and infrastructure delivery (Hearne, 2006). In this context, PPPs are seen as a key instrument for furthering this neo-liberal political and ideological agenda. The advocates of this school of thought see PPPs as attempts to translate neo-liberal ideology into practice.

In summary, the philosophy behind PPPs may draw from all these schools of thought. The fluidity and diversity of government operations imply that some governments may engage the private sector in infrastructure PPPs purely because of public finance limitations. In other cases, it may be to attain synergy by combining the strengths of either parties. Yet in other situations, it may be a neo-liberal political agenda. Further still, one cannot discount the possibility of a motivation that draws from a combination of all these factors.

2.3. Theories and Models of Financing Infrastructure through PPPs

The various theories explaining the growing popularity of the use of PPPs in financing and implementing public infrastructure projects are discussed below.

2.3.1. Theories on Financing Infrastructure through PPPs

PPP theory has evolved through various significant milestones. Leibenstein (1966) proposed the X-efficiency hypothesis of PPPs. It explains that government backed public entities are inherently inefficient such that PPPs are necessary to reduce the sources of inefficiency in such organizations. Accordingly, the involvement of the private sector allows public entities to respond to market forces and become more competitive. This explanation is rooted in the belief that government interventions in the operations of public entities to bail them out during potential failure, introduces inefficiencies in their operations. The knowledge by a public entity that it would not be allowed to fail worsens the moral hazard among public entities. The need to avoid this hazard and improve efficiency in infrastructure provision necessitates the use of PPPs.

Whereas this is a plausible theoretical foundation of PPPs, it can be discounted on the basis of the agency theory and the agency problems inherent in the contracts between the public authority (the principal) and the private partner (the agent) as Scholtes, De Neufville and Lee (2007) argue. In their counter-argument, the movement away from the formative methods of PPPs like private contracting to the more common ones like PFI is as a consequence of the need to manage this problem through aligning the long term returns of the private consortia to the long-term

performance of the resultant PPP project. In this respect, PPPs are not aimed at overcoming public sector inherent inefficiencies, but at avoiding the agency costs especially when such contracts are designed to be of a long-term nature.

In the 1980s there evolved a similar and equally persuasive hypothesis- the value for money postulation (Sappington and Stiglitz, 1987). It argues that PPPs are desirable in infrastructure financing because they promote technical and allocative efficiency of projects, hence their value for money. Sappington and Stiglitz (Ibid) view value for money from an efficiency point of view where cost is the fundamental factor in determination of value for money. There has however been an evolution from this initial point of view of value for money to a more comprehensive modern view as discussed below.

In the modern view, value for money is looked at from a broader and more versatile perspective. For instance, Reeves (2004) indicates that PPPs might help derive value for money so long as they are established in an environment rooted in long term cooperative relations among stakeholders. This co-operation should incorporate risk sharing and proper delineation of authority, communication and information channels as well as responsibility and accountability. VFM has been crucial in the execution of PPP programs although it is still problematic to measure and establish a PPP contracts' value for money, risk sharing and risk transfer ability (Akkawi, 2001).

During the experimentation with and consolidation of PPP programs in the last 20 years of the 20th century, there arose several other justifications for use PPPs in infrastructure financing. For instance, the market orientation theory which advances the case for PPPs from the market demand point of view while incorporating PPP risk considerations was incorporated as an argument for PPPs in the mid 1990s. The reasoning here is that market conditions affect the incentives of private firms to participate in any PPP in infrastructure projects (Dailami and Klein, 1997). A private partner is bound to have a faster recovery of their investment in a larger and profitable market segments with considerable purchasing power than otherwise.

The market also affects the long-term demand for the PPP financed infrastructure projects and the volatility in such demand. Pitt, Collins and Walls (2006, p.364) observe that “construction companies involved in PPPs projects expect to make higher profit than that on traditional contracts”. They hence are only willing to engage in PPP contracts for infrastructure financing when they are comfortable with the expected risk exposures and related benefits as shown by demand expectations.

Kopp (1997) posits that PPPs enable the public sector to leverage more financial resources by using the private sector as an intermediary. Accordingly, propensity for a government to use PPPs to finance infrastructure is a function of the fiscal constraints such a government faces. According to this argument, PPPs allow the public sector to consider the otherwise unaffordable projects. Imperatively, countries facing fiscal problems coupled with deficient external sources of revenue tend to be more open to foreign private investment including in the infrastructure sector. Such countries are more open to the use of PPPs in infrastructure (Kopp, 1997).

Consequently, strong institutions and effective rule of law are important for securing PPP arrangements given that private investors are averse to political and other risks. This can be seen from the perspective that an effective legal system inspires more investor confidence than an elaborate set of laws in a lax enforcement environment. Besides finance, the other constraint a government faces is flexibility in project delivery. Scholars opposed to this view like Cohn (2004) believe that PPPs may not necessarily address financing constraints but may well just be a consequence of neo-liberal political agenda for promotion of economic development. Nevertheless, PPPs are crucial in project finance and implementation flexibility.

Alesina, Baqir and Easterly (1999) postulate that ethnically divided countries require a larger number of infrastructure projects or public goods and services to meet the varied expectations of the distinct ethnic blocks. The different ethnic preferences prevent the pooling of resources for common public projects necessitating various projects to satisfy each group separately and reduce the likelihood of conflicts over common resources or public goods and services. This increases the number of infrastructure projects to be financed, of which the traditional public finance sources may not be adequate to meet. This leads to the demand for private financing to increase. The hypothesis thus presupposes that PPP arrangements are likely to be positively correlated with ethnic fractionalization. While this may be true, the theory fails to explain the extensive use of PPPs in politically stable and non-fractionalized economic environments.

Closely related to the X-Efficiency hypothesis presented earlier is the competitive market theory. Kee and Forrer (2002) note that a competitive market is central to ensuring effective PPPs. Theoretically, a competitive PPP contract model is superior in delivering infrastructure because it encourages efficiency stemming from the inherent competition among the market players. It is noteworthy however that while the use of competitive markets to deliver private goods and services is common in the world economy, there may be reasons to question its applicability for delivery of infrastructure projects (Kee and Forrer, *Ibid*). Pointedly, some of the assumptions of the market model like freedom of entry and exit from the market may not apply to PPPs in

infrastructure. The huge capital required for PPP infrastructure contracts may act as a barrier of entry to small potential private partners. Similarly, exit from the market could be prohibitively expensive given the contractual obligations implicit in PPP arrangements. In spite of these misgivings, the model if well exploited can overcome the agency conflict discussed above because markets need not be perfectly competitive in order to serve the private sector. This range of theories can be evaluated through analysis of the experience of various countries with the use of PPPs in financing infrastructure. These are discussed below.

2.3.2. The Global Experience with Infrastructure PPPs

Various countries present varying experiences with use and application of PPPs in financing infrastructure projects. In Europe, most PPP infrastructure financing models are derivatives of the French concession model and the British PFI model. Karisa and Dantas (2006) classify the development of high-performance roads in France into four phases. They put the first phase, from 1955-69, when France made a commitment to the use of tolls for financing motorway construction by public companies. Liberalization and privatization, the second phase lasted from 1969 to 1981 while the third phase, from 1982 to 1993, involved crisis management through a state takeover and a national system of cross-subsidies. The last phase from 1993 to the 2000s involved planning agreements and consolidation within the public sector. All these phases have elements of PPPs in financing infrastructure.

Karisa and Dantas (2006) document several major issues arising from France's experience with concession as a form PPP. These include the relative advantages and disadvantages of motorway financing through cross subsidies; relative advantages and disadvantages of toll financing of highways; efficiency of private concessions for highways; dilemma of regulating toll rates of concessionaires; importance of guarding against potential conflicts of interest when construction companies participate in concessions and relative ability of public and private sector companies to take environmental considerations into account.

In the UK, the government embarked on a political strategy to restructure the private sector in the early 1980s (Wolmer, 2004). In this country, PPPs fall under what has come to be known as new public management. The pillars of this approach are improvement of efficiency and accountability of the infrastructure service provision (Maytson, 1999). Over time, key economic sectors in the UK have benefited from the PFI in infrastructure development especially the health, transport and the energy sectors. For instance the London underground railway network began operating as a public private partnership in 2003 (Wolmer, 2004). In this context, the issues arising in PPP finance include determination appropriate sharing of revenues, risks and other issues

relating to value for money derived from PFI infrastructure projects.

Evidence from South America seems to suggest that most countries follow the French concession model of PPPs in infrastructure financing. This category includes Chile, Brazil, Colombia and Argentina. Harris (2003) shows that by 2003, Argentina's toll road concession program had been transferred to private operators one-third of the inter-city road system and the vast majority of the access roads to Buenos Aires, the capital city. The other countries have sought billions of US dollars from private sector participation to enhance infrastructure development. The major issues arising from the experience in these South American nations relate mainly to the challenges of structuring PPP contracts and facilitating a legal environment for their implementation. Political issues are also of great interest.

Karisa and Dantas (2006) notes that Brazil in this respect grappled with the challenges of using cross-subsidies to fund unprofitable toll roads as well as issues concerning the use of relatively low toll rates to foster public acceptance. To solve these challenges some countries have resorted to legal measures. Chile for instance enacted a law allowing for the award of concessions for the construction, maintenance, and operation of toll roads, tunnels, and related infrastructure under Build, Operate and Transfer (BOT) schemes, which intended to attract US\$4 billion from 1997 to 2000. Besides, there has been collaboration with multinational lending institutions. Harris (2003) indicates that for these South American countries, the World Bank played a major role in partly financing the infrastructure projects.

