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UNIVERSITY OF CALGARY

An Examination of Risk Perceptions and Allocation Preferences in
Public-Private Partnerships in Nigeria

by

Olufemi Vincent Tolani

A THESIS

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Abstract

Risk perceptions and allocation preferences are important elements of Public-Private Partnerships (PPP); as the fundamental tension in any negotiation between the public and private sector in PPPs usually comes down to the question: who is responsible for managing a particular risk? Yet research literature suggests that these phenomena have not been adequately studied; hence they remained poorly understood. Particularly within the context of a developing country such as Nigeria: a complex country characterised by shifting socio-political and economic systems, yet bedevilled with huge infrastructure gap. This gap keeps widening especially with Nigeria's burgeoning population, rapid urbanization, dysfunctional institutions and increasing fiscal pressures. This certainly makes the poignant case for a PPP as an alternative procurement method.

To shed light on these phenomena, the research expedition in this thesis empirically answers the following interrelated questions: How do private and public sector partner prefer risks to be shared (or allocated) in PPPs in Nigeria? Second, given that the initial disposition towards risk is the starting point for risk allocation in PPPs, are there significant differences in risk perceptions of different stakeholder groups involved in PPPs in Nigeria?

Research participants (spanning banking, construction, and public sector groups who were selected through a convenience sampling method) completed an online survey with Likert-type items within six months (i.e. between June and November 2011) to gauge probabilities of occurrence, risk impact and risk significance of 46 risk factors pertaining to PPP projects. As data did not meet the assumptions for parametric statistics, Mann-Whitney *U* tests were performed to evaluate the ranked differences in the variables (i.e. 46 risk factors) between private and public sector groups. This study dissects empirically the risk perceptions of stakeholders, confirming homogeneity in risk perceptions contrary to the heterogeneity prediction of agency theory. It was established that there were no significant ranked differences for perceptions of risk significance among various stakeholder groups. Therefore, with homogeneity in risk perceptions among PPP stakeholders (contrary to the theoretical heterogeneity prediction) it was argued that risks are likely to be allocated to the party best capable of managing them in Nigeria; thus PPPs could have a chance to succeed in the country in spite of its weak institutional conditions. The

results further show that the three most important risk factors in Nigeria are: excessive contract variation, construction time delay and construction cost overrun.

Lastly, on risk allocation preferences, this study shows that 27 (59%) out of the 46 risk factors are preferred to be allocated to the private sector, while 8 (17%) risk factors are to be allocated to the public sector and 11 (24%) of the risk factors are to be equally shared between the private and public sectors.

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Dedication

*This dissertation is dedicated to Him who is able to do immeasurably more than all I ask
or imagine....*

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Epigraph

Studying risk preferences is particularly opportune because of recent advances in measuring risk preferences.

(Eisenhardt 1989: 70)

Chapter One: Introduction

1.1 Introduction

All over the world, there is a growing appetite for Public-Private Partnership (PPP) as a vehicle for the delivery of public infrastructure projects. This model is aimed at harnessing private sector capital and efficiency gains by allocating risks to the party best able to manage them optimally¹. Proponents of the PPP model believe that a genuine transfer of risk to the private sector must be done to support the overriding principle that a project must provide value-for-money to the taxpayer. This principle is hinged on the risk transfer argument² that compensates for higher cost of capital used by private sector partners (Akintoye and Beck, 2009 pg. 29). It is widely believed that PPP is an effective approach to enhance infrastructure project delivery by bringing in management efficiency and creative skills from the business world, and reducing public sector involvement by using private sectors in the provision of infrastructure services. In other words, its usage is largely driven by the belief that governments should ‘steer more and row less’ (PPP Conference in Hong Kong, 2009³).

Given that PPP can be viewed as a bundle of rights, obligations and specific allocation of risks among various project participants; at issue in the design of every PPP contractual structure is how public and private partners can price and optimally allocate risks between themselves⁴. In other words, the assessment of risk and who is best able to manage it needs to be carefully considered in the design of PPP contracts. It can therefore be argued that the real success of PPP

¹ In 1992, the UK embarked upon a new type of PPP, known as the Private Finance Initiative (PFI). Under this arrangement, the private sector firms take on the responsibility for providing a public service including maintaining, enhancing or constructing the necessary infrastructure required. The essential feature of PFI is that the infrastructure is built and owned by the private sector, the public sector purchasing the flow of services (directly or indirectly) from the asset rather than the infrastructure asset that provides the services.

² Much of the case for PPP rests on the relative efficiency of the private sector. While there is an extensive literature on this aspect, the theory is ambiguous and the empirical evidence is mixed. However, PPP are more likely to result in efficiency gains that offset higher private sector borrowing costs if they have the following three characteristics: a) the quality of services can be readily defined and measured; b) there is adequate risk transfer to the private sector, and c) there is either competition or incentive-based regulation. See IMF 2006 report titled: “Public Private Partnerships, Government Guarantees, and Fiscal Risk” prepared by a Staff Team Led by Richard Hemming. In general, infrastructure project finance is usually held to be more expensive than public debt; indeed the rates paid by project sponsors are usually higher than rates paid by government debt (Robin, et al. 2010).

³ The root word “to govern” flowing from the concept of “governance” actually means “to steer” as in the “Captain or Governor of a ship.” The PPP model being strategically used by Governments during the past two decades to reform infrastructure sectors and public services, can be understood as changing Government’s role from “rowing” (i.e. directly providing public services itself) to “steering”: now essentially working with private sector “rowers” who will provide services, while Government returns to its core role of “steering,” including monitoring and overseeing the work that private service providers do under various contractual arrangements.

⁴ Bear in mind that it is crucial to have in contracts which party is to bear the financial liability for risks should they eventuate or crystallize.

projects depends on the degree to which risk is genuinely transferred from the public to the private sector and optimally shared (Hodge and Greve, 2005).

Value for Money (VFM)⁵ can be expected to increase initially as risk is transferred to the private sector until the optimum point is reached at which all risks have been allocated to the partner best able to manage them. Any further risk transfer will lead to a decline in VFM (Akintoye, et al. 2003, pg 160) and less than optimal outcomes. Optimal risk allocation therefore seeks to minimise risks to the project by allocating to the party in the best position to control them (Kangari, 1995; Hayford 2006)⁶. In theory, this reduces individual risk premiums and the overall cost of the project, because the party in the best position to manage a particular risk should be able to do so at the lowest possible price (Partnerships Victoria, 2001)⁷.

The questions of risk perceptions and risk allocation preferences in the design of PPP contractual structure are uniquely important in Nigeria⁸. Arguably, the inability to understand and control for certain critical elements in PPP contract design (such as risk perceptions by stakeholders and risk allocation preferences) had accounted for the slow take off of PPP projects in tackling huge infrastructure challenges in the country⁹. For instance, statistical evidence shows that only 51 projects amounting to \$21 billion reached financial and contractual closure between 1990 and 2008 in Nigeria out of which three have been cancelled¹⁰; and not all of the projects were executed using PPPs.

⁵ “Value for Money” means achieving the optimal combination of benefits and costs, in delivering services users want. See for example the United Kingdom National Audit Office Value for Money program website, which defines “good value for money” as “the optimal use of resources to achieve the intended outcomes”. http://www.nao.org.uk/what_we_do/value_for_money_audit/what_is_vfm_audit.aspx

⁶ Risk allocation in the context of PPP means deciding which party to the PPP contract will bear the cost (or reap the benefit) of a variation in project outcomes arising from each risk factor.

⁷.See [http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/RiskAllocationandContractualIssues1-Entire/\\$File/Risk%20Allocation%20and%20Contractual%20Issues1%20-%20Entire.pdf](http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/RiskAllocationandContractualIssues1-Entire/$File/Risk%20Allocation%20and%20Contractual%20Issues1%20-%20Entire.pdf)

⁸ Crucially too, the exercise of risk allocation is one of the most important steps in assessing and developing the bankability of PPP projects. In particular, transferring to the private sector partner the risks that it is better able to control or mitigate can help lower the overall project cost, and improve value for money. However, the more total risk transferred to the private sector partner, the higher the return- or risk premium- the equity investors will require, and the harder it will be to raise debt finance or the less bankable the project will become.

⁹ In Nigeria, the collapse of public infrastructure is obviously one of the most discussed issues by policymakers and concerned stakeholders. Clearly, the challenges are legion: roads have become death traps, epileptic power supply, decrepit rail system, unreliable security system, substandard airports, poor health and educational institutions among others. For instance in the power sector, Nigeria, a country of over 150 million people is still generating less than 3,500 megawatts, whereas Alberta, a province to 3.5 million Canadians is generating about 13,000 megawatts. USA with a population of 308 million people generates 700,000 MW, South Africa generates 40,000 MW for its 50 million people, and Brazil generates 100,000 MW for its 192 million people. See Alberta Electric System Operator’s report titled “Powering Albertans” Volume 4 issue 1, www.allafrica.com accessed on April 20, 2010: report titled “Nigeria: As Power Generation drops to 3,200 MW” and a report presented by Ayo Gbeleyi, Director General – PPP Office Lagos titled “Powering Africa’s Megacity” November 18, 2009.

¹⁰ See-The World Bank’s database on private participation in infrastructure- <http://ppi.worldbank.org/>

Sadly, the problem of existence in Nigeria is the problem of dilapidated nay, non-existent infrastructure¹¹. There is no aspect of life in this country, which is not affected either directly or indirectly by this complex problem. It constitutes one of the most important causes of economic misfortune, engendering poverty, generating social tensions, diminishing productivity in all sectors, lowering the physical and intellectual standards of the nation and hampering increased prosperity in every ramification. The criticality of this infrastructure to the very existence of any nation accounts for the exciting exploration of the interrelationships between infrastructure, growth and institutions in the literature. For example, using cross country estimates, Esfahani and Ramirez (2002) indicate that the contribution of infrastructure services to GDP is substantial and, in general, exceeds the cost of provision of those services.

No doubt, Nigeria is the paradox of penury in the midst of plenty. It is one of the largest oil producers in the World, yet a greater majority of its people still lives below poverty line. Nevertheless, its economy is the second largest in Africa after South Africa and it is still by far the most populous country in the Continent, moreover the eighth largest country by population in the World; thus making it the largest black race nation on Earth.

To attend to huge infrastructure gaps in the country, PPPs are now increasingly being used by both Federal and State Governments in Nigeria. However, this procurement option is still generally evolving as the few PPPs in the country are characterized by delays due to lengthy contract negotiation processes between private and public sector entities with limited PPP experiences (Ahwireng-Obeng and Mokgohlwa, 2002)¹². In spite of these problems however, risk perceptions of stakeholders are strikingly found to be homogenous (contrary to the theoretical heterogeneity prediction); which suggests that, risks are still likely to be allocated to the party best capable of managing them in Nigeria; in spite of its weak institutional conditions. The theoretical explanation for this finding is that the interests of those who participate in PPPs

¹¹ Indeed, infrastructure problems in Nigeria are symptomatic of the situation in other African Countries. In 2009, the World Bank estimated that Africa required \$93bn spent annually on infrastructure, including new investment and maintenance, to close the gap with other parts of the world and meet development targets within 10 years. But currently only around \$45bn is being invested, and in 2010 there were 13 projects in sub-Saharan Africa – compared to 103 for South Asia and 66 for Latin America and the Caribbean (see <http://blogs.ft.com/beyond-brics/2012/05/08/africa-ifc-says-ppp-is-the-abc/#axzz1uOmku0A8> accessed on May 16, 2012).

¹² The inertia of the risk allocation process has led to delayed and costly financial closure and sub-economic costs. Transaction costs of up to 10% have been incurred in documented cases and the situation is exacerbated in developing economies by political and economic instability and unproven track record of PPP.

as private sector stakeholders and those in the public sector (particularly the political leadership) are somewhat interwoven due to the unchecked institutionalized corruption in the country.

In carrying out this empirical study, professionals and public officials in leading public and private institutions with some experience in PPP practices were targeted such as those working with: Lagos State, Federal Capital Territory and bankers with some project finance experience in Nigeria.

1.2 Brief History and Pitfalls of PPPs

The history of PPPs can be traced to the eighteenth century in the USA. Early examples of PPPs include the Lancaster Turnpike, the first long distance stone and gravel road in the country, which was built by the Philadelphia and Lancaster Turnpike Company from 1792-1795; the Erie Canal, which opened in 1823; and the Transcontinental Railroad; completed in 1869 (Smith, 2009). This model of infrastructure development eventually spread to other parts of Europe, Australia, Canada, South Africa and various Asian countries. In recent times, PPP has been used to deliver various public infrastructures such as highway construction, mass transport development, airports, seaports, hospitals, schools and utilities of various kinds in various jurisdictions, including Nigeria. Li and Akintoye, (2003), analyzed the pattern of PPP use across continents. What is striking in their study is that: while PPP is used predominantly in public sector infrastructure developments in developing economies, it is used in the developed economies to deliver various government public services, goods and facilities. The benefits of PPPs stemming from value for money drivers include: the transfer of risks to the private sector, whole-of-life costing, innovation, earlier project delivery and asset utilization, (Hayford, 2006); i.e. PPPs could enhance projects completion on budget and on time¹³.

Despite the wide use and benefits¹⁴ of PPPs across the world, PPPs do have pitfalls; hence they should not be seen as the panacea to the problem of plugging infrastructure gaps¹⁵. Indeed,

¹³ In other words, PPPs have the potential to deliver considerable benefits, such as: value for money; greater expertise and innovation; and assets available for use earlier than would normally have been the case.

¹⁴ The experience of the UK and Australia suggest that one advantage of PPPs in complex projects such as schools, prisons and hospitals is that they get completed on time and closer to the budgeted cost. There are two caveats to be made to this observation. First, this does not mean that a PPP is better than public provision, because these are not the only elements that should be considered on choosing a PPP. Second, because these results can be reproduced with a fixed cost contract with graduated fines and rewards for late or early delivery of the project, implying that the

inappropriate or sub-optimal allocation of risk is not the only challenge with PPPs: other challenges include, lack of political will, incomplete contracts, lack of capacity¹⁶, uncertainty¹⁷, provision of infrastructure facilities at a steep cost (thereby converting hitherto public goods to economic goods), tendency to cut down on costs and compromise on standards with the connivance of highly corrupt public officials who are meant to enforce PPP contracts over a long horizon.

Other inherent challenges of PPPs are listed below:

1. Partners' little confidence (or lack of mutual trust) in each other, thus providing little or no basis for a lasting relationship;
2. Lack of clarity about project objectives and working methods;
3. Conflicting interests of the public and private sectors (goal incongruence);and
4. Lack of clarity about the allocation of responsibilities, rewards, risks and resources.

It has been argued too that PPP ventures are indeed susceptible to business cycles. During the period of economic boom in Japan and other Asian Countries, many ambitious PPP projects stalled after the breakdown of bubble economy (Choe, 2002). In Hong Kong, the government's attempt to use a PPP to develop the vast West Kowloon Cultural District, based on Lord Foster's iconic design that included what was intended to be the world's largest glass canopy, came to an ignominious end and abandonment as a direct consequence of the poor identification and management of the many political risks involved (Hayllar and Wettenhall, 2010).

cost and timeliness advantage of PPPs over public provision is due to ill-designed contracts- see, Fischer,(2011). http://www.theigc.org/sites/default/files/11_0483_wp_igc_fischer_final_2_0.pdf

¹⁵ To be clear, a PPP is not a solution to infrastructure gaps per se, but an alternative procurement method. Infact, almost every PPP project is potentially controversial and thus liable to be subjected to intense political scrutiny and debate; due to their complexity, scale, value and the gestation period required to birth and operate the projects. According to Boardman and Vining, despite the widespread use of PPPs in many countries, both case study and quantitative empirical evidence indicates that many PPPs have had unsatisfactory outcomes. Some of this evidence has concluded that many of the problems ultimately stem from the conflicting goals and motivations of governments and their private-sector 'partners' in PPPs. The empirical support for their analysis comes from many high-quality, peer-reviewed studies of PPP performance and outcomes. Some of these studies simply documented obviously bad outcomes such as strategic behavior, bankruptcy, eventual government take-over or disputes over cost overruns. Others, whether explicitly or implicitly, adopted a social welfare evaluation perspective (2012).

¹⁶ "But the problem is the capacity – understanding what it's really about and how to do it, and the right expectations around it. Everybody says that (PPPs) sounds like a fantastic thing – then they believe if you are a government you are going to get it for free but still do whatever you want. And if you are a company you believe that you are going to get the government to take all the risks and you will have all the profits" Lars Thunell, Chief Executive Officer of the International Finance Corporation (IFC), the investment arm of the World Bank. See, <http://blogs.ft.com/beyond-brics/2012/05/08/africa-ifc-says-ppp-is-the-abc/#axzz1uOmku0A8>

¹⁷ Uncertain is one of the key features of PPPs which makes risk allocation in projects suitable to be viewed from the perspective of Transaction Cost Economics (Jin and Doloi, 2008).

To further draw this point home, it is important to examine PPP pitfalls from the experience of mature PPP jurisdictions such as Chile¹⁸, Australia, Canada and UK to note lessons that might be applicable to Nigeria.

Chile and other Latin American countries have long history of PPPs, but they have been less successful with PPPs than anticipated for three reasons (Fischer, 2011):

1. They do not provide additional financial resources: the investment must be repaid through availability payments and invariably the country still incurs the same obligations as under a loan. Alternatively, the resources are derived from user fees, and in that case the government could potentially have asked for a loan and built the project, and then would have utilized the user fees to pay for the loans. So in terms of this consideration, no fresh financial resources are brought to the table through PPPs.

2. Organizational problems in the PPP unit: in Chile, this eventually led to a corruption scandal that brought an end to the PPP process for several years, while reforms were carried out.

3. Renegotiations of contracts: in Chile also, changes to the original contracts represented 26% of total PPP investments. Since these renegotiations are bilateral, without the element of competition present in the initial award of the PPP, they are expensive and have serious consequences on the sector.

It has not been all without controversies in the UK also, despite her rich experience in Private Finance Initiatives (PFIs)¹⁹. Hellowell and Pollock (2009) examine the issue further using empirical evidence from England's National Health Service (NHS). In their article, they question whether PFI, which under the Labour government has become the UK's dominant source of capital investment for health services, has truly enhanced the public interest by bringing in additional resources and delivering infrastructure and services more efficiently, or whether the high costs of PFI-type PPPs impact on health services in materially negative ways. These authors

¹⁸ Chile has one of the most successful PPP programs among developing countries. Operational investments reached US\$ 11 billion by 2007 and there are several additional billions under construction or soon to be awarded. These investments have substantially improved the infrastructure and reduced transport costs. Nevertheless, in the past it has had to modify its legislation and approach to PPPs twice, to deal with problems related to PPPs, see http://www.theigc.org/sites/default/files/11_0483_wp_igc_fischer_final_2_0.pdf- accessed on May 14, 2012.

¹⁹ UK's variant of PPPs

argue that social welfare losses are in fact more likely with PFIs. This is because the contracts for such projects tend to be incomplete with many of the asset and service inputs not specified or measured, thus giving suppliers incentives to cut costs at the expense of quality. From their analysis of financial data, Hellowell and Pollock come to the conclusion that the questionable politico-economic rationale of PFI has effectively become associated with diminished capacity in England's NHS, thus reducing the provision of health care and consequentially harming the public interest (Hayllar and Wettenhall, 2010).

Canada (a mature PPP jurisdiction by all standards) has its own PPP challenges too. For example, The Canada Line in Vancouver, BC, provides an example of a PPP project that was initially 'sold' to the public on the basis of significant risk transfer to the private sector partners, including revenue risk transfer. However, the final contract resulted in only 10% ridership revenue risk transferred to the private participant. Governments with less experience at PPP negotiations²⁰ seem particularly unable to transfer *any* revenue risk and often end up essentially guaranteeing private-sector profits; see, for example, the Zagreb Wastewater Treatment Plant in Croatia, and the Horgos-Pozega Highway in Serbia (Bacheva-McGrath et al. 2008 cited in Boardman and Vining, 2012).

What are the outcomes in Australia? While the international failure rate of PPPs is assessed by ratings agencies at below 1% of total projects, problems in Australian PPPs have supposedly amounted to around 7%. Problematic issues include those such as under-bidding, over-optimistic forecasts, and inappropriate risk allocation. Other criticisms relate to the higher cost of private capital versus government finance and the lack of transparency and disclosure of the arrangements. One classical example is the *Cross-City Tunnel Tollway in Sydney*: several reports (into the initial operating problems of whose operating arrangements eventually failed in December 2006) recognized that the opening of the tunnel caused 'great controversy' and community discontent. Indeed, a major pitfall for Australian PPPs is that they are regularly perceived not to have achieved their intended promises. As such, the fundamental rationale for government to support PPPs as a procurement choice may be in question (Johnston, 2010).

²⁰ Negotiations are used as a vehicle for reaching a compromise position on how best to allocate project risks between parties.

In summary, it is clear that there are lessons to be learnt from mature PPP jurisdictions; as the practice of PPPs obviously comes with diverse and complex challenges. Nevertheless, PPPs have proven to be the game changers in so many respects; particularly in helping to address urgent and critical infrastructure challenges with international success rate at 99% ²¹of total projects executed²². In broad terms, the critical success factors for these few PPPs are the following: favourable investment environment with predictable legal, regulatory and institutional framework, respect for the sanctity of contracts, economic viability of projects, reliable concessionaire consortium with strong technical strength, sound financial package and appropriate risk allocation via reliable contractual arrangements²³.

1.3. The Rationale for the Choice of Nigeria

Generally, contracting and implementing PPPs in developing countries present some inherent challenges. This is due to the problems of weak institutions, poor democratic cultures, endemic corruption and the absence of strong institutional linkages. To present a balanced discussion on the challenges of contracting and implementing PPPs (of which risk allocation is a key component) it is pertinent to situate the discussions within the context of a developing country. In this thesis, we discuss the problem of risk perceptions and allocation preferences pertaining to PPPs in general, by looking at this problem in the case of Nigeria²⁴ - a complex country characterised by shifting socio-political and economic systems, yet bedevilled with huge infrastructure gap. This gap keeps widening especially with Nigeria's burgeoning population, rapid urbanization, dysfunctional institutions and increasing fiscal pressures.

Our choice of Nigeria is therefore based on the fact that Nigeria is one developing country with strong imperative for PPPs as vehicles for addressing huge infrastructure challenges but with less

²¹ See Johnston, 2010.

²² One study estimates that in excess of 2000 public infrastructure projects have been proposed and/or developed internationally using PPP with a total value in excess of US\$850 billion in the period 1985 – 2004 (see, 2004 International Public Works Financing Projects – Volume 187, Public Works Financing, Westfield NJ USA October 2004 summarised in “Synthesis of Public Private Partnership Projects for Roads, Bridges and Tunnels from around the world 1985 -2004” published by AE Comm Consult Inc).

²³Babatunde, S. et al. (2012) identified nine CSFs in public-private partnerships as follows: competitive procurement process, thorough and realistic assessment of the cost and benefits, favorable framework, appropriate risk allocation and risk sharing, government involvement by providing a guarantee, political support, stable macroeconomic condition, sound economic policy and availability of suitable financial market.

²⁴ See more background details on Nigeria in Chapter Two.

solutions and results. To be clear, due to the well documented problems of endemic corruption and institutional weaknesses, the idea of PPPs in Nigeria is yet to produce as much results as in Canada, UK and the USA.

Sadly, with its relatively little experience in PPPs, the prevailing regulatory framework and the nature of emerging trend in PPP projects serve to wane the expectations that it might be the panacea to the infrastructure challenges in the land. Controversies, project failures and abandonment, protests from the public and allegation of corruption have become the hallmark of many of the projects. Some of the root causes of these challenges are as follows: inadequate legal framework, weak institutional arrangements, inadequate regulatory capacity, lack of transparency, competition and accountability in the bidding process, and lack of continuity in projects as a result of change in regimes (Sotola and Ayodele, 2011). Furthermore, in Nigeria, where institutions are weak and poorly articulated, public institutions responsible for PPPs could be captured and raided by private parties. Risks that are meant to be transferred to the private sector operator may be retained by the public institution, either as a result of corruption or lack of capacity to match the superior negotiation skills of private sector operator. Overall, an exaggerated exposure of the government to risks may also manifest in the form of hidden or contingent liabilities.

In summary, in selecting Nigeria as our example, we bear in mind the strategic importance and strengths of Nigeria as Africa's second biggest economy and the most populous nation in Africa. These strengths should *prima facie* offer potentials for PPPs to thrive, if appropriate structures are put in place. No doubt, Nigeria's success with PPPs would also be crucial to the rest of Africa. Arguably, if Nigeria could take the fullest advantage of PPP opportunities, it would provide appropriate benchmark and an easy reference point for many other African countries that are equally grappling with the challenge of huge infrastructure deficit.

1.4 Statement of the Problem

A clear understanding of the way and manner stakeholders prefer risks embedded in infrastructure projects to be shared and their respective risk perceptions is indeed germane to the success of PPP projects. Corner (in Hodge and Greve, 2005. pg 44) argues that the real success

of PPP projects depends on the degree to which risk is genuinely transferred from the public to the private sector and optimally shared²⁵. Moreover, PPP is generally underpinned by two related principles: transfer of many risks from the public to the private sector and achievement of value for money. The transfer of risks must be done optimally otherwise the VFM goal will be threatened: because appropriate risk allocation between the public and private sectors is crucially the key to achieving value for money on PPP projects.

It is well recognised that the imperfect allocation of risks constitutes one of the primary causes for the failures of private sector participation (Marques and Berg, 2009) or for its success when it is done adequately (Murphy, 2008).

More importantly, inappropriate risk allocation can ruin the value for money proposition because the measures of the whole-of-life project cost are highly sensitive to the allocation of risks. If risks rest inappropriately with the public sector, government would raise taxes or curtail public services to pay for its obligations when the risks crystallize. Inappropriate risk allocation can equally raise the costs of capital as well as tariff levels in the investment (Medda, 2007). Also, if risks rest inappropriately with the private sector, excess premiums would be charged to the government or even directly to the end users of infrastructure services (Thompson and Perry, 1992, Akintoye et al. 2003, pg 124).

To be clear, the following four conditions must be satisfied to determine whether project risks have been allocated appropriately or not (Ward and Chapman (1991), Edwards (1995), and Flanagan and Norman (1993) all cited in (Abednego and Ogunlana, 2006) :

- Risk should be allocated to the party with the best capability to control the events that might trigger its occurrence.
- Risks must be properly identified, understood and evaluated by all parties.
- A party must have the technical/managerial capability to manage the risks.

²⁵ As a study report acknowledges, *risk allocation is a major problem throughout*: from early in the construction phase; and then through the life of the PPP arrangement. For example, 61% of participants surveyed indicated dissatisfaction with risk allocation (such as delays, site conditions, approvals), particularly as risk almost universally shifts from government (the principals) to the private sector (the agents) see, Johnston, J. (2010).

- A party must have the financial ability to sustain the consequences of the risk or to prevent the risk from occurring.

More crucially too, the concept of risk transfer that lies at the heart of the rationale for partnerships is problematic, regardless of whether the project is ‘successful’ or not (Shaoul, 2009). Risk management should therefore involve a detailed examination of what can go wrong, what to do about it and who has responsibility for doing what. For the public sector partner, the risk management objective is to identify, quantify and transfer appropriate risks based on the principles of VFM²⁶ and allocation of risks to party best able to manage them; whereas the goal of the private sector is to assess and price transferred risks, to allocate and flow-down those risks to the appropriate consortium member, and to manage and control those risks (Akintoye, et al. 2003, pg 154). Also at a more general level, the goal of the private sector is profitability while the goal of the public sector is efficiency in delivering public sector objectives. *These varying objectives (in theory, could lead to varying risk perceptions) have therefore led to conflicting allocation preferences between public and private sector partners thus leading to a lengthy PPP contract negotiation process or PPPs that are potentially flawed.*

The only previous attempt to study this phenomenon empirically in the context of Nigeria shows the following allocation preferences: the majority of endogenous risk factors could be assigned to the private sector partner, the public sector should retain political and site acquisition risks, while relationship-based risks should be shared between private and public sector partners (Ibrahim et al. 2006). This study however did not incorporate the views of project financiers (i.e. consortium of lenders to PPP projects, which is a key private sector group). Therefore, this topic remains grossly understudied and under researched in the context of Nigeria; a country with a huge opportunity for PPPs owing to its dilapidated nay, non-existent infrastructure.

²⁶ Discussing the VFM methodology is beyond the scope of this thesis, but a great deal of information is publicly available on how various governments go about it (see for example, Partnerships Victoria, 2001, 2003b; South Africa, National Treasury 2004b; United Kingdom, Her Majesty’s Treasury 2006 all as cited in Farquharson et. Al 2011).

1.5 Research Questions and Hypotheses

According to Cooper and Schindler (2006) the research questions are the choices that best capture the purpose of the research study; therefore the following questions will be answered in this study.

a. How do private and public sector partner prefer risks to be shared (or allocated) in PPPs in Nigeria?

b. Are there significant differences in risk perceptions of different stakeholder groups involved in PPPs in Nigeria?

To empirically answer question (b) above, the following hypotheses were formulated for testing using Mann Whitney U test.

1a. Alternative hypothesis: - There are no significant differences in the risk perceptions between private and public sector partners in Nigeria.

1b. Null hypothesis. There are significant differences in the risk perceptions between private and public sector partners in Nigeria.

2a. Alternative hypothesis: - There are no significant differences in the risk perceptions between private sector parties and the bankers to PPPs in Nigeria.

2b. Null hypothesis. There are significant differences in the risk perceptions between private sector parties and the bankers to PPPs in Nigeria.

3a. Alternative hypothesis: - There are no significant differences in the risk perceptions between public sector parties and the bankers to PPPs in Nigeria.

3b. Null hypothesis. There are significant differences in the risk perceptions between public sector parties and the bankers to PPPs in Nigeria.

4a. Alternative hypothesis: - There are no significant differences in the risk perceptions between parties with varied PPP experience and knowledge in Nigeria.

4b. Null hypothesis. There are significant differences in the risk perceptions between parties with varied PPP experience and knowledge in Nigeria.

5a. Alternative hypothesis: - There are no significant differences in the risk perceptions between parties with varied management experience in Nigeria.