In the Oceania region, English (2007) categorizes the development and implementation of PPPs in Australia into the pre- and post-2000 periods. She shows that in the pre-2000 period, implementation and development was largely steered by non-PPP specific infrastructure procurement policies, which nonetheless resulted in distinct PPP types. These notably include Build, Own and Operate (BOO) and Build, Own, Operate and Transfer (BOOT) models which involved the private consortia in building, operation, ownership and transfer to the public sector with varying conditions.

She shows that in the post 2000 period, control modifications were done resulting in two main PPP models following the establishment of the land transport management bill in 2002 (English, 2007). Under the first model, she notes that core public services are delivered by government agencies whereas infrastructure and associated ancillary services are delivered by the private partner. Here the government directly pays the consortium for service provision having assumed the demand risk. According to her, the second PPP model is characterized by the transfer of demand based market or revenue risk to the consortium and financial risk to users. The key

challenges of the models revolve around the fact that they are hybrid arrangements such that they present varying accountability and audit risks associated with their pre- and post-contracting stages that give rise to a need for independent appraisal for value for money. For control purposes partnership arrangements are limited to 35 years or less.

In Asia many countries including the large ones like China and India also have experience with PPPs in infrastructure facilitation. The Government of India in their bid to modernize the road network embarked on a rigorous PPP road infrastructure financing. According to Government of India (2008), both transport and water supply infrastructure heavily benefited from the PPP infrastructure financing initiatives. In China, Hao (2004) classifies Chinese PPPs into three distinct types of outsourcing, concession and divestiture. Each portrays variations in application, design and purpose. Adams, Young and Zhihong (2006) note that one of the greatest challenges in China's PPP set-up is the country's legal system that is not clear about ownership of private property. They argue that this has an impact on policy risk where there is a big gap between the policies of central government and implementation by the local governments where local governments could vary PPP policies to align with local circumstances.

In Africa, PPPs have been implemented on a lower scale than in the developed countries. Sheppard et al (1997) show that the Sub-Saharan Africa receives only a small share of private funds targeted for investment in infrastructure. They suggest that this could be a consequence of the difficulties in accessing project finance mostly because of the low creditworthiness of most African countries, the limits of local financial markets, and the adverse risk profiles typical of infrastructure projects. They further indicate that the ability of the region to attract more private foreign currency funding for infrastructure depends in part on the ability to reduce foreign exchange risks.

It is noteworthy that donors who are critical in Africa's PPPs envision public-private partnerships (PPPs) as an effective means through which to expand water and other public infrastructure provision (Alexander, 2008). She indicates that the World Bank (WB) Group through its private sector arm, the International Finance Corporation (IFC) supports PPPs in Africa through the Sustainable Infrastructure Action Plan (SIAP). Between 2006 and 2007, policy conditions attached to its grants and credits called for building and managing 10 water systems under PPP arrangements in Benin; ensuring that 10% of rural water supply systems are managed by local private operators in Rwanda; the promotion of private participation in water supply (Madagascar) and the adoption of a PPP law for infrastructure (Niger).

Russell and Bvuma (2001) indicate that PPPs in all sectors including infrastructure financing were introduced in South Africa in the year 2000. This was after implementation of reforms geared towards new public management including the enactment of the Public Finance Management Act of 1999 to guide PPPs contracting, implementation and evaluation (PPP Unit, 2003). In determining the value for money of PPP infrastructure projects, the PPP Unit (2003) of South Africa uses the public sector comparator adjusted for risk in PPP appraisal. According to their model, value for money is only achieved if all appropriate risks are transferred to the private sector. The lessons the PPP experiences offer in the country are that there is need for regulatory framework that is affordable, offers value for money and affords effective risk transfer. The PPP Unit (2003) also suggests that procedural certainty with technical assistance and political goodwill help boost infrastructure projects. Ultimately, development of Africa's capital markets is crucial to help access private debt finance to facilitate infrastructural PPPs.

2.3.3. Models of PPPs in Financing Infrastructure

There are numerous PPP approaches to infrastructure financing. The precise definition of each depends on the combination of various contractual functions expected to be performed by the respective partners on the infrastructure project (Karisa and Dantas, 2006). These individual functions include designing, building, financing, operating, maintaining, owning, transferring, leasing, developing and buying the infrastructure. The mixture of the functions performed as well as the degree of risk borne by either partner is used in defining the type of PPP option put in place.

The length of the period necessary for implementation of the various models would vary depending on the matrix of the various combinations of functions described above. Accordingly, there are short-term service and management contracts not expected to last more than five years as well as long term contracts with contractual periods extending to thirty five years. The extreme forms of the latter are permanent PPP contracts. It is noteworthy however that, the clear definition of each contract type depends on the regulatory and policy stipulations in each country. The definitions of the contractual terms are in this regard largely depend on the country the PPP contract is operationalised. The paragraphs below describe the most common PPP models.

According to Hammami et al (2006), the short term PPP contracts take contractual periods of one to five years. These include service contracts and management contracts. Accordingly, in a service contract, the public sector entrusts private companies with the responsibility of providing some services traditionally provided by government, often for a period of up to three years. These include infrastructure services like maintenance of equipment and/or cleaning services. The payments for these services are according to contract. In a management contract, the public sector entrusts private

companies with the responsibility of operating infrastructure or providing management services according to contract. These contracts have contractual terms of between three and five years.

Medium term infrastructure PPP contracts last for periods of between five and fifteen years. These include operation and maintenance (OM), lease, upgrade, operate, transfer (LUOT) and purchase, upgrade, operate and transfer (PUOT). Under OM contract, which lasts between five and eight years, the public sector signs an agreement with the private sector. In the agreement, the private sector is responsible for operation and maintenance of infrastructure according to contract. The payments are through fees from government or the contracting public organisation. LUOT contract is operational for a period of between eight and fifteen years. In this context, infrastructure is leased and operated for a period specified in the contract by a private company over which it can be upgraded and extended before transfer to the public sector at the end of the contract. This is comparable to the PUOT contract, which however stipulates that private companies operate and own the infrastructure during the period of the contract, before the facilities are reverted back to public ownership.

PPP contracts lasting beyond the medium term and lasting up to thirty five years are often referred to as long term models (Hammami et al, 2006). These include the build, lease operate and transfer (BLOT); Build own operate transfer (BOOT); design, build, transfer and operate (DBTO); design build, finance and operate (BDFO) which is also called public finance initiative (PFI). On the extreme side, some PPP contracts are permanent. The most common in this category are purchase, upgrade, operate (PUO) and build, own and operate (BOO). All these, their terms and their characteristic features are described in appendix 2.

Whereas literature exposes these different types of PPP infrastructure financing contracts Hall, De la Motte and Davies (2003) reveal that the most commonly used form of PPPs in infrastructure financing involve building, whole or partial financing and operation of the project before eventual transfer back to the public authority. Scholtes, De Neufville and Lee (2007) attribute this fact to the inherent moral hazard in a poorly structured PPP contracts and the need to control agency conflict between the private and public sector partners. According to this perspective, a build only contract may involve an agency problem where the private partner may construct a poor project if it is expected to revert to the public sector immediately after construction. This problem is avoided by the use of a model that involves building; financing and operating like the DBFO model. In such circumstances the partner is forced to have a long term interest in the project which directly hedges against the moral hazard and agency conflict.

2.4. PPP Project Appraisal Approaches and Methodologies

Appraisal of the effectiveness of PPP financed infrastructure projects is essentially an effort in determining the value for money for such projects over their useful life. Among the earliest models of appraisal is cost benefit analysis. CBA estimates and totals up the equivalent money value of the benefits and costs to the community of projects to establish whether they are worthwhile (Akintoye et al, 2003). CBA is the process of comparing the total expected costs with the total expected benefits of a PPP financed project. Accordingly, all benefits and costs of a project should be measured in terms of their equivalent money value and in particular time. The approach considers both explicit and implicit costs and benefits of a PPP infrastructure project. The costs and benefits are quantified in money terms so that each can be aggregated and then weighed against each other (Harvey, 2000).

Groot (1997) indicates that an appropriate discount rate has to be used in evaluating (discounting) future costs and benefits of the PPP projects. This rate is a function of the cost of the project finance. Various elements in CBA include incorporate PVB (present value of benefits); PVC (present value of costs); NPV (PVB less PVC); NPV/k , where k is the level of funds available and BCR (benefit cost ratio i.e. PVB divided by PVC). The limitation of the method is that it ignores uncertainties like chances of project abandonment in the evaluation process. In a bid to improve appraisal, social and environmental costs and benefits are being incorporated into this method. Social and environmental costs are estimated using shadow prices to establish total costs of a PPP project as opposed to the financial costs and benefits only of the traditional CBA (Murty et al, 2006).

Public Sector Comparator (PSC) is another evaluation method. PSC is defined by the HM Treasury (1999, p.7) as a “hypothetical risk-adjusted costing by the public sector as a supplier, to an output specification produced as part of a PPP procurement exercise”. This definition is widely accepted for PSC which is also called public sector benchmark (PSB). The PSC describes the option for comparison and assesses what it would cost the public sector to provide the outputs it is requesting from the private sector. In order to construct the PSC, a PSC reference project is identified. This is the most likely and efficient form of public sector delivery of the project that would satisfy all elements of the output specification (HM Treasury, 1999). Mathematically, this is expressed as identified in appendix 6. Just like CBA, PSC also ignores project uncertainties.