5b. *Null hypothesis.* There are significant differences in the risk perceptions between parties with varied management experience in Nigeria.

1.6 Nature of the Study

The purpose of this quantitative study was twofold: (a) to show how stakeholders involved in PPPs prefer risks to be allocated and (b) to compare stakeholders' perceptions of risk significance of 46 risk factors. The study was comparative and nonexperimental in design, with no manipulation of variables or random assignment of participants. Responses were received from 45 participants with varied interest and/or experience with PPPs and the survey was administered between June and November 2011. In all, 285 professionals in the Nigerian PPP space were invited to participate in the study.

The independent variables were the risk factors (46 risk factors pertinent to PPPs). The dependent variables were the following: stakeholder groups, management level experience, and PPP experience. To provide measurements for these variables, participants completed the electronic survey designed for this study (see Appendix A for an extract from the full survey). The survey contained questions on probability of occurrence and risk impact for each of the 46 risk factors.

For this study, nonparametric statistics were used to analyze the data. Mann-Whitney U tests, rather than independent sample t tests, were performed to evaluate the differences between the perceptions of groups in terms of the dependent variables.

1.7 Significance of the Study

It is important for both the public and private sectors to fully understand the various risks associated with PPPs throughout the whole life cycle of infrastructure projects, the significance of these risks and how best to allocate them to guarantee long-term success of partnerships. However, previous research has indicated that even on the largest PPP projects, risk management practices are highly variable, intuitive, subjective and unsophisticated (Akintoye et al. 2001). The purpose of this study is to bridge this gap by identifying risk allocation preferences and perceptions of risk significance by different stakeholders, particularly in the context of Nigeria; a developing country characterised by high levels of poverty, inequality, huge infrastructure gaps, yet has limited experience in PPPs.

The findings of the research could serve as the baseline for the various stakeholders (public and private sector organisations) in preparing an effective practical risk allocation framework and matrix for use in bidding and filing document, thus saving time in negotiation and contract transaction (Ibrahim et al. 2006). Moreover, the findings would help to influence public policy development toward PPP and the way in which stakeholders can implement PPP contracts with due regard to their risk perceptions.

1.8 Dissertation Process and Structure

Chapter two reviews the literature on key issues pertinent to the dissertation topic, including types of infrastructure projects, risk factors in PPPs, risk perceptions, risk allocation preferences, agency and contract theories; Chapter three reviews the Nigerian context and macroeconomic risks facing PPPs; Chapter four describes the selected research methodology with data collection issues and an analysis of the findings; Chapter five articulates the results and major findings from the survey including detailed hypotheses testing using Mann Whitney tests; while the final Chapter discusses the summary, implications, conclusion and recommendations for future research.

1.9 Summary

Despite a long history of PPPs implementation, many jurisdictions are still unclear of risk perceptions and allocation preferences of stakeholders in PPP infrastructure projects, thus leading to very lengthy contract negotiation processes. Although the need to allocate project risks ex-ante is well understood, the framework for risk allocation is however poorly understood or often ignored in most PPPs. Hence, this chapter lays out a clear approach used in this study to address this gap: i.e. with a research expedition that seeks to empirically answer two related and equally germane research questions.

Overall, this chapter provides a brief discussion on the main areas of this research project. This includes a concise history and pitfalls of PPPs, statement of the problem, research questions, methodology and hypotheses tested in this study. The significance of the study is also highlighted. This chapter concludes with a description of the dissertation process and structure.

Chapter Two: Literature Review and Hypotheses

2.1 Introduction

Essentially this literature review is focused on acquiring comprehensive background knowledge about the various risk factors that relate to infrastructure projects. It also dwells on the results of empirical studies done in this area in the past and the gaps in these studies. The analytical review of the literature provides the best opportunity to explore the various risk factors, different categories cum classifications of these risks, risk allocation preferences and risk perceptions of stakeholders. For this purpose, various contemporary and previous research papers were reviewed.

This chapter kicks off with the definition of key concepts used in this study and later focuses on answers to the following questions:

- 1) What are risk perceptions and how do they impact risk allocation preferences?
- 2) What are infrastructure project risks and how have they been categorized in the literature?
- 3) What are risk allocation preferences in PPPs and what predictions can be made?

2.1.1 Infrastructure

Investment in infrastructure is said to provide: ‘basic services to firms and households’, ‘key inputs into the economy’ and ‘a crucial input into economic activity’ (Grimsey and Lewis, 2004). In theory, the right kind of infrastructure project boosts the long-term productive potential of an economy and pays for itself- at the same time providing much-needed jobs in the short-term (The Economist, December 3, 2011).

While there would be general agreement that tangible capital assets such as roads, bridges, streets and tunnels are infrastructure, others would cast the net much wider (Grimsey and Lewis, 2004). There are various ways infrastructure is categorised in the literature. Grimsey and Lewis (2004) in particular describe four categories:

Hard Economic Infrastructure such as roads, motorways, bridges, ports, railways etc. is considered to provide key intermediate services to business, industry, (even to consumers and households) and its principal function is to enhance productivity and innovation initiatives. It should be noted that when procuring highway projects and (indeed other hard economic

infrastructures), governments have two options for underwriting capital spending: tax revenues or user fees (G. Smith & Ogden, 1996). Even when debt financing option is explored for underwriting government capital spending on hard economic infrastructure, loan repayments would still have to come from tax revenues and/or user fees.

Soft Economic Infrastructure includes vocational training, financial facilities for business, the facilitation of research and development, technology transfer and organisations encouraging export orientation.

Hard Social Infrastructure such as hospitals, schools, water supply, housing, sewage etc. is seen as providing basic services to households and thus serves to improve the quality of life and welfare in the community, especially among those of limited means. It should be noted that some of these are sometimes provided by private sector bodies (e.g. hospitals and schools).

Soft Social Infrastructure takes the form of the social security system, a range of community services and environmental protection agencies.

According to Grimsey and Lewis (2004), the distinction between ‘economic’ (hard or soft) and ‘social’ (hard or soft) may be a useful one for organizing thinking about infrastructure policy, although these categories do overlap. Some forms of social infrastructure such as those that enhance the skills, health, productivity and morale of the work force and the quality of life may have as much impact on the productivity of business and industry as economic infrastructure. Economic infrastructure such as roads can impact on the quality of life, even if this is not the intent.

Generally, infrastructure has a number of inherent characteristics, which altogether cast doubt on the viability of private sector cum competitive provision despite the fact that some infrastructure is privately owned and operated. These include: a) the presence of network services, providing activities that bind economic activity together; b) the provision of public goods (generally, competitive markets will tend to under produce this kind of goods); c) the presence of network externalities; d) economies of scale with the tendency to give rise to natural monopolies; and e) large investment capital requirements; due to the large scale and scope of most infrastructure projects (Grimsey and Lewis, 2004).

The impact infrastructure could have on growth and poverty reduction is well documented and thoroughly understood. Specifically, the World Bank in 1994 found evidence which overall

confirmed that the role of infrastructure in growth is substantial, and frequently greater than that of investment in other forms of capital (Grimsey and Lewis, 2004).

2.1.2 Public-Private Partnership Model

PPP is an approach where the public and private sector collaborate to deliver a public service or infrastructure. In this arrangement, normally both the public and private sector will contribute their expertise and resources to the project and share the risks involved. Akintoye (2006) defines PPP as “a contractual agreement of shared ownership between a public agency and private company, whereby they pool resources together and share risks and rewards to create efficiency in the production and provision of public or private goods”.

PPPs are based on a partnership arrangement, where the responsibility for the delivery of services is shared between the public and the private sectors, both of which bring their complementary skills to the venture. Moreover, PPPs bring together public and private sectors in a long term relationship, with the private sector moving on to become a ‘long-term service provider’ rather than a ‘simple upfront asset builder’: a ‘partner’ rather than a ‘contractor’.

Finally, the National Council for Public-Private Partnerships in the USA defined PPPs expansively as follows:

‘A Public-Private Partnership is a contractual agreement between a public agency (federal, state or local) and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public. In addition to the sharing of resources, each party shares in the risks and rewards potential in the delivery of the service and/or facility (2011)²⁷.

The definition of PPP may differ slightly between different jurisdictions, depending on which part of the arrangement the importance is focused on. But in general and for the purpose of this dissertation, a PPP can be defined as: *any arrangement and/or agreement where the public and private sectors work together to deliver a public project or render an infrastructure service (hitherto being rendered or provided exclusively by the government); and this will entail the sharing of risks, rewards, resources and responsibilities (4Rs) for actions and outcomes on a long-term basis.*

²⁷ See <http://ncppp.org/howpart/index.shtml#define> - accessed on May 09, 2011

It must be noted at this juncture, that NOT all projects are suitable for PPPs. However, when considering whether a certain project or public service should be provided publicly or privately or through PPP we must consider the following.

- a) Public Goods: Does this good have the properties of a pure public good? i.e. non-rival in consumption and non-excludable; where nonexcludable for instance means that it is too expensive to maintain a system that collects payments for access to the good e.g. the use of public street light. Non-rival for instance means one person's consumption of them does not prevent anyone else's. For example, no one in a population can be excluded from benefiting from a reduction in the crime rate due to more efficient policing of a country, and one person benefiting from this reduction in the crime rate does not prevent anyone else from benefiting from it as well.
- b) Externalities: Are there any positive or negative externalities involved? These could lead to insufficient or excessive levels of production of the good from the social perspective.
- c) Monopoly Power: Can a competitive market exist for this good? It is worth mentioning that the first theorem of welfare economics validates the view that all things being equal, competitive markets produce efficient outcomes without government intervention.

In summary, monopoly power, externalities, and the nature of public goods are causes of market failure that will not make the provision of certain public goods attractive to the private sector; these factors also place potential constraints on improving social welfare²⁸.

To be sure, market failure as we address it in this thesis refers to a condition under which the market, underinvests from society's standpoint in a particular piece of infrastructure. Such underinvestment occurs because conditions exist (monopoly power etc.) that prevent entities from fully realizing or appropriating the benefits created by their investments. In our brief reference to market failure as it pertains to PPP, we essentially reiterate and apply the seminal work of Arrow (1962). This thesis submits that the root causes of market failure somewhat encourage governments to provide mechanisms to address them in practical terms: PPPs and various cash transfer policies are arguably part of these mechanisms.

²⁸ It is well known in welfare economics that the Theory of the Second Best (by showing how any policy designed for improving social welfare that only corrects some constraints) may not result in social welfare improvement per se.

Even with PPPs, some projects may not make any commercial sense unless government still supports them with some Viability Gap Funding (VGF). The non-viability of an infrastructure project may be due to technical and market risk and because of appropriability issues - key elements of market failure-; these may happen where firms may perceive that their expected rate of return had they pursued the infrastructure projects in the absence of viability gap funding would have been less than their required rate of return. The VGF provided by governments to these projects serves to reduce risks to the private firm²⁹.

2.1.3 Risk Classifications in PPP Projects

Oxford English Dictionary defines risk as a ‘chance or possibility of danger, loss, injury etc.’ It is generally the chance of something happening that will have an impact on agreed or stated objectives.

According to the European Union (EU) Guidelines for Successful Public and Private Partnerships (2003), “risk can be defined as any factor, event or influence that threatens the successful completion of a project in terms of time, costs or quality”.

Risks can therefore be characterized by three factors:

- a) The event- i.e. the possible occurrence that would affect the outcome of a project (i.e. the 46 risk factors),
- b) The likelihood (probability) of the event happening; and,
- c) The impact of the event occurring (financial, social, political etc.).

Frank Knight in his classic 1921 treatise distinguished sharply between one type of situation, which he called “risk”, and another situation altogether, which he christened “uncertainty”. In both situations, the future outcome is not predictable with certainty: but in the case of risk, probabilities of the various future outcomes are known (either precisely mathematically, or from past experience in similar situations); whereas in the case of uncertainty, the probabilities of the various future outcomes are merely “wild guesses”.

The idea of risk is embedded, of course, in the larger idea of choice as affected by the expected return of an alternative. Virtually all theories of choice assume that decision makers prefer larger

²⁹ See more excellent discussion of market failure as it pertains to PPPs in: Link and Scott (2001).

expected returns to smaller ones, provided all other factors (e.g., risk) are constant (Lindley 1971). In general, they also assume that decision makers prefer smaller risks to larger ones, provided other factors (e.g., expected value) are constant (Arrow 1965). Thus, expected value is assumed to be positively associated, and risk is assumed to be negatively associated, with the attractiveness of an alternative (March and Shapira, 1987).

There are different categories of risk factors analysed in the literature. There are risk factors categorised according to typical life cycles of PPP projects: Design, Engineering and Construction (DEC) phase, start-up phase and operations phase. There are sets of risks that are usually associated with these different phases. DEC phase is usually subject to the highest level of risks, while the operations phase is usually the phase with the least risks. Robin et al. (2010) argues that this accounts for the sources of finance change over PPP project's life cycle; usually from equity and bank loans during construction to a greater reliance on bond financing during operation. The changing sources of finance match the evolving pattern of risks and incentives over the life cycle of infrastructure projects.

In general, two major types of risk categorization can be drawn from the literature (Xenidis and Angelides, 2005): the first is according to the lifecycle phase that a risk occurs during the concession period; and the second is according to the source of each risk.

Consequently, Grimsey and Lewis (2004) identified at least nine risks that face any infrastructure project:

1. Technical risk, due to engineering and design failures;
2. Construction risk, because of faulty construction techniques and cost escalation and delays in construction;
3. Operating risk, due to higher operating costs and maintenance costs;
4. Revenue/demand risk, e.g. due to traffic shortfall or failure to extract resources, the volatility of prices and demand for products and services sold (e.g. minerals, office space etc.) leading to revenue deficiency;
5. Financial risks arising from inadequate hedging of revenue streams and financing costs;
6. Force majeure risk, involving war and other calamities and acts of God;
7. Regulatory/political risks, due to legal changes and unsupportive government policies;
8. Environmental risks, because of adverse environmental impacts and hazards;

9. Project default, due to failure of the project from a combination of any of the above.

They broadly categorized these risks into global or elemental. Global risks are those risks that are normally allocated through the project agreement and typically include: political, legal, commercial and environmental risks. Elemental risks are deemed as those associated with construction, operation, finance and revenue generation components.

Li et al. (2005) propose a meta classification approach based on three levels of risk factors for PPP/PFI projects. The three levels comprise: macro level risks; meso level risks and micro level risks. The macro level of PPP/PFI risk comprises risks sourced exogenously, i.e., external to the project itself. The meso level of PPP/PFI risk includes risks sourced endogenously, i.e., risk events and their consequences occurring within the system boundaries of the project. The micro level of PPP/PFI risks represents the risks found in the stakeholder relationships formed in the procurement process, due to the inherent differences between the public and private sectors in contract management. These are also endogenous risks, but differ from meso risks in that they are relationship-based rather than project-based. In all, 46 risk factors were identified: 17 macro level risks, 21 meso level risks and 8 micro level risks (see Table 1 below).

A Nigerian study by Ibrahim et al. (2006) identified 61 risk factors from the literature and classified them into exogenous and endogenous. Their results show that the three most important PPP risk factors in Nigeria are “unstable government”, “inadequate experience in PPP” and “availability of finance”.

In a more recent study by Ng and Loosemore (2007), risks were simply categorized into general risks and project risks. Project risks arise from the way a project is managed or from events in its immediate microenvironment.

On the other hand, general (i.e. macro level, exogenous and global) risks are not directly associated with project strategies, yet can have a significant impact on its outcome. These normally arise from natural, political, regulatory, legal and economic events in the general macro environment surrounding the project.

It should be noted that while a generic list of project risks may be applicable to most PPP projects, each project would also have its unique risks. However in general, project risks could be distilled into three broad categories: exogenous risks (global or macro level risks which are

external to the particular project under consideration), endogenous risks (events and consequences which occur within the system boundaries of the infrastructure project under consideration) and behavioral risks (risks which are inherent in the relationship between the public and private partner regarding the project).

Behavioral risks have been further decomposed into relational risk (the possibility of opportunistic behavior that could arise in the form of ‘shirking, cheating, distorting information, appropriating resources, and so on’ (Das and Teng 2001) and performance risks (the possibility that partners fail to work or neglect to work for the best interest of the partnership without being opportunistic but due to various other factors including uncertainties in the political, social, technological and economic environments, and complexity associated with decomposing and integrating activities related to the project (see Das and Teng 2001; Langfield-Smith 2008; Dekker 2004; Gulati and Singh 1998).

Generally, the issue of risk classification in PPPs has followed a consistent pattern in the literature and the understanding of this classification is germane to how risks are eventually allocated between stakeholders in PPPs.

2.1.4 Risk Management Process for PPP

The Australian/New Zealand Risk Management Standard (AS/NZS 4360:2004) defines risk management as ‘the culture, process and structure, which come together to optimise the management of potential opportunities and adverse effects.’ More recently, the International Standard Organisation (ISO) 31000 broadly defines risk as: “the effect of uncertainty on objectives”. The standard views risk as the consequence of an organization setting and pursuing objectives against an uncertain environment. The uncertainty arises from those internal and external factors and influences that it does not completely control but that may cause the organization to fail to achieve its objectives or may cause delay. In the context of PPP, risks are often more pronounced due to the gestation period of projects that are executed usually under contractual arrangements between public and private sector partners. It should be noted that the longer the term of the PPP contracts, the more likely it is that variations from assumptions and objectives will occur.

Generally, the approach to managing risks involves: identification of the context (i.e. considering the social, political and economic environment for the project), identification of the risk, assessment of the risk, response and control of risks- which includes: avoidance, prevention, transfer, retention and reduction³⁰.

Traditionally, a standard risk management process follows three steps: risk identification, risk analysis or measurement or assessment (in PPP projects, this step is rather less scientific than might be imagined; the client identifies risk in three parts: the risk associated with construction cost, resources cost and delivery risks ;) and risk mitigation.

Risk mitigation strategies (finding solutions to counter risks) can be further divided into risk avoidance, risk reduction, risk shifting or transfer, and risk retention. Although, these four risk mitigation strategies can help to manage uncertainty, they presume a certain degree of losses as a starting point³¹. For instance, some risks can be transferred and mitigated through the use of: sub-contract, guarantees, bid bonds, performance bonds, surety bonds and insurance. In practice, there is usually a flow-down or cascade of many risks from the Special Purpose Vehicle (SPV) to other parties such as the sub-contractors, insurers etc. because the lenders do not want the SPV to bear significant risks.

2.3 Theoretical Framework on Risk Perceptions and Hypotheses

Risk perception refers to the way in which individuals intuitively see and judge the level of risk associated with a particular exposure or hazard. In general, risk perception is influenced by many factors like level of experience, the stake or profit expected from the project, geographical region and values and the level of risk communication transmitted through the news media or other sources of information related to a particular exposure or hazard. Essentially, the criticality of risk is often perceived differently by the project participants based on their involvement, capability of management and level of investment and return from a project. When risk

30 The ISO 31000 definition of risk shifts emphasis from past preoccupations with the possibility of an event (something happens) to the possibility of an effect and, in particular, an effect on objectives

31 In terms of taking mitigating action on risks, they may be classified in the following ways:

–Compensation events: whereby the government will compensate the private sector (Project Company) for the effect of those risks;

–Relief events: where the private sector is not penalized for failure, but is not paid either;

–Force majeure: (also called “Acts of God”), where although neither party is at fault, the effect is so catastrophic (and cannot be addressed through insurance), that the contract has to be terminated

criticality³² and capability of risk management of project participants are perceived differently, the risk allocation becomes a difficult task (Thomas et al.2003). In other words, risk perceptions could potentially shape risk allocation preferences of stakeholders in PPPs. Risk perceptions therefore matter to risk allocation preferences. In part because they take into account probabilities, the impact of risky events and the preferences to take risks by parties. Essentially, risk perceptions boil down to the risks we think as most important (viewed from the probability that they occur and size of loss if they should occur). These two variables have been used extensively in the empirical section of this study i.e. through the questionnaire administered on PPP players.

On the other hand, risk preferences deal with tastes and they show up in choices being made by players in terms of risks they are willing to manage in PPPs or extent of risks that should be transferred by the government to the private sector players in PPPs. For example, the preference would be for the private sector players to over price risks they are willing to accept from the government in order to optimise their returns in PPPs; while government would like to shift as many commercial risks as possible to the private sector players and tend to underplay the impact of risks that are within the control of government; for example, uncertainties associated with a change of regime that is common with most established democracies. The preferences of the private sector would be influenced by the quality of institutions that could help to ensure some degree of continuity in long term PPP projects when new governments get to power. It is important to note however that neither of these two groups have an easily derived aggregate preference function.

In line with the core argument in this thesis, due to the homogeneity in risk perception among project participants in Nigeria, the principle of allocating risk to the party best capable of managing the risk is likely to be followed. A survey research carried out by Touche (1989) has indicated that contractors' risk perception is influenced by many factors such as expected return, government's commitment (political will), costs of tendering and long-term equity interest. At a much broader level therefore, risk perceptions are affected by taste, role, probabilities (shaped by

³² Critically (or risk significance) is assumed to be the combined effect of probability of occurrence and the impact of occurrence of the risk – this definition was strictly followed in the design of the questionnaire sent to participants.

trend or precedents), and experience of stakeholders. Specifically, Thomas et. al. (2003) show that risk perception is connected to behavior patterns, also seen to be country specific, i.e. connected to national culture.

In Nigeria, the quality of institutions and unclear bifurcation of roles between private and public sector stakeholders are important factors that shape risk perceptions in PPPs. With a highly dysfunctional institutional setting, and a deeply uncertain operating environment, it is expected that private sector players might want to demand for high risk premiums on PPP projects. On the other hand, while clear bifurcation of roles is required to enable stakeholders on both sides of the divide to have different risk perceptions, due to corruption and the convergence of interests that could occur as a result of politicians (or public sector officials) having interests in business ventures that bid for PPP projects, risk perceptions may appear homogenous.

Using March and Shapira model (1987), perceptions toward risk are usually pictured as stable properties of individuals, perhaps related to aspects of personality development or culture (Douglas and Wildavsky 1982); and efforts have been made to associate risk perception with dimensions of personality, such as achievement motivation (McClelland 1961; Atkinson 1964; Kogan and Wallach 1964).

Global differences between presumed risk takers and others within a culture or job have, however, remained relatively elusive. For example, Brockhaus (1980) attempted to study the risk taking propensities of entrepreneurs. The individuals who quit their managerial jobs and became owners of business or managers of business ventures were compared to regular managers. Using the choice dilemma questionnaire of Kogan and Wallach (1964), he found no differences in risk propensity among the different groups (confirming homogeneity of risk perception). It is possible that risk perception is partly a stable feature of individual personality, but a number of variable factors such as mood (Hastorf and Isen 1982), feelings (Johnson and Tversky 1983), and the way in which problems are framed (Tversky and Kahneman 1981) also appear to affect risk perceptions and general attitudes toward risk. In particular, Kahneman and Tversky (1979) have observed that when dealing with a risky alternative whose possible outcomes are generally good (e.g., positive monetary outcomes), human subjects appear to be risk averse; but if they are dealing with a risky alternative whose possible outcomes are generally poor, human subjects tend to be risk-seeking. This pattern of context dependence is familiar to students of risk taking by

animals (Kamil and Roitblat 1985), individuals (Griffith 1949; Snyder 1978; Laugh-hunn, Payne and Crum 1980; Payne, Laughhunn and Crum 1981), and organizations (Mayhew 1979; Bowman 1982). It forms the basis for several modern treatments of context-dependent risk taking (Maynard Smith 1978; Kahneman and Tversky 1979; Lopes 1987; March 1988, all cited in March and Shapira, 1987).

In the context of PPP, based on the risk aversion assumption embedded in agency theory, the hypothesis of this study is that of heterogeneity in risk perceptions of various parties to PPPs- bankers, private and public sector partners in Nigeria. It is hypothesized that the risk perceptions of these groups will be significantly different, such that the private sector partners (agents) will be more risk averse than the public sector partners (principal). Thus the following hypotheses on risk perceptions were tested:

1a. Alternative hypothesis: - There are no significant differences in the risk perceptions between private and public sector partners in Nigeria.

1b. Null hypothesis. There are significant differences in the risk perceptions between private and public sector partners in Nigeria.

2a. Alternative hypothesis: - There are no significant differences in the risk perceptions between private sector parties and the bankers to PPPs in Nigeria.

2b. Null hypothesis. There are significant differences in the risk perceptions between private sector parties and the bankers to PPPs in Nigeria.

3a. Alternative hypothesis: - There are no significant differences in the risk perceptions between public sector parties and the bankers to PPPs in Nigeria.

3b. Null hypothesis. There are significant differences in the risk perceptions between public sector parties and the bankers to PPPs in Nigeria.

4a. Alternative hypothesis: - There are no significant differences in the risk perceptions between parties with varied PPP experience and knowledge in Nigeria.

4b. Null hypothesis. There are significant differences in the risk perceptions between parties with varied PPP experience and knowledge in Nigeria.

5a. Alternative hypothesis: - There are no significant differences in the risk perceptions between parties with varied management experience in Nigeria.

5b. *Null hypothesis.* There are significant differences in the risk perceptions between parties with varied management experience in Nigeria.

2.4 Risk Allocation Preferences

A core principle of any PPP is *the allocation of risk to the party best able to manage it at the least cost.* The aim is to optimize rather than maximize risk transfer, to ensure that best value is achieved (EU Guidelines, 2003). A schematic process of negotiation for risk allocation is presented in Figure 1 below.

A party must be willing to accept a risk based on risk pricing and subsequent negotiations on risk allocation. It bears mentioning, therefore, that one of the critical ‘Value for Money’ (VFM) drivers in a PPP transaction is the transfer of risks to the private sector (others are, whole-of-life costing, innovation, earlier project delivery and asset utilization, Hayford, 2006). However, this transfer of risk comes at a price, and attempts to transfer risks which the public sector is better placed to manage than the private sector can damage the VFM proposition of a PPP transaction. The transfer will only improve VFM if the price charged by the private sector to manage the risk is less than what it would cost government to manage the risk itself.

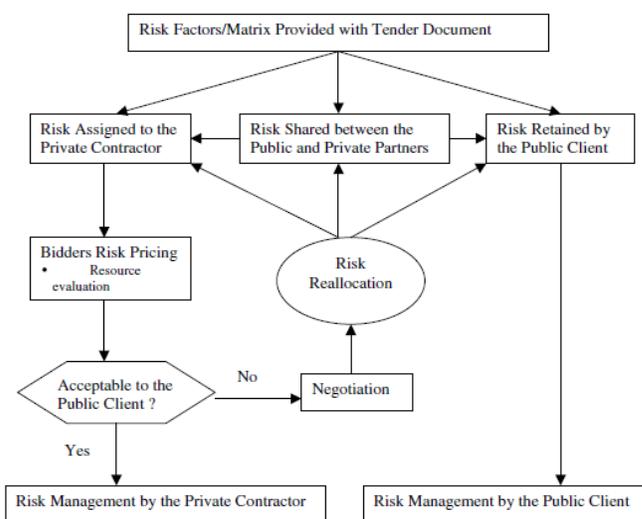


Figure 1: Risk Allocation Process in PPP/PFI (Li et al. 2005)

It is posited therefore that the notion of risk pricing in PPP transactions largely depends on risk perceptions of partners, such that if their risk perceptions and allocation preferences are materially different, it may lead to a lengthy negotiation process on risk allocation. This lengthy process will require extensive analysis and the outcome will be the allocation of a broader spectrum of risks, which may include, but not limited to, design and construction risk,

operational risk, demand risk, technological risk, regulatory risk, political risk, *force majeure* and others.

In PPPs, the risk allocation is usually more complex than the traditional construction contracts, where the demand risk, for example would typically be borne by the government, (i.e. where government is the procurer of projects e.g. roads, hospitals etc.) Identification, disclosure and appropriate allocation of risk are therefore critical to the PPP environment.

As mentioned above, there are mixed and divergent views on how partners prefer various infrastructure project risks to be allocated in PPP contracts. Grimsey and Lewis suggest that it is more appealing for the government to shift project risks from the public sector to the consortium involved with the project even though this requires a profit incentive to be provided to the project consortium. They argue that the transfer of risks to the private sector provides an incentive for private entities to maximize efficiency. But for this transfer to happen, a clear delineation of property rights must be created (2004).

Robin et al. (2010) for instance shows that with financing considerations, it is optimal to transfer demand risk to the government. They argue that since PPPs involve large upfront investments, exogenous demand risk is an important concern of lenders when user fees are the main revenue source, so by assigning it to the government, the risk and therefore the interest rates charged to the project fall. However, even when projects are based on availability payments (and thus there is no demand risk), the finance rates charged PPPs are higher than the rates charged on government debt. In this case, the higher rate reflects in part the risk that the infrastructure will be unavailable at some point in the life of the contract, and no payments will be received to service the debt.

Li et al. (2005) recommend a risk allocation framework, in which the public sector client retains political risks and the risk pertaining to project site availability. According to this study, both the public sector client and private sector contractor should share the risks pertaining to general legislation, *force majeure* and relationship, while the contractor should take most of the project risks. The allocation of some risk factors, like obtaining project approval and permit, varies with different projects, and depends on prevalent circumstances.

The underlying assumption of risk aversion forms the basis of understanding the risk allocation preferences of partners. This suggests that partners can generally avoid or shift certain risks even

when *prima facie* they are best able to manage them. This runs contrary to the notion of optimism bias³³ where partners would deliberately downplay risks embedded in infrastructure projects in order to move forward with the business case for the project and then turn around in an opportunistic manner to request for a contract renegotiation; usually without a competitive tension typical of the original bidding process thereby eroding value for money.

Public partner may exhibit low perception for risks when its assessment of risk management capability of the private sector partner is low. In that case it may not want to share in certain types of risks such as demand risks (with user fees). Nevertheless, it is important that risk allocation be symmetrical: in other words, if one party accepts the consequences of a downside risk, it should also gain the benefits of an upside risk (Grimsey and Lewis 2004).

Since stakeholders have a significant impact on decisions made in the ongoing management of a PPP project, it is important to understand their preferences in the allocation of project risks. Risk allocation preferences may vary because of differences in underlying assumptions and interests resulting in disagreements over risk priorities and mitigation strategies.