The third method besides CBA and PSC used in appraisal of PPP projects is the Best Value Approach (BVA). According to Zhang (2006), this approach incorporates an evaluation process that emphasizes the optimal cost option of delivering PPP infrastructure projects. It allows

the public sector to make a right tradeoff between cost and non-cost criteria in PPP evaluation. The critical issue in this approach is to identify the best-value standards, the contributing factors and their relative significance. If the public sector relies on these standards, it would to enhance the best-value objective through long-term PPP contractual arrangements

In addition to the above three methods which can be considered as the traditional appraisal approaches, there are also other contemporary approaches aimed at overcoming the shortcomings identified in the traditional methods. One of these methods (which are still under evolution) is the Option Pricing Approach (OPA). It is recognized that the long-term nature of PPP projects presents various risks and uncertainties from both the public sectors and private partners' points of view. However, successive stages of implementation yield information that reduces the uncertainty over the value of the completed project hence force revision from prior plans and estimates (Leung and Hui, 2000). Ho and Lieu (2002) also developed an option pricing model that incorporated project net cash flows and construction costs as the pricing variables. They indicate that the model provides a framework for evaluating PPPs because of the uncertainties during their implementation. From a different perspective, Mattar and Cheah (2006) consider real options in evaluating private risks of PPP contracts which they consider as the premium of real option analysis

In one of the multi-criteria approaches (MCA), Zhang (2006) attempts to encompass both CBA and option pricing in developing a hybrid appraisal method for the evaluation of urban redevelopment projects which could equally apply to PPP infrastructure projects. He argues that a project would be more valuable if it is equipped with an option to contract or defer. It then is necessary to develop a method of appraising the effectiveness of such an arrangement. Accordingly, any possible flexibility can be captured to reflect the potential of the project and the relevant costs and benefits can also be more accurately identified and evaluated.

2.5. Latest Theoretical Perspectives on PPPs

Theoretical literature on the use of PPPs in financing infrastructure is evolving into newer points of view in the appraisal of infrastructure projects. Three perspectives have been identified in this respect. *First*, there are new theoretical models that are expected to be more robust in project evaluation than the traditional CBA and PSC appraisal approaches. Accordingly, the option pricing model has been considered. This is aimed at overcoming the shortcomings of the traditional methods. As indicated section 2.5, the traditional methods often fail to consider uncertainties in PPP financing decisions like the possibilities of delays or abandonment of PPP projects, and may therefore lead to wrong decisions (Leung and Hui, 2000; Ho and Lieu,

2002 and Matter and Cheah, 2006). The biggest challenge with this emerging new method however, is that these uncertainties are difficult to incorporate into a model with accuracy. This is as a result of the challenges involved in forecasting the uncertainties given the long term nature of PPP contracts. Despite these difficulties, the approach may improve decision-making by improving the accuracy in appraisal of PPP projects.

The *second* perspective is the development of environmental and social cost benefit analysis model of PPP project appraisal. This derives from the need to incorporate the impact of externalities of PPP infrastructural projects like social and environmental costs into evaluation of the effectiveness of such projects. According to this view, a PPP project should be evaluated in terms of its total costs and total benefits and not only the financial costs and benefits as is the case with the traditional CBA (Thirlwall, 2003; Murty et al, 2006). The method not only considers the present value of actual contract price and expenses of the PPP project, but also incorporates estimates of social benefits using shadow prices of the relevant externalities like the social time preference rate for participating partners. The difficulty involved in the use of the approach is the estimation of shadow values or opportunity costs of a PPP project to the society. However, if accurately done, it could greatly improve the appraisal techniques for PPP projects.

Finally, the appraisal of PPP financed infrastructure projects should involve not one method like CBA but a combination of methods that take into account various aspects of a project like in the Zhang (2006) MCA criteria. PPP projects have many evaluation criteria aspects to be considered such as project quality, flexibility, cost efficiency, timeliness in delivery and risk transfer to the private sector. This approach would be desirable for reconciling the qualitative as well as the quantitative aspects of measuring value for money. The method however is complex to implement given the challenges involved in estimating qualitative aspects of PPP projects.

2.6 Summary

In a summary, the key issues central to appraisal of the effectiveness of using PPPs in infrastructure financing are established as the accuracy in cost estimation and related challenges of any appraisal methodology secondly, the various models of PPP project appraisal. The most common valuation models are based on cash flows from the PPP projects, the cost of contracting process and the projects themselves, discounting rates and public sector benchmark projects. The biggest theoretical gap relates to failure by the literature to identify the best PPP appraisal criterion for every legal-economic and political situation given that some PPP infrastructure projects are implemented under organized legal and political environments with close monitoring systems. A model addressing varying political situations would be very helpful.

CHAPTER THREE

3.0. EMPIRICAL LITERATURE REVIEW

3.1. Introduction

Empirical evidence on the effectiveness of PPPs in infrastructure provision shows mixed findings. Early estimates of efficiencies to be gained through PPPs showed cost-savings figures of 17 per cent from HM Treasury (2003) in their analysis of 29 business cases and 10 to 20 per cent based on seven empirical cases from the National Audit Office (2000). However, other scholars refute this implied value for money pointing towards contrary evidence. Prominent among these are Pollock et al (2002) who have been highly critical of PFI arrangements across a wide range of services, including roads, hospitals and rail-transport infrastructure. The following sub-sections dwell on the empirical evidence on rationale for PPPs, the key success factors necessary for effective PPPs and the factors that impact the effectiveness of PPPs in various politico-legal, business and regulatory environments.

3.2. Studies on the Explanatory Factors for the Shift to PPPs in Infrastructure

A number of studies have been carried out to explain the theoretical justifications of PPPs. Allen Consulting Group (2007) for instance investigates cost performance and timeliness outcomes of PPPs in Australia relative to budgetary provisions for the management and construction of public infrastructure projects. The study covers largely completed projects that were undertaken from the year 2000 to 2007. Drawing from a population of 206 projects, 50 of which were PPP financed, the study is based on detailed analysis of publicly available data for a sample of 21 PPP projects and 33 traditional projects. These are categorized as 24 social, 25 transport, 3 water and 4 information technology infrastructure projects. On the cost aspect they use value weighted analysis to test and estimate the optimism bias which is the possibility of underestimating costs and overestimating benefits from a PPP financed project.

From the findings, PPPs are more cost efficient than traditional procurement methods. This efficiency ranges from 30.8 percent when measured from the time of project inception, to 11.4 percent when measured from the time of contractual commitment to the final outcome. The study indicates that in absolute terms, the PPP cost advantage is economically and statistically significant. Additionally, with respect to time over-runs, on a value-weighted basis they find that traditional projects are likely to be completed later than PPPs relative to the budget. Between the signing of the final contract and project completion, PPPs are found to be completed 3.4 percent

ahead of time on average, while traditional projects are completed 23.5 percent behind time. In their conclusion they note that PPPs provide superior performance in both the cost and time dimensions, and that the PPP advantage increases (in absolute terms) with the size and complexity of projects.

This is a more comprehensive study that not only categorizes PPP projects into various infrastructural groups, but it also draws from largely completed projects making the results more informative. It also involves subdivision of the PPP contracts into various implementation phases which captures cost aspects from a time perspective. However, the findings are drawn from only one country, which may not necessarily apply in other environments.

McKee, Edwards and Atun (2006) investigate the success of PPPs relative to the traditional method of procurement of hospital infrastructure projects in Australia, USA, UK, Canada and the European Union. They carry out the study of the two decades leading up to December 2006 by exploring four main issues related to PPPs: cost, quality, flexibility and complexity of the resultant infrastructural project. They use PFI and its variants DBFO, BOO, BOOT and franchising on one hand and public procurement on the other. They combine case study research method with cross-sectional analysis to investigate various types of hospital infrastructure projects in the countries identified above. The methodology involves identifying relevant cases, evaluating cost, flexibility, quality and complexity at individual levels and comparing with public facilities in the same country. Eventually, cross section analysis is done by comparing similar facilities with those in other countries.

After their comparison of PFI with the conventional mainly public finance procurement their results reveal varying results. In the UK for instance, 76% of PFI projects are delivered on time while only 30% of the conventionally procured projects meet this target. Furthermore, PFI approach is better at meeting budget provisions (79%) compared to the conventionally procured projects (27%). In the USA, out of 149 projects, 88 public facilities were found to be less costly, there was no cost difference among 43 while 18 cases reported better cost performance for PPPs.

In general, for all the countries investigated, the findings indicate that PFI is a significant success with regard to delivery on time and on budget of hospital infrastructure, although this is achieved at the expense of quality such that the gains of efficiency and time could be watered down from the detriment of poor quality. Further their results imply that new facilities are in general, more expensive under PPP than they would have been if procured using traditional methods. They

conclude that PFI seems to work well on budget discipline and timely delivery aspects assuming that neither budgets nor time are inflated at the contracting time. Such inflation, they observe, is less likely in competitive PPP implementation. This is because in such a case competition in the bidding process would keep total budgets down. In addition, PPP contracting procedures are found to be very complex because of regulatory policies. This gives the private sector an incentive to keep construction times low because they would otherwise lose part of their income stream. These findings imply that the advantages and shortcomings of PPP in infrastructure financing are finely balanced and that only careful analysis is likely to reveal if PPP approach is advantageous in particular circumstances.

Consistent with the findings above are the results of HM Treasury (2003) who carried out a study among all PPP projects in Britain in the year 2003. The objective was to determine the ex post performance of PPPs in the country since the inception of the program in 1992. At the time of the study, there were 451 PPP projects that had become operational. Accordingly, a study was carried to evaluate the performance of these projects vis-à-vis the rationale for the involvement of the private sector in infrastructure financing. The evaluation was made for timeliness of completion, cost efficiency and quality of PPP projects as proxied by operational performance.

The study methodology involved comprehensive assessment of projects on these various aspects. The main findings of this research are that PFI projects in UK were being delivered on time and on budget. Accordingly 88 per cent of the projects were shown to come in on time or early, and with no cost overruns on construction borne by the public sector. Although this is a comprehensive study, it falls short on time comparisons by using the budgets as the benchmark instead of a more elaborate tool like PSC that takes into consideration time value of money. This is a critical issue given that PPPs are implemented over a long period of time.

Low, Hulls and Rennison (2005) investigate relative costs and benefits of PPP in comparison with the traditional procurement methods in Scotland. The study covers all infrastructure PPP projects implemented up to 2005 in Scotland. The approach involves sending questionnaires to the public authority and private sector contractor responsible for each operational PPP in Scotland as well as interviewing public and private sector PPP contract managers. 84% of the projects use PSC in project evaluation all of which indicate that the proposed PPP shows a saving versus the PSC. However, from the procurement and construction point of view, the PPP procurement process is shown to be expensive and representing a greater burden for smaller projects. Here, the mean time taken to procure the PPP projects surveyed is 28 months, which is generally perceived to be

slower than non- PPP procurement. Besides this, the study finds that authorities were satisfied with design quality and the considerable innovation levels that PPPs seem to have stimulated in the construction of infrastructure. On the other hand however, they find no evidence that PPP operators delivered a better or worse standard of service than the public sector and that PPP contracts are less flexible than non- PPP contracts. In general, majority of authorities considered PPP to represent good or excellent value for money with risks, for the most part, being allocated appropriately between the contracting parties.

Vining et al (2005) evaluate the cost savings of PPP projects in Canada and the USA. They collect evidence on cost aspects of PPPs from six major prison infrastructure projects in these two countries operational at the year 2005. They use qualitative analysis combined with descriptive statistics on the contracting costs of the target PPP projects. They then provide a summary analysis of these PPP financed prisons. Their results confirm that PPP contracting costs are usually high. They conclude that the specifically, high contracting costs reflect the presence of complexity/uncertainty and a lack of contract management skills by governments. Given these circumstances, they indicate that the private sector can behave opportunistically at the expense of the public sector as there has sometimes been a political imperative to prevent projects from terminating. According to them, efficiency and effectiveness of PPP projects would only be realized if public sector managers recognize that they must design contracts that both compensate private sector partners for risk and then ensure that they actually bear it.

3.3. Studies on Critical Success Factors for PPP Projects

The factors that have an impact on the effectiveness, and hence value for money of PPP infrastructure projects can summarily be referred to as critical success factors or value for money drivers. Pitt, Collins and Walls (2006) investigate the principal factors which drive value for money within the PFI framework in the UK. They use a research methodology that first involves the review of literature in texts books, published papers, and reports which they use to identify relevant parameters to the research that forms the basis of their survey. These factors are then assessed against the existing PFI projects in UK as at the year 2006. This is done through report analysis and interviews with PFI stakeholders.

Their results provide evidence that the PFI mode of PPPs is still perceived by the government as the most cost effective means of procuring public infrastructure. They reveal that the positive aspects of PFI incorporate the advantages of competition generated by the concept as well as

improved risk management. They however point out that lack of agreed formulae by all stakeholders by which to benchmark VFM coupled with a skeptical electorate regarding the ability PFI concept to provide VFM provide the biggest challenge to their implementation. Their study identifies the factors that affect a PFIs value for money which they refer to as the drivers of VFM

The findings reveal that the highest ranking driver of value for money is the transfer of risks that are better managed by the private sector when the PFI model is utilized. In addition, the survey reveals that the long term nature of PFIs; contracts based on output specification of the PFI; competitive bidding for the contracts; the harnessing of private sector management skills as well as performance evaluation and incentives all contribute towards ensuring value for money for the PFI initiatives. The length of time is crucial because it determines if the duration is long enough to allow for recovery of the initial investment while offering flexibility for changes given the developments in the environment.

These are in line with the views shown by Andersen and LSE Enterprise (2000) in the survey carried among the stakeholders in the PFI in the UK. These findings can be compared and contrasted with those of Hardcastle et al (2005) who in the indirect quest to reveal the factors that affect the effectiveness of PPPs in infrastructure undertook a study to reveal the relative importance of various identified critical success factors among PPPs that were involved in service provision in the UK's construction industry. They administered a survey in the year 2001 when they send 500 questionnaires to organizations involved with PFI out of which 61 were returned. The respondents were directors or managers in the target companies. According to them, critical success factors (CSFs) are the areas of activity in which favourable results are absolutely necessary for a manager to achieve desired goals. The study uses the survey approach to examine the relative importance of eighteen critical success factors for PPP/PFI in the country's construction industry.

Data analysis involves descriptive analysis of the data, reliability tests using Cronbach's alpha, one way analysis of variance and factor analysis. The eighteen CSFs evaluated include a strong private consortium; appropriate risk allocation and risk sharing; competitive procurement process; commitment/responsibility of public-private sectors; thorough and realistic cost-benefit analysis; project technical feasibility; transparency in the procurement process and good governance. Others include a favourable legal framework; available financial market; political support; government involvement by providing guarantees; well organized public agency; sound economic policy; social support; technical transfer and shared authority between the public and the private

sectors. The study survey is administered in the year 2001 among private and public organizations involved with PPP in that period. The findings reveal that the appropriate factor groupings of PPP CSFs are: effective procurement, project implementability, government guarantee, favourable economic conditions and available financial market.

Nisar (2007) also investigates value for money drivers in PPP schemes in the UK. He adopts the case study research methodology by carrying out three case studies of PPP construction projects in the UK existing in the year 2007. The findings are relevant for efficiency and risk transfer postulations with regard to achievement of PPP objectives. Accordingly, he finds that PPP contracts often require the private consortia to take responsibilities for the performance of the asset over a long term, at least for a significant part of its useful life, so that efficiencies arising from long term asset management can be obtained. Although the evidence from the study is balanced on the usefulness of PPPs in realizing efficiency gains it is overwhelmingly clear that there is a clear benefit of risk transfer. The implications from the findings are that PPP contracts may need to be designed in such a way as to adopt policies that will optimise on the benefits of PPP risk transfer as a driver of value for money.

Hannami, Ruhashyankiko and Yehoue (2006) using panel data method of analysis on PPPs in infrastructure projects in various countries for the period 1990 to 2003 presents an empirical analysis of the cross-country and cross-industry determinants of public-private partnership (PPP) arrangements and their prevalence thereof. Their PFI database incorporates projects in low- and middle-income countries most of which are in Latin America, the Caribbean, East Asia, the Pacific, Eastern Europe and Central Asia. It also includes South Asia, sub-Saharan Africa as well as the Middle East, and North Africa which however lag well behind in the use of PPP finance as is pointed out in the study. They determine the prevalence through counting their occurrence; considering the monetary values of these PPP occurrences before considering the extent of private participation that distinguishes different types of PPP arrangements

To analyse the data, they carry out three different regression analyses as determined the nature of the dependent variable. Where the dependent variable is the number of PPP projects they use Poisson or negative binomial regressions which uses zero-inflated Poisson (ZIP) specifications where appropriate (zero counts of PPPs in a year). Where the dependent variable is the nonnegative dollar value of investments in PPP projects they use Tobit regression model. They use this as an inbuilt mechanism to account for the truncation that might otherwise create biases in the ordinary least squares (OLS) model. Finally, where the dependent variable is the extent of

private participation in PPP arrangements, they cautiously use both ordered Probit and Logit regression models given the ordinal nature of such data especially as regard the possible bias in the PPP index ranking.

They find that PPPs tend to be more common in countries where governments suffer from heavy debt burdens and where aggregate demand and market size are large. Their findings also suggest that macroeconomic stability is essential for PPPs. They provide evidence on the importance of institutional quality, where less corruption and effective rule of law are associated with more PPP projects. PPPs are also more prevalent in countries with previous PPP experiences. At the industry level, they find that PPP determinants vary across industries depending on the nature of public infrastructure, capital intensity, and technology required. They also find that private participation in PPPs depends on the expected marketability and the technology required.

Various scholars have identified the bidding procedures and the competition involved as a key issue with regard to the eventual effectiveness of PPP infrastructure projects. Amaral, Saussier and Billon (2006) investigate the relationship between PPP bidding auctions' results and the number of bidders for local transportation contracts in London based on multiple regression analysis research model. Using an original database concerning 294 local transportation routes they find that a high number of bidders are associated with a lower cost of service.

The findings above are comparable to those of Athias and Nuñez (2007) who empirically assess the effects of the bidding competitiveness (which they call the winner's curse) on the auctions for road concession contracts. Athias and Nuñez (Ibid) use their study to address three questions. First, they investigate the overall effects of the winner's curse on bidding behaviour in such auctions. Second, they examine the effects of the winner's curse on contract auctions with differing levels of common-value components. Lastly they interrogate how the winner's curse affects bidding behaviour in such auctions after accounting for the possibility for bidders to renegotiate. They use a dataset of 37 road concessions worldwide and cross sectional research methodology that involves comparison of similar projects across countries.

Their findings show that the winner's curse effect is strong in toll road concession contract auctions. Thus, they show that bidders would bid less aggressively in toll road concession auctions when they expect more competition. They also show that the winner's curse effect is weaker when the likelihood of renegotiation is higher. This shows that bidders are more likely to bid more strategically in weaker institutional frameworks, where renegotiations are easier. The findings are

further compared to those of Gómez-Lobo and Szymanski (1997) who report that a higher number of bids in the process of contracting out local authority refuse services bear a direct positive correlation with a lower cost of service.

Sciulli (2008) uses the Casey Hospital (CH) case study research to investigate the factors that enhance the success of PPPs in Australian infrastructure financing. He sets out to document the construction and development of a Victorian state government hospital (CH). This is used by the study to identify the essential features of this contract and the relationship between the government and the private sector provider. The data collection methods include interviews with key participants in the project and analysis of archival documentation. Their findings indicate that the successes for PPP projects are achieved when they are built on time and within budget and when flexibility is inbuilt to respond to changes and risk factors. This seems to suggest that the success of a PPP project hinges on clearly defined outcomes that must be specified in the contract. In addition the participating parties must be willing to be flexible on key factors based on their previous experience with PPPs and the changing circumstances during implementation.