The risk allocation preferences of stakeholders predicted³⁴ in this study suggests that while most of the endogenous risk factors could be assigned to the private sector partner, the public sector should retain political and site acquisition risks, while relationship-based risks should be shared between the partners.

One endogenous risk factor that requires further analysis is the revenue risk- this falls directly under the meso risk category in Table 1 below. A critical aspect of any PPP contract is the allocation of revenue risk between the government and the private sector partner. Revenue risk for the purpose of this study could be distilled further into price and volume risks. The means through which revenue or demand risk is allocated is the payment mechanism. In practice, there are three main payment mechanisms, depending on whether the payment is based on (i) user charges, (ii) usage³⁵, or on (iii) availability³⁶. In a payment mechanism solely based on user charges, the private sector partner receives its revenues directly through charges on the end users

³³ This often occurs when costs are systematically under-estimated and/or when benefits are over-estimated.

³⁴ See Table 2 below on predicted outcomes of risk allocation preferences.

³⁵ Note however that usage could be in form of a shadow toll regime: where users do not pay any fee per se; but the payment of the operator by the public authority depends on the frequenting of the infrastructure (road). In this case, the demand risk is still borne by the private operator. This is more or less an intermediary solution, where risk is shared between the private sector operator and the government.

³⁶ Under availability payment, the private sector operator is paid a fixed sum by the public authority, provided that some basic verifiable criteria that are decided *ex ante* are met.

of the infrastructure facility and bears all demand risk. Instead, in a payment mechanism based on usage, the government collects user charges and then makes unitary payments to the contractor. The allocation of demand risk depends on the relationship between the payment and the actual usage level. In a payment mechanism based on availability, the government rewards the contractor for making the service available but the payment is independent of the service actual usage (e.g. PPP contracts for schools, hospitals and prisons); in this case, the government retains all demand risk.

In many schemes, the payment to the private sector comprises a combination of the above payment regimes. Nevertheless, it has been documented that the optimal payment mechanism comes closer to be based on user charges only when risk-aversion and demand risk are small (high-powered incentives). Instead, the payment mechanism moves towards being based on availability only when risk-aversion and demand uncertainty are large (low-powered incentives) (Iossa and Martimort, 2008).

It is worth noting that when demand risk is large, the optimal contract is often characterized by a minimum revenue guarantee and a cap on the firm's revenues. Under a symmetry allocation of demand risk, contracts could be structured to allow government partake in the upside potentials rather than placing a ceiling or cap on the firm's revenues, particularly where you are dealing with pure economic goods.

2.5 Risk Allocation Preferences and Agency Theory

Agency theory is truly interdisciplinary. It is a general model of social relations involving the delegation of authority, and generally resulting in problems of control, which has been applied to a broad range of substantive contexts across different disciplines. According to the widely cited Eisenhardt, (1989), agency theory has been used by researchers in accounting (e.g., Demski & Feltham, 1978), economics (e.g., Spence & Zeckhauser, 1971), finance (e.g., Fama, 1980), marketing (e.g., Basu, Lal, Srinivasan, & Staelin, 1985), political science (e.g., Mitnick, 1986), organizational behaviour (e.g., Eisenhardt, 1985, 1988; Kosnik, 1987), and sociology (e.g., Eccles, 1985; White, 1985). Despite its interdisciplinary usage, it is still surrounded by

controversy. Its proponents argue that a revolution is at hand and that "the foundation for a powerful theory of organizations is being put into place" (Jensen, 1983).

Similarly, Kiser (1999, *Sociological Theory*) critically x-rays the intellectual evolution of agency theory in three disciplines—economics, political science, and sociology. He argues that agency theory in economics was initiated by the work of Berhold (1971), Ross (1973), and especially Jensen and Meckling (1976) as a way to address problems of control that arise as a result of information asymmetries between agents delegated to carry out tasks that affect the welfare of the principals who delegated authority to them.

There are several good summaries of agency theory in the literature (see for example (MacDonald, 1984, Eisenhardt, 1989, Petersen, 1993 and Kiser, 1999). Eisenhardt, (1989) in particular distinguished between two paradigms of agency theory: positive agency framework and principal-agent framework.

Positivist researchers have focused on identifying situations in which the principal and agent are likely to have conflicting goals and then describing the governance mechanisms that limit the agent's self-serving behaviour. Positivist research is less mathematical than principal-agent research. Also, positivist researchers have focused almost exclusively on the special case of the principal-agent relationship between owners and managers of large, public corporations (Berle & Means, 1932, Eisenhardt, 1989). Along this line, agency theorists have identified a number of variables that influence the relationship between the risk preferences of owners and managers: risk attitudes of the principal and agent, outcome uncertainty, and information systems (Eisenhardt, 1989).

The positive branch of agency theory has much in common with the basic hidden action model (moral hazard). Both are primarily concerned with the design of appropriate governance and control mechanisms, though the positive branch has tended to be more narrowly focused on inter organisational relationships such as PPPs. One unique difference in the positive approach however is that it seems to adopt the assumption that agents are risk neutral rather than risk averse, an assumption that is also common in transaction cost economics³⁷ (Williamson 1988).

³⁷ Agency theory has similarities with the transaction cost perspective (Williamson, 1975). As noted by Barney and Ouchi (1986), the theories share assumptions of self-interest and bounded rationality. They also have similar dependent variables; that is, hierarchies roughly correspond to behavior-based contracts, and markets correspond to outcome-based contracts. However, the most important difference is that each theory includes unique independent

Generally, the positive branch is non-mathematical and empirically oriented and focuses in particular on the effects of market and institutional mechanisms that affect the contracting process. The tension between the two branches of agency theory partly results from the different approaches developed by each branch and partly from the fact that the mathematical approach of the principal-agent literature offers little insight "to explain the rich variety of observed contracting practices," and in particular, when it comes to analyzing the effects of market and institutional mechanisms in the forms of contracts. On the other hand, positive theory of agency literature appears to offer better insights to explain the variety of contracting practices and how market mechanisms affect the contracting process. This theory is also more likely to produce practical conclusions in terms of economic policy (Eisenhardt, 1998).

In general however, agency theory broadens the risk-sharing literature to include the so-called agency problem that occurs when cooperating parties have different goals and division of labour (Jensen & Meckling, 1976; Ross, 1973). Specifically, agency theory is directed at the ubiquitous agency relationship, in which one party (the principal) delegates work to another (the agent), who performs that work. Agency theory attempts to describe this relationship using the metaphor of a contract (Jensen & Meckling, 1976 cited in Eisenhardt, 1998). Therefore, the role of risk becomes an important innovation in the economic theory of agency. Economists recognize that agency relations involve not only problems of control but issues of risk-sharing as well (Kiser, 1999).

Essentially, agency theory is focused on resolving two problems that can occur in agency relationships. The first is the agency problem that arises when (a) the desires or goals of the principal and agent conflict and (b) it is difficult or expensive for the principal to verify what the agent is actually doing ex-post. The problem here is that the principal cannot verify that the agent has behaved appropriately. The second is the problem of risk sharing that arises when the principal and agent have different attitudes toward risk. The problem here is that the principal and the agent may prefer different actions because of the different risk perceptions. To be clear, the two key elements of agency theory are goal conflict (incongruence) and information asymmetry; they are the spark plugs that power the theory.

variables (Eisenhardt, 1989). In this thesis, our dependent variables correspond to the risk perceptions of various stakeholder groups and the independent variables are 46 risk factors.

On the first agency problem: several conflicting goals inherently exist among the three major constituencies involved in public-private partnerships; thus leading to compounded agency problem: i.e. public sector operating as the contracting authority, the private sector and the consumers or end users of services. The public sector partner for example has the goal of job creation and increasing services to the public³⁸; the private sector organization's goal is to maximize the value of the firm; and the consumers' goal is to maximize consumer surplus. This problem of goal incongruence is serious from the perspective of organization theory and business strategy since structuring the arrangement that maximizes the value of the firm has negative feedback effects on the goals of the other constituents (Trailer et al. 2004).

A few empirical studies had been carried out to test for agency problems in PPPs. Trailer et al., (2004) for example find evidence to suggest that agency problems involving both adverse selection and moral hazard exist in PPPs. They argue that the problems seem to exist due to the compounded agency relationships inherent in the PPP hybrid organization structure. That is, the private firm is an agent for the public organization, in providing a piece of infrastructure, and the public organization is an agent for the consumers, who finance the public organization through taxes and fees. Thus, the public organization is accountable to the customers of its own agent. It, therefore, has a responsibility to ensure that the agent acts in the best interests of the consumers. Their results further show that financial structure of the partnership can interfere with the public organization's ability to maximize social welfare. The public organization may enter a situation where it benefits and the private firm benefits at the expense of consumer welfare.

Engel et al. (2010) argue that the life cycle of PPP finance and the change in financing sources is determined by the different incentive problems faced in the two stages of the PPP: its construction and operational phases. Construction phase is subject to substantial uncertainty; major design changes and costs depend crucially on the diligence of the sponsor and the building contractor. Thus, there is ample scope for moral hazard at this stage. As is well known (Tirole 2006; Yescombe 2007), banks perform a monitoring role that is well suited to mitigate moral

³⁸ This goal aligns with the Public Interest Theory of Regulation (PITR) analysed in Boardman and Vining (2012). This is a normative perspective and it is different from the Economic Theory of Regulation (ETR) which focuses on what governments *actually* do. The basic argument is that governmental action will be based on, or at least significantly influenced by, the self-interest of politicians and bureaucrats: such as seeking to maximise votes or scoring political points. PITR in particular focuses on the presence of market failures and governments' role in correcting these failures. PITR is inherently normative, as it focuses on what governments *should* do.

hazard by exercising tight control over changes to the project's contract and the behaviour of the special purpose vehicle and her contractors. In order to control behaviour, banks disburse funds only gradually as project stages are completed. After completion and ramp-up of the project, risk falls abruptly and is limited to events that may affect cash flows.

To deal with adverse selection problems- public sector partner can offer a menu of contracts to private sector bidders at pre-deal stages. The public client (principal) would express its expected risk allocation framework (i.e. initial risk matrix) along the invitation to negotiation/tender document, by setting out a list of the main risks contained within the scheme, and bidders are required to specify their views on:

- The probability of each risk event occurring;
- The cost consequences (impact), if the event did occur; and
- Whether they were prepared to take all, or part of the risk, within their bid price³⁹.

The individual bidders (potential agents) would assess the client's proposition and either agree or disagree. Ultimately, the iterative evaluation of risks by these agents enables them to reach a decision on whether they should bear certain risks or part of certain risks or not (see Figure 1 above for the iteration process).

Having assessed and mitigated all risks, the PPP contract would invariably reflect the final allocation of risks between the private and public sector partners (Akintoye et al., 2003).

Theoretically, this process should lead to the finding of an optimal trade-off solution where each constituent cannot be made better off without making another constituent worse off; i.e. "Pareto optimal" (Pareto, 1897; Blaug, 1992). However, this study suggests that a Pareto optimal arrangement will not be observed in practice due to the compounded agency problem explained earlier⁴⁰. Equally germane is the role of institutions in shaping Pareto optimal outcomes. In Nigeria, with its weak institutions, it is difficult to achieve this theoretical position. Public sector

³⁹ See Bing's Paper in PPP Conference in Hong Kong, 2009.

⁴⁰ Note that Pareto-optimal allocation yields an efficient allocation of resources and thus is a necessary condition for a social optimum.

partner could be short-changed and raided by private parties due to corruption, information asymmetries, lack of capacity and a host of other context specific factors. These altogether would prevent the attainment of Pareto optimal outcomes- where private sector operator could be made better at the expense of the public sector institution.

Another important element of agency problems in PPPs is the tendency to result in some self-selection. This is common where unsolicited bids are considered by governments: for instance, a risk-averse agent (private sector) may want to get government engaged in the Special Purpose Vehicle (SPV) by creating a rosy picture of a project or underplay the risks in a project. In that case, the government may succumb particularly where it doesn't have a clear framework for dealing with unsolicited bids or where it is fully 'sold out' based on the optimism bias of the private sector.

It is crucial to also note that agency theory overlaps contract theory because the unit of analysis is the contract governing the relationship between the principal and the agent. The focus of agency theory is on determining the most optimal contract governing the principal-agent relationship given assumptions about people (e.g., self-interest, bounded rationality, risk aversion), organizations (e.g., goal conflict among members), and information (e.g., information is a commodity which can be purchased).

Moreover, because no definition of risk neutrality is offered in the Transaction Cost Economics (TCE) literature, Chiles and McMackin (1996) assume that the term is intended to be interpreted as it is defined in the neoclassical economics literature. According to them, an assumption of risk neutrality suggests that a risk-neutral party is "indifferent between a prospect of uncertain profits and a certain profit, provided that the expected average of the prospective fluctuating profits is equal to the certain profit" (Aoki, 1984: 15). These parties therefore have a linear utility function (Townsend, 1982), which is characterized by constant marginal utility. This assumption can be contrasted with the risk-aversion assumption of neoclassical economics that suggests that a party

which is risk averse will always prefer certain or guaranteed profit to the prospect of fluctuating profits, provided the expected value of the certain profit is not less than the expected average of the prospective profits by more than some positive value. The utility function for risk-averse parties is, therefore, "strictly concave, strictly increasing and continuously differentiable" (Townsend, 1982). The concept of risk aversion is based on diminishing marginal utility, which "supposes" that the marginal utility of an extra dollar in payoffs declines as more dollars are won. In essence, risk-averse parties will always prefer a guaranteed profit to the prospect of fluctuating profits (e.g. preferring fixed salary to a bonus tied to performance), whereas risk-neutral parties will be indifferent between the two, provided that their expected values are equal.

It should be noted that Williamson's (1985) discussion of risk neutrality in TCE compares it with a single alternative assumption of risk aversion. In a more complete conceptualization of the range of possible risk preferences, one must also consider risk seeking, as suggested by *prospect theory* (Bromiley, 1991; Fiegenbaum & Thomas, 1988; Kahneman & Tversky, 1979). A party that is risk seeking will always prefer a fluctuating profit to the prospect of certain profits provided the expected average of the fluctuating profit is greater than the expected value of the certain profit. The utility function for risk-seeking parties is therefore convex (i.e., concave-up), increasing, and continuously differentiable-properties that are consistent with increasing marginal utility (Chiles and McMackin (1996⁴¹)).

Following from the exposition above, suppose that both the agent and principal are risk neutral. Agency theory would predict that risks would solely be allocated to one or the other depending on who has control over actions or events that could affect payoffs i.e. risk elements. This could explain why risks might be borne solely by either the private sector partner (agent) or the government (principal) in PPPs. In the situation where both parties somewhat have control over actions and events that could affect payoffs, then it is possible to have shared risks. Furthermore, if the agent and principal are both risk-averse, the theory would suggest some sharing of risks in all cases, thus corner solutions could be ruled out. However, few risks

⁴¹ It is crucial to acknowledge that under prospect theory, utility function may not be convex over the whole range of outcomes. Clearly, it could be convex over the loss part- which explains for example, why people might be willing to take bets.

would be allocated exclusively to one or the other even if one controls the events over another unless certain corner conditions prevail.