3.4. Studies on the Challenges Associated with PPP Appraisal Methods

There are several PPP appraisal methods. When trying to understand the applicability of CBA in appraisal of effectiveness of PPP financed projects, the results from Flyvbjerg et al. (2002) who apply to long-term projects in general may be put into perspective before further evaluation. Flyvbjerg et al. (Ibid) carried out a research on the accuracy of cost estimations in 258 transport infrastructure and land development projects in Europe, North America, Japan and a another group comprising 10 developing countries using the survey methodology. The study covers an 88 year period of 1910 to 1998 and assesses the cases at fixed dollar prices. The projects in the sample represent different project types and historical periods.

The findings indicate a consistent and statistically significant trend of costs underestimation by public authorities and the partners in the contracting process. This is attributed to two main causes of misinformation in PPP policy and management: strategic misrepresentation and optimism bias (appraisal optimism). Strategic misrepresentation arises from the deliberate efforts by the authorities to give wrong evaluations while optimism bias could be attributed to psychological factors leading to poor estimations.

These findings of Flyvbjerg et al (2002) are corroborated with those of Prud'homme (2004). In trying to understand cost-benefit analysis of PPP of the France-England railway infrastructure

financing, Prud'homme (2004), reports that costs are generally underestimated and benefits overestimated, and by large amounts, in public infrastructure projects. He discloses that errors of 50 percent or more are prevalent. The study discloses that in 2003 actual revenue from the tolls from the railway was about a third of what had been predicted. This presents a serious challenge for CBA since these diminished revenues are to be evaluated against costs that would have gone up significantly from the projections at the initial stages of the PPP contracting process.

These findings in the above background are quite significant since they imply that if care is not taken the comparison of costs against benefits (CBA) would more often than not be measured with bias by the promoters, both the public and private, of the project. Consequently, a more comprehensive CBA analysis beyond the figures provided by project promoters and their analysts should be undertaken and that assessing the effectiveness of a PPP financed project must ensure such biases are factored in the evaluation process if not eliminated. The same applies to the other methods of appraisal of the effectiveness of PPPs since they of necessity must consider costs and benefit besides other factors like social costs in the appraisal process.

Pollock et al (2002) evaluate the accuracy of and challenges in the appraisal of value for money in the UK context. They use the country's National Health System (NHS) data from 1991 to 2002. This corresponds to the time when the NHS was transferred to the PPP system of financing from the traditional public finance. They compare cash costs and net present costs of individual PFI hospital schemes and their risk valuations. Their data were derived from published data in the British House of Commons Health Select Committee Public Expenditure Memorandum of 2000 and 2001 and from full business cases for individual hospitals that benefited from the PPP system finance. The main issue leading to the appraisal difficulties is the rate of discounting cash flows to enable comparison of the PPP estimates and those of a PSC. Their methodology shows the impact of discounting on cash flows before and after risk transfer.

Their results show that the costs of raising the finance account for 39% of the total project costs under the PPP yet publicly financed capital does not incur these costs. On the other hand the PPP approach seems to be only better than PSC after risk transfer was included in the net present value of PFI. This indicates the crucial significance of incorporating risk transfer when appraising the suitability of the PPP yet the evaluation of risk is quite problematic. For instance the results indicate that the private sector's risk as a proportion of the total capital costs under PFI varies enormously between projects from 17.4% to 50.4%. This presents a headache in consistency in the appraisal process. In addition, the results show that the value of risk transferred to the private

sector is remarkably close to the amount needed to close the gap between the public sector comparator and the PFI. This calls to serious doubt the usefulness of PPPs in this sector.

Boardman, Poschmann and Vining (2005) as quoted in Hodge and Greve (2005) noted the difficulties of evaluating PPP projects' value for money lie in the challenges inherent in capturing PPP contract transaction costs. Such data are crucial in any comparison of partnership and traditional project delivery. With the objective of establishing the reasons behind difficulties of cost estimations in determination of value for money, they catalogue 76 major North American PPP projects existing at the time of their study (2005) that is based on case studies' approach. The present five transport, water provision and waste projects, showcasing a series of 'imperfect' partnership projects with high complexity, high asset specificity, a lack of public-sector contract management skills and a tendency for governments to be unwilling to re-evaluate the projects once under way. Their findings show that cost estimates are difficult because of a number of factors. They point out that private entities are skilful in ensuring full compensation for risk-taking, and to their strategic behaviour such as declaring bankruptcy (or threatening to) in order to avoid large losses. These are not usually factored in at the contracting phase.

Leung and Hui (2005) set out to examine the most appropriate method of appraisal of value for money from point of view of social costs and benefits to local residents where a PPP financed urban redevelopment project is implemented. They carry out a case study on the redevelopment of PPP financed London's Docklands in Britain. Docklands was redeveloped using PPP finances for commercial and residential purposes. The case study covers the period from 1974 when the redevelopment efforts commenced to 1998 when the redevelopment was completed. Their paper demonstrates that the use of an MCA method encompassing CBA and option pricing concepts is a more appropriate approach to realizing the social benefits and costs yielded to the local residents in the appraisal process.

Adams, Young and Zhihong (2006) examine the PPP system in China to identify the constraints facing its implementation and progress in the context of several models of bureaucracy in the country. Their study uses qualitative analysis based on Chinese PPP secondary data available for a twenty year period commencing when the PPP arrangements came to practice in China up to 2006. This involves intensive study of the individual projects by studying reports, news items, manager responses and the details of project implementation, ex ante budget and ex post cost and performance records. In the Chinese PPP context, they indicate that the main PPP models are concessions, divestiture and outsourcing. The qualitative desk-top research reveals the

following as the major stumbling blocks to the effectiveness of PPPs in China. First is the allocation of risk between the public and private partners. The other challenges are identified as corruption, continued weak supervision, poor accessibility to investment capital and authorities and the central government which exacerbates this fluidity and policy contradictions.

3.5. Current Empirical Research Focus

In the recent past current research trends on PPPs in financing are moving towards newer empirical perspectives. Studies are in this respect focusing on three main empirical aspects. *First*, there are studies to investigate cross country performance of PPPs. To facilitate such investigations, empirical methods of determining the effectiveness of PPPs in infrastructure financing are turning to the panel data analysis method. This method endows regression analysis with both spatial and temporal dimensions. The spatial dimension pertains to a set of cross-sectional observation of PPP cases in different countries or industries. The temporal dimension pertains to periodic observations of PPP projects by characterizing them over a specified time span. Athias and Nuñez (2007) for instance effectively use this method to analyse effects of the winner's curse in PPPs contracting among infrastructure projects in various countries. This method allows wider investigations compared to case studies done in single operational environments. However, the method may be limited in application. This is because of the lack of standardization of PPP frameworks across countries that limit spatial and temporal dimensions necessary for the method.

Second, there is an increasing trend of moving away from the use of ordinary least squares (OLS) method of regression in the empirical studies on the factors that determine the effectiveness of PPPs in infrastructure financing. A new trend involves the use of a combination of a variety of regression approaches in the same study as determined by the various characteristics of individual dependent variables. Accordingly, Poisson, Tobit and Logit regressions would be used in the same study where the PPP dependent variables are countable variables, monetary variables and degree of performance variables respectively. This approach is effective in a panel data study setup and was used by Hannami, Ruhashyankiko and Yehoue (2006) in establishing the determinants of PPP arrangements. The approach considers both qualitative and quantitative PPP project data hence is more robust than the OLS approach which applies to quantitative data only. It can therefore be used to obtain more reliable findings.

Finally, there are empirical studies to investigate the new theoretical developments described in section 2.6 in chapter two. Accordingly, there are studies into the applicability of option

pricing model (Matter and Cheah, 2006), social cost benefit analysis (Murty et al, 2006) and MCA (Zhang, 2006) on PPP contracts in infrastructure financing. These new approaches aim at determining the possibility of increasing accuracy in the appraisal of the effectiveness of PPPs in infrastructure financing relative to the traditional approaches to financing.

3.6. Summary

Evidence is mixed with regard to whether PPPs contribute a net positive value for money when compared to the traditional public finance approach to infrastructure financing. From studies, including McKee, Edwards and Atun (2006), it is shown that whereas PPPs are crucial in enhancing faster completion and compliance to PPP budgetary targets, they nevertheless are more costly and may compromise on quality to meet the budget provisions. With regard to the effectiveness of appraisal methods, it is revealed that CBA and the use of a PSC are common in PPP project appraisal. However, their effectiveness in this regard is riddled with some complexities. For instance, CBA encounters problems that are associated with cost and benefit estimation inaccuracies.

These inaccuracies associated with the measurement of CBA are attributed to strategic misrepresentation and the optimism bias in the estimation process (Flyvbjerg et al, 2002). Similar problems are raised about the use of the PSC. The construction of the PSC requires strict definition of transferable risk, competitive neutrality as well as explicit and implicit costs and revenues of implementing a project (HM Treasury, 2003). All these are estimated ex ante, leading to high levels of subjectivity in the evaluation process. It is with such bottlenecks in place that other methods like MCA and incorporation of option pricing approach are introduced.

Concerning the factors that hinder the optimization of value for money among PPP financed infrastructural projects evidence reveals them as the ability to pass on risk to the private consortia and the presence or otherwise of strong politico-legal and capital market systems. Most PPPs have thus succeeded and been evaluated in the strong legal and regulatory environments including the English PFI model also adopted in Australia, Spain, Ireland, Scotland and other European Asian and American markets. The factors that affect the effectiveness of PPPs in financing infrastructure are identified in the literature as the key success factors. These are comparable to the drivers of value for money which include risk transferability; the expected marketability and the technology required for the PPP projects; the level of competition in PPP consortia procurement process and the extent of clarity in in the contract specifications.

Most of the studies involve the use of the case study methodology of research. However, others like those of Flyvbjerg et al (2002) use large data sets of PPPs from across various countries necessitating the use of cross sectional analysis in data evaluation. Factor analysis is also used extensively particularly with regard to evaluation of the drivers of value for money among PPP projects in infrastructure. This is because of the qualitative nature of the data required to rank stakeholder and managerial viewpoints for the PPP projects. Regression analyses including the Logit, Probit and Tobit models are used for both qualitative and quantitative data generated in the PPP studies.

CHAPTER FOUR

4.0. CONCLUSION AND RECOMMENDATIONS

4.1. Key Findings, Discussion and Recommendations

Six findings are made from this study. *Firstly*, the effectiveness of PPP financed infrastructure projects depends on what are commonly referred to drivers of value for money. These are the key success factors that contribute to the effectiveness of PPPs as an approach to infrastructure financing. From empirical findings (Hardcastle et al, 2005; Hannami et al, 2006; Nisar, 2007 and others), these are identified as firstly the ability to transfer risks associated with infrastructure projects to the private sector. There is need for appropriate risk allocation and risk sharing.

Another factor relates to the term of PPP contract. From this perspective, the longer the contract, the more likely it is for the private sector to recoup their investment, hence the more they are attracted to the partnership contributing towards enhancing the chances of its success. In addition, clarity in PPP infrastructure contract output specification is crucial. The contracting partners need to be clear of the expected outcomes so as to enhance the appraisal process and have a basis of determining the success or otherwise of the contract. This factor can be contrasted with another one which relates to the nature of PPP bidding process. Empirical findings (Amaral, Saussier and Billon, 2006; Athias and Nuñez, 2007) indicate that a competitive, well structured and transparent PPP contract bidding process eliminates the winners' curse problem and reduces the ultimate cost of the contract.

Additionally, project technical feasibility is critical. A thorough and realistic cost-benefit analysis forms part of the appraisal process. The success of the PPP contract depends on the accuracy of the technical feasibility process. This is coupled with a favourable legal framework since the success of the PPPs in countries including France, England and South Africa seems to stem from among other factors, the supportive legal framework. In South Africa for instance, the PPP projects' appraisal is centrally done by a PPP unit. The legal environment should be supplemented by political support. For instance, the Government should be ready to be involved in providing support for some extraneous risks like demand risk and legal risk as identified in appendix 3.

The nature of the financial markets in place is critical in facilitating PPP projects. PPP funds are ultimately sourced from the capital markets. A stable financial market therefore enhances success of PPPs. This is in addition to social support and sound economic policy. To prevent political backlash the PPP environment should be supported by the citizens who need to

understand why the necessity of the PPP arrangement. Finally literature including Karisa and Dantas (2006) indicate that institutional quality is paramount since PPPs thrive where there is less corruption and effective rule of law. The above success factors can be compared with the empirical findings in some emerging PPP environments like China, Eastern Europe, Latin America and Africa that reveal the factors that have hindered the use of PPPs in infrastructure financing. These include conditions related to weaker institutional and legal systems and inadequate experience with PPP financing. Chief among them are inadequacies in PPP risk management, corruption, policy conflicts and poor capital markets.

These success factors can be categorized into two groups: the macro level success factors and the micro level success factors. Macro level factors are associated with the entire politico-legal and economic institutional framework and are expected to affect all PPP infrastructural projects regardless of the private consortia and the public authorities involved. On the other hand, micro level success factors impact the success and effectiveness of a PPP contract in delivering infrastructure projects at the contract specific procurement and implementation level including the nature of parties involved. There is need for excellent technical expertise among the public sector technocrats involved in the contracting process to ensure they deliver a PPP contract that affords value for money. The appendix 5 best illustrates this dichotomy.

The *second* finding is that the effectiveness of PPPs in providing infrastructure projects relative to the traditional public finance approach is dependent on the project parameter under evaluation. The key parameters are adherence to budgetary provisions, timeliness in project delivery, cost efficiency, risk transferability, flexibility, and quality of the outcome project. Evidence (HM Treasury, 2003; Low, Hulls and Rennison, 2005; McKee, Edwards and Atun, 2006) suggests that PPPs are effective in ensuring that projects are implemented within budgetary allocations. They also enhance timely delivery of infrastructure projects. The success and effectiveness of PPPs on these two fronts is somehow watered down when the remaining parameters where effectiveness in one could be attained at the expense of one or more of the others. For instance, cost efficiency could be attainable at the expense of quality, flexibility and risk transferability. The implication is that the advantages of using PPPs may well be offset by the shortcomings although as stated in the first finding, clear identification of project objectives and performance targets at contracting stage will help identify the parameters to pursue. This can be done by establishing a PPP unit for central co-ordination, evaluation, regulation and monitoring of infrastructure PPP contracts as has successfully been done in South Africa, India, Australia and England (Karisa and Dantas, 2006).

The *third* shows that there are various theories that explain the proliferation of PPPs in

infrastructure financing. These include the x-efficiency hypothesis; the competitive market theory; value for money postulation; government constraints theory and political and ethnic fractionalization postulation. Generally one can categorise these theoretical arguments as attempts at addressing public sector limitations to infrastructure provision. Accordingly, these can be summarized as resource utilization limitations and resource availability limitations. Leibenstein's (1966) x-efficiency model, Kee and Forrer's (2002) competitive market theory and the value for money argument all look at PPPs as a way of overcoming the public sectors' inefficiencies in resource utilization. The supposition is that the private sector is more efficient in the way it employs the use of resources.

McKee et al (2006) provide evidence that PPPs are reliable in meeting budgetary allocations and timely deliveries of infrastructure projects at the expense of cost and quality. This seems to limit the efficiency argument. In fact the findings of others like Flyvbjerg et al (2002) and Prud'homme (2004) who show inconsistencies involved in cost and revenue estimations for PPP projects generally limit the strength of the efficiency argument. Besides, the agency problems may demand that the PPP contracts are structured in a long term period to avoid satisficing behaviour among the private consortia.

The other remaining theories seem to dwell on the public sector financial limitations as the key precipitations of the emergence of PPPs in infrastructure financing. This is true with regard to Government constraints theory of Kopp (1997) and political and ethnic fractionalization postulation of Alesina, Baqir and Easterly (1999). They imply that enormous resources can be mobilized from the private sector. Scholars opposed to this view like Cohn (2004) believe that PPPs may not necessarily address financing constraints, but may be used as a tool for furthering neo-liberal political agenda.

The *fourth* finding is that PPPs are widely used in infrastructure financing. Karisa and Dantas (2006) trace the experience of PPPs across the various continents. They show that the contractual periods of various PPP models vary across countries depending on which partner assumes the project functions of designing, building, financing, operating, maintaining, owning, transferring, leasing, developing and/or buying the infrastructure project. Accordingly, these periods can be divided to five main categories. These include short term contracts that cover one to five years; medium term contracts that cover five to fifteen years; long-term contracts that cover fifteen to thirty five years; permanent contracts that are perpetual and lastly PPP contracts whose terms are variable. These are identified in appendix 2. Short term contracts are basically service and

management contracts where the public sector entrusts the private sector to either provide services or operate infrastructure projects. Consequently, most of the risks except the operating risk are borne by the public sector. Accordingly, the inherent agency problem is quite serious since the project are expected to revert to the public sector in the short term and the private sector may provide poor projects given that they are only expected to operate it for a short period.

Medium term contracts include OM, LUOT and PUOT. These contracts essentially involve operation of the PPP project by a private partner before eventual transfer back to the public sector. The private partners can either recover money through fees from the government (OM) or recoveries from operating the contract (LUOT and PUOT). Their medium term nature implies that the agency risk is less serious and that most contract risks are borne by the private sector.

The most common PPP contract models are long term with terms up to thirty five years. Most derive from the British and French PPP models. They include PFI, BOT, DBFO, BLOT and concessions. The contracts are built and owned by the private partner for the term of the contract before they revert back to the public sector. Because the contracts are long term and partly owned by the private partner, most project risks are transferred to the private partners and the agency problem is less serious. This is because the private partner is sufficiently motivated to have flexible, quality and cost effective contract given their long term stake in the project. This is why these projects are the most common type of PPP contracts.

Some PPP projects however have inbuilt flexibility with variable contractual terms. These include DBO, DBM and DBT. The contracts explicitly show which partner will bear extension risks; manage the PPP contract; carry out major maintenance and own the project during the contractual terms. They are advantageous because they offer inbuilt flexibility and their periods are determined by the needs each specific project. These can be contrasted with the permanent contracts which include BOO and PUO. The private sector essentially purchases the project but the contractual terms aim to secure public interest under government supervision. The private sector bears all the project risks although the terms reduce the government influence in the project operation. Given the diverse varieties of PPP models, achievement of objectives require a clear policy to guide their implementation. As is the case in England, South Africa and other countries, central co-ordination of PPP efforts may be needed through the use of a PPP unit.

The *fifth* finding is that whereas all the PPPs in infrastructure financing identified by literature are justified on the rationale of the need to overcome the limitations of public finance, it is

not clear whether some governments engage the private sector as an ideological shift to neo-liberalism. This is because all governments justify the use of PPPs from the point of view of cost reduction, improvement of quality, timeliness in project delivery and generally value for money. This seems to imply that their perception is that PPPs would help deliver these advantages which may not be available under the traditional approach to financing infrastructure.