In conclusion, drawing from the perspectives of the agent theorists, the following pattern of risk allocation could be predicted between the public and private sector partners: the risks that are solely within the control of private sector are allocated wholly to the private sector (such as demand risk under a user-fee regime, design risk etc.), while the risks that are solely within the control of the public sector are allocated wholly to the public sector; where risks are partly controlled by both parties, such risks are shared. The prediction of risk allocation using the lens of agency theory is outlined in Table 2 below.

2.6 Risk Allocation Preferences and Control

PPPs are usually being established as a cost effective strategy of minimizing costs associated with the delivery of infrastructure services. Crucially, this can be achieved through optimal risk allocation, which seeks to minimize both project costs and the risks to the project by allocating particular risks to the party in the best position to control them. This is based on the theory that the party in the greatest position of control with respect to a particular risk has the best opportunity to reduce the likelihood of the risk eventuating and to control the consequences of the risk if it indeed materializes. Allocating the risk in line with those considerations creates an incentive for the controlling party to use its influence to prevent or mitigate the risk and to use its capacity to do so in the overall interests of the project (Victoria Partnerships, 2001, pg. 20).

To minimize costs, the PPP model often requires parties to assume the risk that lies with the party who is in most control. For instance, the public sector has control over political instability; therefore it makes sense for the public partner to assume this risk in PPPs. However, due to adverse selection problems, a partner may ex-ante pretend not to have control over some risk factors in order to attract higher incentives for their mitigation ex-post; as PPP contracts often include incentives that reward private partners for mitigating risk factors. Moreover, since PPP contracts cannot always be complete, i.e. contracts cannot always be written to cover all contingencies, incentives problems often arise (Grout, 1997)⁴².

⁴² For a discussion of the consequences of incomplete contracts, see for example Grout (1984), Hart and Holmstrom (1987), and Hart (1995), all cited in Grout, 1997.

2.7 Empirical Research into PPP Risk Factors and Risk Allocation Preferences

Empirical research on risks can help to explore the appropriate ways for managing the important risks associated with PPP projects (Tang, 2010). Risks in PPPs can be clustered according to the conventional risk management process: identification of risk areas, risk analysis, and risk mitigation strategies. To improve the use of risk mitigation strategies, risk areas need to be identified and analyzed properly.

Studies had been carried out to identify the key PPP risk areas and attributes, and to study how governments, private sector partners and financial institutions perceive risks that are embedded in infrastructure projects. For example, previous studies have used questionnaires to collect data for identifying the key risk areas in Build Operate and Transfer (BOT) projects, such as political risks, financial risks, revenue risks, market risks, promoting risks, procurement risks, development risks, construction completion risks, and operating risks (Akintoye et al., 1998; Zayed and Chang, 2002).

Martinus and Stephen (2011) made use of survey by questionnaire to collect data and found that proper risk allocation can be achieved through good governance. Also, management approaches need to be combined to enhance proper risk allocation and proper projects' performance. The good project governance concept is developed since projects under PPP procurement system usually encounter strategic long-term problems in addition to the typical management (short-term) problems.

In some other studies, risks have been allocated based on the projects under review or peculiarity in the level of awareness of both the parties and the nation involved while some risks are allocated to the same party across the empirical findings from different studies (e.g. Bin, Akintoye and Hardcast., 2004; Ibrahim et al., 2006; Shen, Platen and Deng., 2006 and Ke, Wang & Chan., 2010).

Discovery from the empirical questionnaire surveys carried out on risk allocation shows that risk factors such as 'poor political process', 'political opposition', 'government instability', 'site acquisition' and 'legal risk' were allocated to the public sector, most of these risks fall either directly within government policy or are such that government is in best position to manage the risks. Moreover, risks such as construction risk, operation risk/ design risk and financial risk are also unanimously allocated to the private sector while force majeure is the only one that was all

agreed to be shared by both parties (e.g. Bin, Akintoye and Hardcast., 2004; Ibrahim et al., 2006; Shen, Platen and Deng., 2006 and Ke, Wang & Chan., 2010).

These studies reveal that there is variation in the manner in which other risks were allocated. For example, Ibrahim et al. (2006) allocated 8 risks factors to the public sector, 34 to the private sector, and 7 to be shared by both parties, while 12 are difficult to allocate, Bin, Akintoye and Hardcast (2004) on the other hand allocated 5 to the public sector, 32 to the private sector and 5 to be shared.

These results equally align with the previous findings of Zhang et al. (1998) and Li et al. (2005) for studies carried out in Hong Kong and UK respectively. These studies indicate that the respondents prefer most of the risk to be allocated to the private sector partner. Shen, Platten and Deng (2006) in their case study research discovered that in the typical PPP, site acquisition, site inexperience, private partner risk, legal risk and policy risk should be allocated to the public sector while design and construction risks and industrial action risks are to be allocated to the private sector. The risks to be shared include development risk, financial risk and force majeure risk.

Chung, Hensher and Rose (2006) investigated a risk perception of PPP in toll roads in the following dimensions: a) benefits and gains arising from PPP toll roads; b) the public/private sector's capacity to manage risks; c) considerations that drive each party entering into a PPP toll way contract, and the extent to which these considerations influence their approach to negotiating risk allocation; and d) the process in which the levels of toll are determined. All participants felt strongly that significant value for money that is translated into commercial and social benefits has been generated by partnerships. Their investigations suggest that most risks should be best shared by both sectors even though they may be perceived to be in the domain of respective sector's field of expertise. All participants in the study confirmed that risk allocation preferences about which party is best able to manage certain risks bear a powerful influence on final risk allocation.

Katia, Cameron and Alanjandro (2011) researched into PPP in the health sector through a computerized data base and eligible journals; their findings reveal that there seems to be a consensus that engaging key stakeholders at an early stage in the process may have assured compliance and accountability during the project. The central attribute of this argument is to

ensure greater support from the recipient country in facilitating access to communities and NGOs, and to eliminate the gaps on the drug supply chain when the drugs come to be distributed. Supporting earlier involvement of key stakeholders helped to create local ownership of the project, and build strong relationship among partner organizations. These findings align with the literature that defines stakeholder engagement as “the process of involving individuals and groups that either affect or are affected by the activities of the company to understand expectation and interests of different stakeholders, to increase accountability [and] trust, to gain acceptance of a wide group of different stakeholders” (Sloan, 2009). The review synthesizes empirical data on the development and management stages of PPPs, using qualitative content analysis, identifying similarities among critical elements and consolidating them into a framework to improve our understanding of the operational aspects of such partnerships.

The literature on PPPs clearly needs to move from anecdotal reports and case studies to large, replicable studies designed to identify and validate critical elements that link operational aspects of PPPs to successful outcomes.

Generally, case studies on risk allocation in PPPs are large in the literature. For instance, empirical findings from the studies conducted by Grimsey and Lewis (2000) on evaluating the risk of Public-Private Partnerships for the infrastructure projects used a case study of water treatment facility in Scotland. They convey that it is indeed crucial to the financial robustness bids, given the highly geared financing structure envisaged, that the risk should be allocated away from the service company under strong contract to a suitable counterparties. However, even when risk is transferred contractually to counterparty, some residual risks will still remain with the special purpose vehicle or the service company.

From the empirical results of comparative analysis carried out by Ke, Wang and Chan (2009) where they used questionnaires in a study spanning participants from China, Hong Kong, UK and Greece, the findings reveal the following allocations: From China, comparing the preferred risk allocation, the numbers of risks allocated to the public and private sector partners respectively are 6 and 19; 7 and 17 in Hong Kong; 4 and 29 in the UK; and 9 and 23 in Greece. This suggests that PPP arrangements in the UK under its PFIs may be most able to transfer risk from the public sector to the private sector than in other jurisdictions.

In contrast with the UK, both the public and private sectors have less experience of PPP in the other three countries/jurisdictions. It is therefore understandable that the private sectors showed a greater degree of risk aversion expressed in avoiding risks, while their UK counterparts would be willing to undertake, especially for the macro level risks. Compared to Greece, respondents from China and Hong Kong were more willing to share different levels of involvement and responsibility between the public and private sectors. The Greek private sector players might have full understanding of the limitations of the public sector and was therefore willing to take full responsibility for the partnership risks (Roumboutsos and Anagnostopoulos, 2008), instead of sharing these risks as indicated in China and Hong Kong.

However there are some common risk allocation preferences among the identified risk factors, there are 15 risks that received the same allocation preferences among four different countries/jurisdictions, while 11 risks at meso level are related to the construction, design, finance, and operation of a PPP project, which could be regarded as the complementary skills of the private sector, and thus were preferred to be assigned to the private sector. This observation also suggests that the driving force for the government to introduce PPP vehicle is to tap in the efficiency and business skills of the private sector. The general principle that “risks should be allocated to the party best able to manage and control them and at the least cost” (*Cooper et al. 2005*) prevails. Of risks that are preferred to be shared, force majeure stands out. The nature of force majeure risk is such that public and private sectors may not be able to deal with it alone. It is thus understandable for both parties to share this risk. Respondents from four countries/jurisdictions also agreed on the same allocation preference for all the political risks, i.e., “unstable government,” “poor public decision making process” and “strong political opposition/hostility”; they should all be taken up by the public sector. Why? Because the public sector has a stronger power to deal with the consequences of these political risks and is therefore better able to absorb them.

As noted above, the comparative analyses of risk allocation preferences among four countries/jurisdictions indicate that the public sector in the UK was most able to transfer the PPP risks to the private sector, followed by Greece, Hong Kong and China. This suggests a positive correlation between PPP experience as a factor, and the proportion of risks that could be transferred to the private sector in PPPs. In broad terms and other things being equal, a more

experienced PPP jurisdiction such as UK will be able to transfer more risks to the private sector than say China, with less experience in PPPs.

Wibowo & Mohamed (2010) asserted from a mail-based survey carried out that private sponsors will normally agree to bear risk that are familiar to them such as most of development, construction, commissioning and operating risks but will hesitate to bear uninsurable risks that are unquantifiable and outside their control, such as political risk, country commercial risk, indeterminate demand risk, and uninsured force majeure risk. To some extent, the survey findings seem to confirm this normal practice, especially for project risk allocation on which both private and public sector moderately agree. It has also been presumed that the public sector would be tempted to transfer as many risks as possible, while the private sector would be expected to accept as few project risks as possible. The survey findings however, do not provide strong evidence in support of this assumption. Both intra-and inter group agreement highlight a clear disagreement between the two contracting parties when dealing with the issue of who assume what risk?

Abdul-Aziz and Kassin (2005) in their research study where a mixed method was adopted using questionnaire and interview for PPP in housing found out that given the choice, public agencies would rather develop lands on their own. But because of certain inherent limitations such as unavailable (in the case of some state Islamic Councils, for example) or limited (in the case of some local authorities) technical and financial resources, they had to turn to the private sector for assistance. External factors which prompted them to do likewise included prohibition to engage in commercial activities (for state Islamic Councils), political pressure to suddenly increase volume of mass housing (e.g. zero squatter policy by 2005 for Selangor State) or even difficult land conditions (e.g. hilly or marshy areas). Several interviewees in the study pointed out that housing PPP development often appreciates the land value of the surrounding area, hence unlocking the economic value to the benefit of private landowners. They regarded this outcome as fulfilling part of their social duties. Without exceptions, all risk factors were considered to be either very important or important by the majority of respondents (Demirag, Khadaroo, Stapleton and Stevenson; 2011).

Overall, the ability to transfer risk to sub-contractors and the availability of insurance are critical ingredients to risk allocation preferences, particularly to financiers.

In conclusion, from the empirical review, it was clearly observed that risk allocation preferences vary according to the nature of project and the country under consideration. From the comparative analysis carried out by Ke, Wang, Chan & Lam (2009) among China Hong Kong, Greece and UK for example, it was discovered that the level of exposure and experience of each nation actually influence how the risk is shared among the parties to the PPP contract. However, while some risks regardless of the nature of project and the nation involved are allocated to a particular party some are strongly a function of projects' nature. For instance construction and operation risks are allocated to the private sector based on all the empirical findings while political risk, regulatory risk and government decision risk are allocated to the public sector, force majeure is considered to be shared by both parties. The 'financial risk, demand risk', 'change in tax regulation', 'inflation rate volatility' and some others are allocated based on the nature of projects.

It is equally clear from this empirical review that there is lack of strong theoretical underpinnings to most of the studies, in other words, the use of theories to explain risk allocation preferences is very scant or almost non-existent. Overall, out of many reviewed papers, a greater proportion involved a certain degree of empirical work⁴³.

2.7.1. Risk Allocation Preferences in the Context of Weak Institutions

The quality of a country's institutions could matter in the allocation preferences that are displayed in PPPs. Project specific risks would equally matter in any jurisdiction and their relative importance would depend on the nature of projects and the stakeholders involved. However, the risks that would materially differ across countries due to the quality of institutions could most broadly be categorised as macro or country-level risks. These country level risks could be further decomposed into political, social, macro-economic and legal risks as presented in Table 1 below. Precisely, sources of political risks include but are not limited to the following: expropriation and nationalisation of assets, unstable government, uncertain (fluid) regulatory environment, delay in project approvals and change in legislation and tax regulation,

⁴³ Empirical studies involve the collection of primary data. These relevant studies have covered a wide range of specific research focus i.e. PPP risks and allocation preferences (e.g., Abednego and Ogunlana, 2006; Li Bing et al., 2005 etc.).

poor public decision-making process, lack of tradition of private provision of public goods, strong political opposition/hostility. While economic risks in particular could come from the following sources: inflation rate volatility, interest rate volatility, poor financial market, and influential economic events. The dimensions of these risks vis-à-vis institutional context of nations would affect the way and manner stakeholders would prefer risks to be priced and allocated in PPPs.

Some of the country-level risks that are considered important within the context of Nigeria are presented below. Interestingly, these risks were equally considered important in the analysis of risk allocation preferences in similar previous studies such as (Li Bing et al. 2005, Ibrahim et al. 2006, Ng and Loosemore, 2007 and Chan et al. 2011). These PPP studies were done in the context UK, Nigeria, Australia, and China respectively.

Some of the most important country-level risks in the context of Nigeria are discussed below:

Unstable Government: Before and even after democracy was restored in 1999 in Nigeria, it became clear that there have been rapid changes in the political leadership in the country. This obviously could lead to policy inconsistency; more so when considered in the light of other weak and unreliable institutions such as the civil service, police, and judiciary. The likelihood that a new government will cancel existing PPP contracts and pursue new priorities is quite high and this could have great impact on the achievement of project objectives. Who should bear risks associated with this? Obviously, in a highly volatile political environment like Nigeria, you would expect a discerning investor/lender to demand for a guarantee that will commit future administrations irrevocably to honour their obligations under existing PPP contracts; such that the penalty for renegeing on the terms of existing contracts would be too costly for a new government to shoulder; thus creating incentives for government in particular to respect sanctity of contracts. The perception of this important risk by stakeholders would determine the way this risk would be priced and eventually allocated in PPPs.