The *sixth* finding is that there are a variety of PPP project appraisal criteria for determination of value for money and effectiveness of PPPs in financing infrastructure. These include CBA, PSC, BVA, option pricing and multi criteria approaches. Earliest attempts at evaluating PPP contracts employed CBA (Flyvbjerg et al, 2002). Whereas this method is widely used in the appraisal of PPPs, it faces some challenges. Leigland and Shugart (2006) show that besides the difficulties of incorporating social issues, there usually are technical problems of the forecasting techniques. These include the use of imperfect estimation model; inadequate data and the lack of experience on the part of forecasters. The technical problems in forecasting are compounded by economic shortcomings. This is especially so when there is the optimism bias and strategic misrepresentation coupled with psychological effects (Flyvbjerg et al, 2002) all of which introduce inaccuracies in the appraisal of effectiveness of PPPs. PSC is the only reasonable way of comparing the effectiveness of a PPP financed infrastructure project with the traditional method. It provides a basis of comparison and is more objective given that the computation of a PSC index is guided by established rules although it is limited by the inherent level of subjectivity in its construction.

4.2. Knowledge Gaps Identified

Three knowledge gaps are identified from the study. *First*, little is known about the factors that affect the effectiveness of PPPs in the developing world, especially in Africa. This is a critical gap given that there are marked contextual and operational differences between the developed and the developing economies that can enrich literature. Unlike the developing world, advanced economies have strong policy and regulatory PPP frameworks (Karisa and Dantas, 2006).

England, Australia, India, China, Ireland, South Africa, Australia and Finland have all developed such policy frameworks. Accordingly, it seems that whereas such economies rely on these frameworks to guide PPP contracts, developing countries implement PPP contracts in the context of the traditional public finance policies. Another difference arises from weak financial markets in the developing characterized by lack of financial deepening and low capitalizations. These markets are critical to PPP partners since they are expected to be their source of project

finances. The developing economies are also characterized by poor infrastructure, weak institutional systems and unstable political atmosphere (Sheppard, von Klaudy and Kumar, 1997). Given these differences, a study that focuses on the factors that affect the effectiveness of PPPs in financing infrastructure in developing countries can potentially yield additional knowledge that can enrich literature on PPPs.

Secondly, evidence indicates that existing models of appraising the value for money from PPP projects have limitations. Flyvbjerg et al (2002) for instance provides evidence that CBA may be prone to optimism bias which may lead to wrong decisions in the PPP project contracting process. As a result new models have been proposed. These include MCA and the option pricing approach. Whereas these are aimed at addressing such limitations of the traditional methods in determining the value for money of PPP projects, little is known about their relative accuracy in determining value for money among PPP projects. Subjecting these new models to rigorous empirical scrutiny will bridge this knowledge gap by providing information about their relative accuracy in measuring value for money for infrastructure projects financed through PPPs.

Finally, a study for assessing the relative effectiveness of different PPP infrastructure financing models in delivering value for money in different countries and regulatory set ups would provide further useful information. Such a study would for example focus on the models that are substantially similar in structure as applied in different countries but similar industries. Using panel data analysis and different Logit, Probit and Poisson regression analyses as done by Hannami et al (2006), cross industry and cross country evaluation of these models would help provide additional invaluable knowledge. In this respect, such an empirical study would identify the best models for specific regulatory environments which could then inform policy formulation in financing public infrastructural projects through PPPs.

4.3. Areas for Possible Further Research

The research gaps identified above are crucial for investigation and therefore they inform areas that are critical for further investigation. Chief among these include *firstly*, the assessment of the PPP experiences and effectiveness in delivering infrastructure projects in Africa and other developing countries. *Secondly*, another possible area for inquiry is the investigation of the appropriateness and accuracy of MCA, option pricing and BVA relative to CBA and the use of PSC in appraisal of PPP financed infrastructural projects. *Thirdly*, it would be important to carry out cross sectional investigation to identify the best suited PPP models in delivering infrastructure projects in different politico-legal and economic environments. This may help in policy

formulation in implementation of PPP approaches to infrastructure.

4.4. Conclusion

The assessment of the effectiveness of PPPs in infrastructure development is in essence an attempt to ascertain whether PPPs can be relied upon to deliver value for money relative to the traditional public finance approach to infrastructure financing. Through theoretical and empirical literature, the study finds out that the major methods of PPP infrastructure project appraisal (and thus determination of value for money) are CBA and comparison to a PSC. Other emerging methods include MCA, BVA (which is a derivative of CBA) and option pricing. Whereas there is plenty of information on the former two, the latter three are relatively new and are still evolving. Besides this finding, literature also reveals the theoretical foundation of PPP is grounded in the efforts to address the financial and institutional limitations of the government.

When empirically evaluated, it emerges that the effectiveness of a PPP approach to delivering infrastructure projects hinges upon factors that are aptly described variously as key success factors or drivers of value for money. These, it is revealed can be project specific (micro level) or politico-legal and economic environment specific (macro level). In essence, the effectiveness of PPPs in delivering infrastructure projects will hinge upon how good these factors are aligned and the general implementation environment.

Finally the following recommendations for further study are made based on the limitations identified in existing literature. Firstly, it is crucial to carry out empirical studies to evaluate the drivers of value for money in developing countries. This is especially the case because there is the scanty literature on infrastructure PPPs literature in such countries. It would be interesting to see if there are any differences from the findings summarized in this paper because the financing markets in these countries are still under developed and the regulatory frameworks may not be similar to those reviewed in this paper. Another possible insightful area for further inquiry is the assessment of the emerging models of appraising the effectiveness of PPPs in infrastructure development. This is with regard to analyzing the impact of externalities especially social and environmental costs of PPP projects on the overall effectiveness of such projects.

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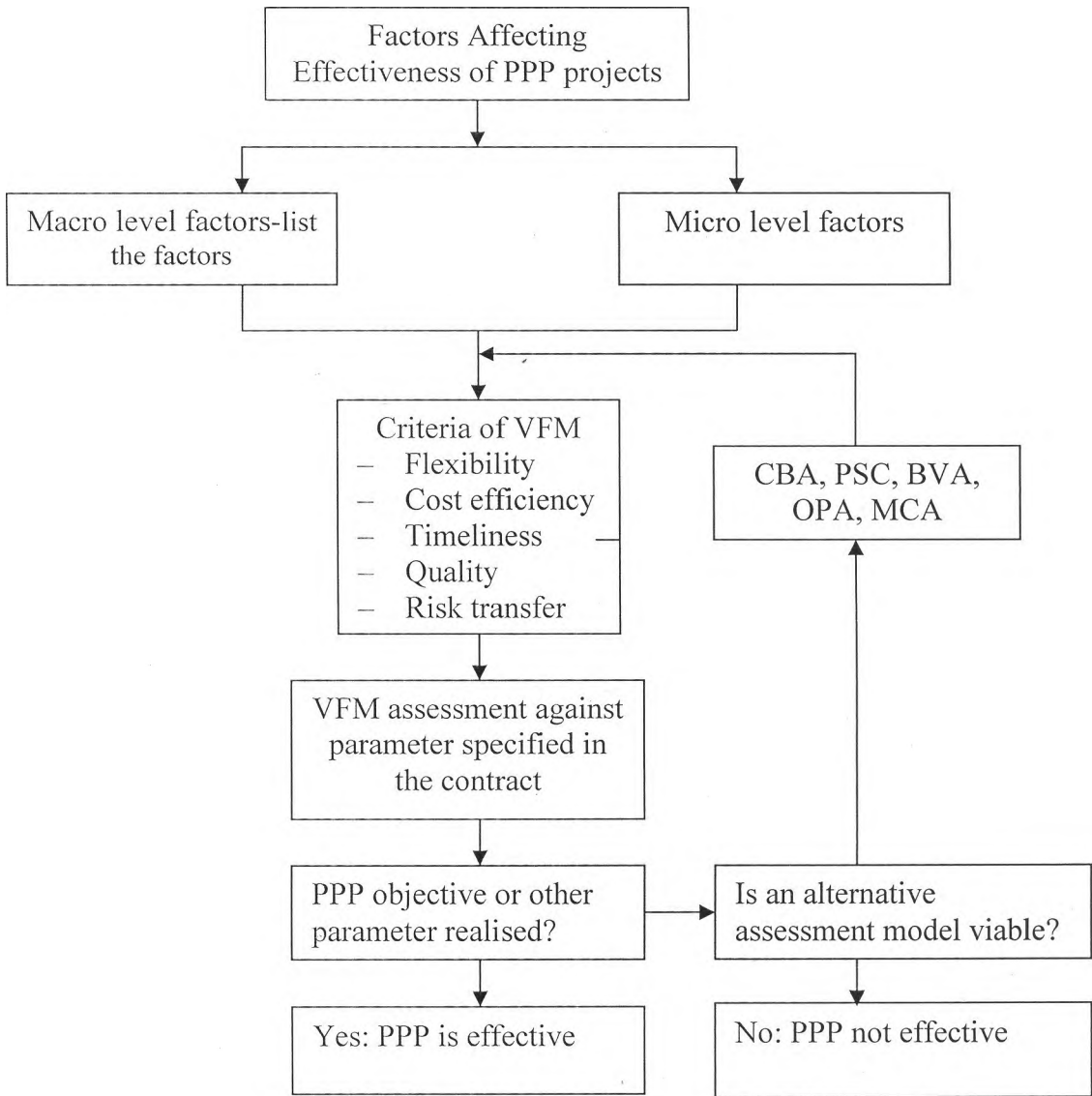
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Appendices

Appendix 1: Conceptual Model for Assessing the Effectiveness of PPPs



Source: Author's Construction.

NB: when PPP is effective when the ex ante objective or a majority of the criteria for VFM are met otherwise it is deemed unsuccessful.

Appendix 2: Defining Characteristics of the Various PPP Models

PPP type	Explanation	Life of the contract
Service contract	Public sector entrusts private companies with providing some services provided traditionally by government such as maintenance of equipment and/or cleaning services and payment for these services are according to contract	1-3 years
Management contract	Public sector entrusts private companies with operating infrastructure or providing management services according to contract.	3-5 years
Design-build-transfer	Private sector designs and builds infrastructure and bears the risks of extension and any additional costs-the standards and the price are set in advance-assets are finally transferred to the public sector	Variable
Design-build-major maintenance	Public sector is responsible for the management of the infrastructure designed and built by the private companies who are also responsible for major maintenance	Variable
Operation and maintenance	Public sector signs agreement with the private sector that will be responsible for operation and maintenance of infrastructure according to contract. Payment is through fees from government	5-8 years
Design build operate	Private companies design build and operate infrastructure projects although ownership remains with the government	Variable
Lease-upgrade-operate transfer	Infrastructure is leased and operated for a certain period by a private company over which it can be upgraded and extended before transfer to the public sector at the end of the contract	8-15 years
Purchase, upgrade, operate transfer	Private companies operate the infrastructure which will be upgraded/extended and possess ownership during the contract which is transferred to the public sector at the contract's end	8-15 years
Build lease operate, transfer	A longrun lease is signed between the public and private sectors. Infrastructure is built by private companies on public land and operated until the private capital is recovered through fees from users. At the end, ownership is transferred to the public sector	25-30 years
Build, own, operate, transfer	Private companies invest, build and operate and own infrastructure until capital is recovered through fees under a concession from the government	25-30 years
Design, build, transfer, operate	Infrastructure is invested in and built by the private sector and transferred to the government at a pre-agreed price. It is then leased and operated by the private sector who through this arrangement avoid ownership risks	25-30 years
Design build finance, operate	Private sector invests and establishes the asset. Public sector provides core services to the asset and private sector provides related services e.g. a hospital	25-30 years
Purchase upgrade operate	Private sector purchases, operates and upgrades assets with view to permanent ownership and the end of the contract under government supervision.	Permanent
Build own operate	Private sector invests, builds and permanently owns asset under terms that secure public interest under government supervision	Permanent

Source: Summarized from literature reviewed.

Appendix 3: Public Private Partnerships Risks

Risk	Definition
Availability risk	The risk that the private sector partner is not in a position to deliver the volume that was contractually agreed upon
Demand risk	The risk that the demand for services from the project may differ from expected
Financing risk	the costs of acquiring the money needed to create and/or operate the project might be higher than estimated
Force Majeure	Project might be damaged by events beyond human control
Operating risk	The operating costs of the project might turn out to be greater than estimated
Political risk	The government might either force modification or cancellation of the project if against public interest due to political consideration
Legal risk	The government might either force modification or cancellation of the project if because of changes in legal procedures and stipulations.
Project risk	The possibility that the capital costs of the project might turn out to be greater than estimated or the project might take longer to create than anticipated
Public policy risk	Changes in public policy might reduce the need for the project
Regulatory risk	The risk of possible changes in regulations that necessitate future modifications
Technical risk	The project might not work as well as expected

Source: Akkawi (2001), pp.3

Appendix 4: roles of partners in the various Types of PPPs

		BOO	BOOT	OM	PFI	Concession	lease	BOT
Operation		X	X	X	X	X	X	X
Finance	private sector financed	X	X		X	X		X
	user charges' recouping					X	X	
	Recouping by contract	X	X	X	X			X
Construction	private asset construction		X		X	X		X
Ownership	public during, after contract			X	X	X	X	
	private during public after		X			X		X
	private indefinitely	X						

Source: Hall, De la Motte and Davies (2003), PP. 5

Appendix 5: Classification of the Drivers of Value for Money in PPP projects

Micro level factors	Macro level factors
<ul style="list-style-type: none">– PPP risks' transferability– PPP's design term of contract– Clarity of PPP contract output specifications– Competitiveness of the PPP contract bidding process– Technical and economic feasibility appraisal through CBA, use of PSC and other criteria– Technical expertise of public sector negotiators	<ul style="list-style-type: none">– The type of the legal framework in place– Institutional quality– Nature of social and economic support of the PPP framework– Nature of the financial markets– Country's previous PPP experiences

Source: Summary of the critical success factors from literature

Appendix 6: Computing the Public Sector Comparator (PSC)

$PSC = \text{Transferable risk} + \text{competitive neutrality} + \text{raw PSC} + \text{retained risk}$:

Where:.

Transferable risk = the value of the risk transferred to the bidder

Competitive neutrality = the value of the competitive advantage that a government business has due to its public ownership

Raw PSC = total costs incurred if the public sector implements the project

Risk = the value of any risk that is not to be transferred to the bidder

Source: HM Treasury (2003), pp.39

Appendix 8: Summary of some of Methodologies Data Analysis cited in the Empirical Literature

Method	Description
Factor Analysis	Factor analysis is a statistical method used to describe variability among observed variables in terms of fewer unobserved variables called factors. The observed variables are modeled as linear combinations of the factors, plus "error" terms. The information gained about the interdependencies can be used later to reduce the set of variables in a dataset. In context this is used in the analysis of the factors that affect the effectiveness of PPP projects
Logit Regression	A model used for prediction of the probability of occurrence of an event by fitting data to a logistic curve. It is a generalized linear model used for binomial regression. It makes use of several predictor variables that may be either numerical or categorical. It is useful in this context because of the various predictor variables in the analysis of the effectiveness of PPP projects.
Ordinary Least Squares (OLS)	The standard linear regression procedure that can be used to estimate a parameter indicating effectiveness of PPP contracts from data and applying the linear model: $y = f(x, \beta) + e$ y is the dependent variable or vector representing a measure of effectiveness of PPP contracts. X is a matrix of independent variables, which are the critical success factors in determination of the effectiveness of PPP contracts. β is a vector of parameters to be estimated, which effectively indicate the nature and strength of the relationship between y and x. e explains the random disturbance term of factors beyond x that have an impact on y. these are assumed to be randomly and normally distributed.
Panel Data Analysis	A method of analyzing data sets that contain observations on multiple phenomena observed over multiple time periods is called. In context it is used for cross sectional and time series analysis of PPP aspects like cost, budgetary targets, benefits, model specifications e.t.c.
Qualitative analysis	The case study analysis tracking factors that affected the effectiveness of PPP projects ex post.

Source: Author's Summary of data analysis methods.

Appendix 9: Contrast between the Characteristics Public and Private Sectors that Necessitate PPPs

Characteristic	Private Sector	Public Sector
1. Risk Perception	<ul style="list-style-type: none"> ▪ The private sector is perceived as more risky than the public sector and their risk measure is often taken as the risk free rate plus a premium indicative of the risk associated with the market segment and the firm itself 	<ul style="list-style-type: none"> ▪ The public sector especially the government is perceived as less risky. In most cases government debt instruments are often used as benchmarks for the risk free level of borrowing.
2. Financial Resource Base and Flexibility	<ul style="list-style-type: none"> ▪ Although individual private firms may have limited resources, on a macro level, the private sector has access to various alternative sources of capital from debt and equity. When backed up by a public sector perceived as less risky with a lower cost of capital, this resource base is greatly magnified. 	<ul style="list-style-type: none"> ▪ Although the public sector has access to relatively large financial resources, the many competing projects for public funding greatly limit the amounts available for each infrastructure project. Public revenue and public debt resources are often inelastic when the economy growth is slow or declining.
3. Operating Motive	<ul style="list-style-type: none"> ▪ They are driven by the profit motive and shareholder wealth maximization aspirations. As a result they are only willing to undertake projects that offer value for investors' money and may not undertake public projects that are necessary but which offer little or no returns. 	<ul style="list-style-type: none"> ▪ The public sector is non-profit driven but provides goods and services largely for the general welfare and common public good. It may invest in projects with low returns but greater public good.
4. Decision Making and Management structure	<ul style="list-style-type: none"> ▪ Characterized by less bureaucratic and lean management structures offer very high flexibility in decision making. They are hence able to quickly respond to changes in the operating environment. This promotes flexibility and timeliness in implementing projects 	<ul style="list-style-type: none"> ▪ They are characterized by bureaucratic and hierarchal management and decision making structures. These may not allow them to offer quick responses to changes in the operating environment. This may hinder the timeliness and flexibility of implementing projects.
5. Political Goodwill		
6. Business Competitiveness		

<p>7. Fiscal Restrictions</p>	<ul style="list-style-type: none"> ▪ The private sector is run by private individuals and corporate motivated by private profits and gains. They lack popular mandate to implement development programs. They possess no political or social goodwill to push through decisions having high negative externalities. 	<ul style="list-style-type: none"> ▪ The public sector is run by governments that often have popular mandate to implement development programs. Accordingly, they possess the political and social goodwill to push through decisions that may be unpopular e.g. clearing settlements to pave way for infrastructure projects.
<p>8. Operation Level</p>	<ul style="list-style-type: none"> ▪ The private sector thrives in a competitive world through enhancing operational efficiency and proving value for customers' money. They therefore promote efficiency in resource allocation. ▪ The private sector is not subject to fiscal policy expenditure and revenue collection restrictions beyond their duty to pay relevant taxes and other government duties. They have options of flexibility in operations hence can finance a wide variety of projects. ▪ They operate on a micro level taking accounting responsibility for each project. The existence of numerous private sector players provides a wide pool of resources that can be tapped for infrastructure financing and development. 	<ul style="list-style-type: none"> ▪ The public sector is often characterized by monopolies created by governments to provide specified services. Lack of exposure to competition may therefore promote efficiency in resource allocation. ▪ The public sector is subject to fiscal policy expenditure and revenue collection restrictions imposed by statutes and parliaments. This places a limit on their ability to finance public infrastructure projects beyond statutory provisions. ▪ The public sector especially the central government operates on a macro level taking accounting responsibility for all public sector projects. The limited public resources limits the pool of resources that can be tapped for infrastructure financing and development.

Source: Author's Summary of the Characteristics Public and Private Sectors.