Poor public decision-making process: weak institutions and rapid changes in government as outlined above could lead to a systemic culture of poor public-decision making process. Bad

governance⁴⁴, which is a by-product of poor public decision making process, has since become closely associated with the Nigerian history. At the federal, state and local government levels, governance crisis of frightening proportion has become entrenched. Oyovbaire (2007) observed that the crisis of governance has indeed, engulfed virtually every department and dimension of the Nigerian state and society. Yet these institutions are meant to be the catalysts for PPPs- thus heightening the macro level risks associated with infrastructure projects. It could be argued that weak institutions in Nigeria are responsible for poor public decision-making process. This process could quite naturally lead to a risk allocation outcomes that will make public institutions retain risks that should ordinarily be transferred to the private parties. In other words, by failing to correct institutional weaknesses, the government will inevitably retain risks that, objectively, should be transferred to the private sector operator and it will therefore have to bear their possible costs (see for example, IMF, 2004, and Hemming et al., 2006).

Lack of tradition of private provision of public goods: this remains a big challenge as Nigeria currently does not have a clearly defined infrastructure policy to attract private investments into the infrastructure space. According to a reputable national newspaper – The Punch (2012)⁴⁵- Nigeria’s Infrastructure Master Plan is currently being worked upon by the ministries of National Planning and Trade and Investment as well as the Federal PPP Unit i.e. Infrastructure Concession Regulatory Commission. This policy would be geared towards attracting investors into key infrastructure projects. It therefore means that any investors willing to invest into infrastructure would clearly demand a relatively higher premium than they would require in climes with well-established tradition of private provision of public goods, like the UK.

Furthermore, most Nigerians still quite naturally believe that most of the infrastructure assets that are placed under PPPs are perceived to be the duty of government to provide, hence they feel short-changed when they find out they have to pay for the services or the use of those facilities. Unfortunately, the same services are provided elsewhere without the need for payment by those who use them. This has somewhat heightened the controversy on the need or otherwise for PPP arrangements especially for public goods such as roads, etc.

⁴⁴ Good governance is synonymous with sound development management while bad governance has lack of accountability and transparency as its elements (Popoola, 2011)

⁴⁵ See The Punch Newspaper, August 14, 2012- www.punchng.com

Strong political opposition/hostility: PPP projects are usually susceptible to political opposition; particularly when due process is not followed i.e. when and where genuine competitive tension in a transparent procurement process was not adopted for the selection of preferred or winning private sector bidder. Then allegation of corruption may be rife, particularly by political opponents. It is usually worse when payment mechanism is through the end-users paying for the use of the facility; particular when such is a strategic asset with attractive revenue potentials.

For example, the Lekki Road Project has been mired in controversy as a result of public hostility arising from certain sentiments: three of those sentiments stood out clearly: first, allegation that an alternative road was not provided by the government initially, given that the road was concessioned under a brownfield build-operate-and-transfer model; second, that the tolling of the road kicked off when barely a fraction of the entire road was completed by the concessionaire and lastly, that there were too many tolling booths close to each other on the finished part of the entire 50-kilometer stretch. Although, (as it was widely claimed), most of these sentiments had some political undertone, they however, came about arguably as a result of inadequate stakeholder engagement and lack of credible facts and information about the project in the public arena.

Similarly, the Ibadan-Lagos expressway⁴⁶ project concessioned to Bi-Courtney Highway Services (the same concessionaire managing, Muritala Muhammed Airport under a PPP as explained above) under a controversial and highly political bidding process, had made no more than motion without movement since the 109-kilometre road was handed over to the company over four years ago - to expand, modernise and maintain for a period of 25 years. The criticisms and bottlenecks against this PPP are legion: issues of design, questionable competence cum pedigree of the concessionaire, inability to attract required funding, challenges with securing the right of way, compensation for affected land/property owners, concession duration and the State governments (Lagos, Ogun, Osun and Oyo; all under the political leadership of the national opposition party, Action Congress of Nigeria) where the road runs through had also demanded 20 per cent equity in the project. There is also evidence of public opposition (including

⁴⁶ Arguably the busiest and one of the most strategic federal highways in Nigeria; it connects Lagos State (a coastal city with population in excess of 16 million) to other parts of the country.

litigation⁴⁷) against the concessionaire, arising from activists and concerned stakeholders. The sentiments of a great number of people from these western states are well known. They felt betrayed and thoroughly disappointed that when their own son (Chief Aremu Okikiola Olusegun Obasanjo) was the president of the Federal Republic of Nigeria for eight years, he failed to rehabilitate and modernise this major road while other trunk A roads (Federal Roads) in other parts of the country received attention during his presidency; yet these roads were not tolled because they were financed 100% by the Federal Government (i.e. not PPP). These issues had altogether stalled the successful take off of the project. Managing the risks associated with these political issues in this context were the responsibility of the Federal Government, hence a high-powered committee was set up to resolve some of these bottlenecks. The contract for this PPP was eventually cancelled by the Federal Government of Nigeria in November 2012 after series of unmet deadlines by the concessionaire⁴⁸.

Fluid and Highly Uncertain Operating Environment :- The latest findings of the World Bank's Investment Climate Report for the 2011 which articulated the challenges that entrepreneurs face in doing business in Nigeria bore eloquent testimony to the hostile and challenging operating environment in Nigeria: the report stated inter alia that investors were losing 10 per cent of their revenue to the hostile operating environment in the country, stemming from poor quality infrastructure, crime, insecurity and corruption (World Bank, 2012). These factors altogether would make a private sector operator not to be too keen to enter into long-term contracts under PPPs or to insist that certain macro level risks should be retained by the public sector and equally demand higher premiums for risks assumed under PPP contracts.

Poor Financial Market: From theoretical standpoint, there are seven market failures in financial markets: monitoring as a public good, externalities of monitoring, selection and lending, externalities of financial disruption, missing and incomplete markets, imperfect competition, Pareto inefficiency of competitive markets and uninformed investors. These failures are likely to be more pervasive in financial markets; thus warranting government

⁴⁷ Two human rights activists had recently asked a Federal High Court sitting in Lagos to revoke the concession agreement for alleged non-performance and incessant destruction of lives and property along the Lagos-Ibadan expressway. See for example, <http://dailyindependentnig.com/2012/06/bi-courtney-activists-sue-fg-over-lagos-ibadan-road-concession/> and The Nation Tuesday, August 14, 2012, pg 18.

⁴⁸ See <http://www.thenigerianreporter.com/fg-revokes-lagos-ibadan-expressway-concession-with-bi-courtney/> accessed on January 1, 2013.

interventions that will not only make these markets function better but will also improve the performance of the economy in general (Stiglitz et al. 1993). In Nigeria, these failures manifest in the form of inefficient allocation of financial resources to merchandising sectors, mostly importation of refined petroleum products, foods, automobiles etc. at the expense of the manufacturing (real) sector, which is often starved of funds. Invariably, any venture that requires long term funding may not be supported due to the nature of the banks' balance sheets. There has also been a lot of inefficiency in the operations of the intermediation architecture in the financial system to attract and retain long-term savings that could be channelled to the infrastructure sector.

The massive losses recorded by investors at the Nigerian capital market in 2008/2009 had equally led to a loss of confidence by investors, debt over-hang arising from delinquent margin loans and general dearth of liquidity, thus making it more difficult to attract long-term capital towards infrastructure. Equally germane is the fact that the markets are yet to develop enough depth and expertise in the area of project finance; as banks still strangely require investors to enhance their project finance proposals with cash flows from their balance sheets; whereas, lending to infrastructure projects should be on a non-recourse or on a limited recourse basis. According to the Chief Executive of Bi Courtney Highway Services, Mr Wale Babalakin,⁴⁹ "there is nobody who wants to give out money. This road was given to Nigerian banks to finance; Nigerian banks don't have a long term contract...all they can give is money for a year or two years and what you need is money for 15 years. We are now making headway because a bank in South Africa showed interest. And we are now going to build the road with a consortium of firms in South Africa". However, this never happened as the PPP contract was eventually terminated in November 2012.

Influential Economic Events: The global financial crisis which peaked in 2008 in the wake of the collapse of the American real estate market and subsequent crash of the unregulated collateralized debt obligation and credit default swap market has infected a still growing number of economic activities. PPPs are by no means immunized against the consequences of this kind of crisis. The ensuing haemorrhage was aggravated by the volatility of the portfolio

⁴⁹ See report titled: Government, Bi Courtney spar over Lagos-Ibadan Expressway, The Nation, Tuesday, August 14, 2012.

investments which formed a key component of funds invested into the Nigerian capital market; precisely, significant negative portfolio investment flows occurred which altogether reduced the amounts of investible funds and general liquidity in the financial system.

In an attempt to see how these macro-level risks would differ across countries at different levels of institutional development, an analysis was carried out of the results of risk allocation preferences in Australia (representing developed institutions) and China (representing emerging economies), South Africa and Nigeria (representing developing economies) using different literature⁵⁰. It turns out that some elements of political risks are either wholly allocated to the private sector or shared in this matured jurisdiction; whereas such risks are either allocated exclusively to the public sector or shared in countries with relatively weaker institutions such as China, South Africa and Nigeria (See table 3 below).

2.8 Risk Allocation Preferences and Contract Theory

During the 1960s and early 1970s, economists explored risk sharing among individuals or groups (e.g., Wilson, 1968, Arrow, 1971). This literature described the risk-sharing problem as one that arises when cooperating parties have different attitudes toward risk. Perhaps the area of economics where the role of risk preferences is most explicit is that of contract theory. Standard treatments of the principal-agent model show that principals are able to offer incentive-compatible contracts that exploit the relative risk aversion of principals and agents (Castilo et al. 2009).

On risk aversion, modern contract theory is based on the assumption that principals are less risk averse than agents; in other words, the agents are more risk averse than the principals. This theory began with the pioneer work by Steven N. S. Cheung's (1969) in the study of sharecropping in China. Shortly thereafter, Joseph E. Stiglitz (1974) initiated a formal principal-agent theory which remains largely intact (Milgrom and Roberts, 1992). To this day, contract theory often focuses on the share contract, which is present throughout the economy in agriculture and beyond, from business partnerships to franchise contracts to royalty-based leases.

⁵⁰ It bears mentioning that the risk classifications used in all these studies are somewhat similar. However, not all the risk factors that were used in this study featured in these similar studies; also the focus of these studies was not so much about the impact of institutions on risk allocation preferences and risk perceptions.

Assumptions of risk aversion in modern economics are pervasive, and economists who substitute risk neutrality often do so with an apology. This is particularly true for contract theories, like the principal-agent model. Despite the theoretical prominence of risk aversion, empirical contract studies tend to ignore risk perceptions and focus exclusively on transaction costs, thus stressing specific incentives, enforcement costs, and transaction-specific assets (Allen and Leuick, 1995).

Risk preferences (perceptions) in contract theory were empirically examined by Allen and Leuick (1995) with evidence failing to support theories relying on risk-averse agents. They conclude that despite the overwhelming use of risk aversion to explain contracts in theoretical models, the supporting evidence has been weak. The accumulated findings of many studies not only cast doubt on the importance of risk-avoidance in determining contract design but also support the risk-neutral transaction-cost approach, which stresses multiple margins for moral hazard and enforcement costs.

More recently, Castilo et al. (2009) investigate if the risk preferences of entrepreneurs are different from those of labourers by implementing experiments with a random sample of the population in a fast-growing, small-manufacturing, economic cluster; i.e. they investigate if risk perceptions⁵¹ are heterogeneous in the field and if markets allocate people to tasks based on their risk preferences. The evidence is also mixed; although, as assumed by theory, they find entrepreneurs are more likely to take risks than hired managers. Likewise in a PPP arrangement, using the framework of contract theory, it can also be assumed that the private sector partners (agent) are more risk averse than the public sector partners.

In early work, using mailed surveys to assess risk preferences, Brockhaus (1980) and Masters and Meier (1988) find no difference between owners and managers. Cramer et al. (2002) find a link between an ex-post hypothetical lottery risk measure and entrepreneurial choice at some previous point in a person's life; however, they caution that their results are not causal. Ekelund et al. (2005) use a psychological measure of "fear of uncertainty" to measure risk. They find a direct link between their risk measure and being self-employed. More generally Bonin et al. (2006) use a hypothetical risky investment question to measure risk and find a correlation

⁵¹ Note that risk perceptions and risk preferences are used interchangeably in this thesis.

between risk and variance in earnings across occupations.

Overall, there is little empirical evidence supporting the basic assumption that agents are more risk-averse than principals, thus providing a theoretical ground to retest this assumption in the framework of PPPs. Doing so in particular in a clime (Nigeria) with limited PPP experience where wide heterogeneity in perceptions between stakeholders should ordinarily be expected.

2.9 Conclusion

This study contributes to the literature in the following ways: the survey employed cuts across an important stakeholder group (bankers⁵²) in Nigeria that was not involved in the previous studies and it dissects empirically the risk perceptions of these stakeholders, confirming homogeneity in risk perceptions contrary to the heterogeneity prediction of agency theory.

Overall, this chapter provides a brief discussion on the theoretical and empirical foundations for this study: especially using part of the lens of agency and contract theorists. Hypotheses were developed for testing based on assumption of risk aversion cum risk perceptions premised on the unsettled debate about homogeneity versus heterogeneity of risk perceptions. This chapter also reflects a brief discussion of the significance of the study in the light of the gaps in the literature.

⁵² It is important to stress that the issue of risk in PPP is not just a matter for consideration between the public sector partner and the private sector bidders for project: financiers (often categorised under private sector) play a major role in this respect. Banks earn a relatively low return (after allowing for cost of funds), but the corollary to this is that they cannot afford to take high risks (risk averseness is expected), the crystallization of which could easily wipe out the return they had expected to make (Farquharson, 2011). Generally, the private sector partner's cost of risk-bearing is captured in the higher return-or risk premium- demanded for taking on a riskier project. These risk premiums are shaped in investment markets, by investors (shareholders or lenders) comparing the opportunity to other possible investments in the space. The government's cost of risk-bearing is more difficult to quantify directly, which can result in contracting agencies accepting too much project risk (The World Bank, 2012).

Table 1: Risk Factors in PPP/PFI Projects

Categorized catalogue of PPP/PFI project risk factors

<i>Risk Meta Level</i>	<i>Risk Factor Category Group</i>	<i>Risk Factor</i>	
Macro level risks	Political and government policy	Unstable Government	
		Expropriation or nationalisation of assets	
		Poor public decision-making process	
		Strong political opposition/hostility	
		Poor financial market	
	Macroeconomic	Inflation rate volatility	
		Interest rate volatility	
		Influential economic events	
	Legal	Legislation change	
		Change in tax regulation	
	Social	Industrial regulatory change	
		Lack of tradition of private provision of public services	
	Natural	Level of public opposition to project	Force majeure
			Geotechnical conditions
		Weather	
Environment			
Meso level risks	Project selection	Land acquisition (site availability)	
		Level of demand for project	
	Project Finance	Availability of finance	
		Financial attraction of project to investors	
		High finance costs	
	Residual Risk	Residual risks	
		Design	Delay in project approvals and permits
	Construction	Design deficiency	Unproven engineering techniques
			Construction cost overrun
		Construction time delay	
		Material/labour availability	
		Late design changes	
		Poor quality workmanship	
		Excessive contract variation	
	Operation	Insolvency/default of sub-contractors or suppliers	
Operation cost overrun			
Operational revenues below expectation			
Low operating productivity			
Maintenance costs higher than expected			
Micro level risks	Relationship	Organization and co-ordination risk	
		Inadequate experience in PPP/PFI	
		Inadequate distribution of responsibilities and risks	
		Inadequate distribution of authority in partnership	
		Differences in working method and know-how between partners	
	Third Party	Lack of commitment from either partner	
		Third Party Tort Liability	
		Staff Crises	

Li Beng et al. (2005)

Table 2: Prediction of Risk Allocation Preferences in PPPs in Nigeria

Risk Factors	PB	SH	PV
Unstable Government	X		
Expropriation or nationalisation of assets	X		
Poor public decision-making process	X		
Strong political opposition/hostility	X		
Poor financial market		X	
Inflation rate volatility		X	
Interest rate volatility		X	
Influential economic events		X	
Legislation change	X		
Change in tax regulation	X		
Industrial regulatory change	X		
Lack of tradition of private provision of public services		X	
Level of public opposition to project	X		
Force majeure		X	
Geotechnical conditions			X
Weather		X	
Environment		X	
Land acquisition (site availability)	X		
Level of demand for project			X
Availability of finance			X
Financial attraction of project to investors	X		
High finance costs			X
Residual risks	X		
Delay in project approvals and permits	X		
Design deficiency			X
Unproven engineering techniques			X
Construction cost overrun			X
Construction time delay			X
Material/labour availability			X
Late design changes		X	
Poor quality workmanship			X
Excessive contract variation			X
Insolvency/default of sub-contractors or suppliers			X
Operation cost overrun			X
Operational revenues below expectation			X
Low operating productivity			X
Maintenance costs higher than expected			X
Maintenance more frequent than expected			X
Organization and co-ordination risk		X	
Inadequate experience in PPP/PFI		X	
Inadequate distribution of responsibilities and risks		X	
Inadequate distribution of authority in partnership		X	
Differences in working method and know-how between partners		X	
Lack of commitment from either partner		X	
Third Party Tort Liability		X	
Staff Crises		X	

PB = Allocated to Public, SH = Shared and PV = Allocated to Private

Source: Author

Table 3: Comparative Analysis of Risk Allocation Preferences Across Different Countries

Type of Risk	Sources of Risks	Australia	China	S/Africa	Nigeria
Political	Unstable Government		Public		Public
	Expropriation or Nationalization of assets	Private		Public	Public
	Strong political opposition/hostility			Public	Public
	Industrial regulatory change			Shared	Shared
	Delay in project approvals and permits	Shared	Private		Public
	Change in Legislation and Tax Regulation	Private	Shared	Shared	Public
Economic	Inflation rate volatility	Shared	Shared	Shared	Shared
	Interest rate volatility	Shared		Private	Shared
	Influential economic events				Shared
Construction	Late design changes	Public	Private	Public	Private
	Availability of finance				Private
	Land acquisition (site availability)	Public		Public	Shared
	High finance costs				Private
	Design deficiency	Private	Private	Private	Private
	Construction cost overrun			Private	Private
	Construction time delay			Private	Private
	Unproven engineering techniques				Private
	Material/labour availability		Private		Private
	Insolvency/default of sub-contractors or suppliers		Private	Private	Private
	Staff Crises		Private		Private
Operation	Operation cost overrun	Private		Private	Private
	Low operating productivity			Private	Private
	Maintenance costs higher than expected			Private	Private
	Maintenance more frequent than expected			Private	Private
	Poor quality workmanship			Private	Private
Legal	Third Party Tort Liability		Public		Private
	Operational revenues below expectation				Private
Market	Level of demand for project	Private		Shared	Private
Other	Residual risks	Public			Private
	Force majeure	Shared		Shared	Shared
	Weather		Shared	Public	Private
	<i>Sources</i>	<i>Ng and Loosemore (2007)</i>	<i>Lam et al.(2007)</i>	<i>NTSA (2004)</i>	<i>Author</i>

Chapter Three: The Nigerian Context and PPP Macro Level Risks

3.1 Introduction

This chapter highlights the context in Nigeria within which Public-Private Partnerships have been explored. The rationale for incorporating a historical review of Nigeria in this study is to aid readers in understanding the context in which private and public sector partners collaborate to share risks, rewards, responsibilities and resources in PPP projects. This chapter in particular focuses on the shifting socio-political and economic systems in Nigeria which are potential catalysts to the crystallization of project risks; an overview of a few operational PPP projects in Nigeria; an analysis of relevant macro level risks; and challenges and lessons learned by stakeholders in planning and implementing PPP projects.

3.2 A brief History of Nigeria and its Shifting Political System

Nigeria is by far the most populous country in Africa. It is the eighth largest country by population in the World and the largest black race nation on Earth. It is situated at the eastern terminus of the bulge of West Africa, on the Gulf of Guinea. Nigeria has total land area of 923,768 square kilometres making it the 32nd largest country⁵³ by land area in the world (this is still however slightly less than twice the land area of California⁵⁴). Nigeria lies entirely within the tropical zone between latitude 40 and 140 north of the equator and longitudes 30 and 14 east of Greenwich Meridian⁵⁵.

Nigeria's national boundaries are the result of its colonial history as common to most African countries. It is bounded on the west by the Republic of Benin, on the north by the Republic of Niger, and on the east by Cameroon. On the North East is Chad and on the South, the Nigerian coastline is surrounded by the Atlantic Ocean⁵⁶.

Nigeria has 250 ethnic groups with Hausa-Fulani, Igbo, Yoruba and Kanuri representing the largest ones. The languages officially spoken and written are English, Hausa, Igbo, Yoruba, and Fulani among others.

⁵³ See The Economist, 2012-The World in Figures

⁵⁴ See www.eia.factbook

⁵⁵ See www.onlinenigeria.com/geography

⁵⁶ See Nigeria's Map in the World in Figures published by The Economist, 2012.

In the pre-colonial period, the economy of Nigeria was traditionally based on agriculture and trade, but this changed profoundly under colonial rule. Lord Frederick Lugard⁵⁷ who became a High Commissioner of the Northern and Southern Protectorates⁵⁸ had the task of transforming the commercial landscape inherited from the Royal Niger Company into a viable territorial unit under effective British political hegemony⁵⁹. He succeeded in this task through the introduction of the “indirect rule” system⁶⁰, which he extended from the northern protectorate to the south. As a consequence of the indirect rule policy, Hausa-Fulani domination was confirmed and in most cases imposed on other ethnic groups outside the northern territory. The lean resources accruing to the colonial government constrained the achievements of Frederick Lugard and his successors in terms of economic development. Since there was a need to pay taxes to the colonial government, Nigerian farmers at the time were forced to replace the cultivation of food crops with cash crops, which the colonial government bought at ridiculously low price and resold at a profit (Stock, 2001).

The colonial government equally decided to impose a head tax on women and domestic animals, a decision that led to the 1929 Aba women’s riot in protest of the colonial fiscal policy⁶¹. In spite of these challenges, economic progress was made through the construction of railroad lines that were used to transport mineral resources and agricultural products such as tin from Jos Plateau, peanuts and cotton from other northern states; cocoa and rubber from the west to ports on the coast. Although the economic linkages among the various regions in Nigeria buoyed, the indirect rule system used by the colonial administrators (whereby the regions were administered through the use of traditional chiefs) tended to discourage political interactions among these regions. Overall, the indirect rule strategy in the south proved relatively easy amongst the Yorubas where the governments and boundaries of traditional kingdom systems

⁵⁷ Lord Frederick Lugard was a High Commissioner (1900-1906) of the British protectorates in Nigeria, which later became Nigeria with him as the first Governor General between 1912-1918.

⁵⁸ The Southern and Northern protectorates were amalgamated in 1914 by Frederick Lugard who became the Governor General of the new Nigerian nation.

⁵⁹ Ibid.

⁶⁰ The policy of indirect rule is the method of governing the protectorates through the traditional or appointed rulers from among people who had been defeated by the British army- see <http://www.country-data.com>- accessed on May 5, 2012.

⁶¹ The Aba Women’s Riots of 1929 arose out of: dissatisfaction with the low prices being offered for local produce such as palm kernels and edible oil, while imported goods were kept at artificially high prices, a fear that the British administration would tax women separately from men, and hatred of the Warrant Chiefs and the Native Courts because of the corruption and unfair sentences imposed- see more details in <http://africanexaminer.com/abariot0712>- accessed on May 5, 2012

were retained. In the southeast, however, the colonial administrators had crushed the Aro⁶² of that region and the search for acceptable local administrators met with frustration. Consequently, the tasks of governance were initially left in the hands of colonial officers who opposed many Igbos, because of the traditional egalitarian principles, which the Igbos used as the basis for their early resistance to colonial rule.

One significant milestone however, was the unification of northern and southern protectorates of Nigeria in 1914. In effect, this unification achieved a loose affiliation of the three distinct regional administrations into which Nigeria was subdivided: northern, western, and eastern regions of Nigeria. Adalikwu, (2007) argues that the aim of the unification was not to create a stable country but rather an avenue to promote a successful colonial trading station for the benefit of the colonialists.

Nationalists, nay tribalists in the south clearly opposed the indirect rule regime that silenced westernized elites who were critical of colonialism for its failure to appreciate the tradition of the indigenous cultures. In the north however, Islamic legitimacy affirmed the rule and hegemony of the emirs, and nationalist sentiments were decidedly anti-western.

In spite of the ethnic rivalry and tension among the nationalists, Nigeria eventually gained her independence from Britain on October 1, 1960. Under British influence, Nigeria fashioned its government after the west minister parliamentary system and leaned towards capitalism. After Independence, it became apparent that the Nigerian politicians and administrators themselves lacked the political experience and skill to run the inherited parliamentary system of government.

Dr. Nnamdi Azikwe was installed as Governor General of the federation while Tafawa Balewa became the head of a democratically elected parliament. In 1963, Nigeria became a republic within the commonwealth, and Dr Nnamdi Azikwe (who was hitherto the Governor General) became the first President of the Federal Republic of Nigeria.

Turner (1980:203) posits that in the first five years of post-independence in Nigeria, “politics rather than entrepreneurship was the more attractive avenue open to the citizens for the

⁶² Aro was a highly organised, egalitarian and prosperous community of people, supported by highly organised hierarchy of priests, chiefs, and agents to “all powerful God” known as “Chukwu” or “Ibini-Ukpabi”. (See Adalikwu, 2007).

accumulation of funds". She affirms that the government was conceived more as a vehicle for distributing bounties than as an agent of economic development.

The attractiveness of public sector as an avenue for amassing and distributing state largess coupled with the disturbances associated with the first Nigerian elections held in 1964/65 led to the first coup in January 1966, where the first civilian administration in Nigeria was sacked. Major General Johnson Aguiyi-Ironsi emerged as the military leader who intervened and restored order to the country. He was subsequently removed in a counter-coup six months after assuming office and was succeeded by Major General Yakubu Gowon. The early military administration came with an agitation for secession by the Eastern Region. This agitation snowballed into a civil war which lasted from 1967 to 1970.

In 1967, the military administration created 12 states of the four regions (i.e. north, west, east and mid-west) in Nigeria. This was increased to 19 states in 1976 by General Murtala Ramat Muhammad who later emerged as the military leader after the ousting of General Gowon; later the states have over the years increased to 36 states including the federal capital territory, Abuja.

In 1979, five political parties contested a series of elections in which Alhaji Shehu Shagari of the National Party of Nigeria (NPN) was elected President, thus ushering in the Second Republic (Meredith, 2005).

In August 1983, President Shagari was re-elected in a landslide victory with a majority of seats in the Parliament and the control of 12 state governments. But the elections were marred by violence and allegations of widespread vote rigging and electoral malfeasance, leading to legal battles over the results (Falola and Ihonvbere, 1985).

On December 31, 1983 the military aborted the Second Republic thus ushering in Major General Muhammadu Buhari⁶³ as the leader of the Supreme Military Council (SMC), the country's new ruling body. The Buhari government was peacefully overthrown in a counter coup led by General Ibrahim Babangida in August 1985.

General Babangida promised to return the country to civilian rule by 1990 which was later

⁶³ General Buhari as at the time of writing this thesis still remains a presidential hopeful having lost the presidential elections twice in Nigeria.

extended until 1993. The presidential election was finally held on June 12, 1993 with the inauguration of the new President scheduled to take place on August 27, 1993, the eighth anniversary of President Babangida's dictatorship.

In the historic June 12, 1993 presidential elections, which most local and international observers adjudged to be Nigeria's fairest, early returns indicated that Chief M.K.O. Abiola won a decisive victory. However, on June 23, Babangida, using several pending lawsuits as an alibi, annulled the election, throwing Nigeria into turmoil. Unable to “maradonise⁶⁴” the situations, President Babangida was forced to “step aside” for Chief Ernest Shonekan, a prominent nonpartisan industrialist. Shonekan was to rule until elections scheduled for February 1994. But because Shonekan was unable to reverse Nigeria's economic problems or to defuse lingering political tension and with the country sliding into chaos, (also motivated by petro dollars) General Sani Abacha assumed power and forced Shonekan's resignation on November 17, 1993.

The crises created by the annulment of June 12, 1993 election continued with the self-declaration as President on June 11, 1994, by Chief M.K.O. Abiola. He was arrested a few weeks later and later died after a protracted detention.

On October 1, 1995 Abacha announced the timetable for a 3-year transition to civilian rule but later died of heart failure (before his plot to install himself as civilian President came to fruition) on June 8, 1998 and was replaced by General Abdulsalami Abubakar who through series of elections held in 1998 and 1999 finally handed over to Chief Olusegun Obasanjo (former military Head of State) thus ushering in the fourth republic on May 29, 1999. The re-emergence of democracy in Nigeria on May 29, 1999 ended 16 years of consecutive military rule!

President Obasanjo took over a country that faced many challenges: including an over-bloated and highly dysfunctional bureaucracy, dilapidated infrastructure, corruption-ridden public institutions and a military that wanted a ‘settlement’ for returning quietly to the barracks. He however ruled for eight years and it was reported that towards the end of his second term, he

⁶⁴ President Babangida was often likened to the Maradona, the great soccer dribbler, due to his penchant for political shenanigans.

attempted to manipulate the constitution to get a third term⁶⁵.

In the general elections conducted in 2007, Alhaji Umaru Yar'Adua and Dr Goodluck Jonathan, both of the People's Democratic Party (then and current ruling party), were elected President and Vice President, respectively. The elections were marred by electoral fraud, and the results of the elections were consequently rejected by other candidates and international observers⁶⁶.

Yar'Adua's presidency was fraught with uncertainty as media reports said he suffered from kidney and heart disease. In November 2009, he fell ill and was flown out of the country to Saudi Arabia for medical attention. He remained incommunicado for about two months, by which time rumours were rife that he had died. In February 2010, Vice President Goodluck Jonathan began serving as acting President in the absence of Yar'Adua. On May 5 2010, President Yar'Adua's passed on after a long battle with undisclosed health problems. Consequently, Goodluck Jonathan was sworn in as the substantive President and he finished Yar'Adua's presidency in 2011. He subsequently got elected and he is currently the President of Federal Republic of Nigeria.

Clearly, the quick and rapid change in political leadership in Nigeria as outlined in the preceding paragraphs suggests a political environment that is highly fluid and inclement to the drive to attract private sector investment into the infrastructure space using PPPs. This fluidity has no doubt affected risk perceptions by stakeholders and the proportion of risks private sector would be willing to accept in infrastructure projects without demanding prohibitive risk premiums that could potentially make PPP projects infeasible and largely unaffordable.

3.3 The Shifting Economic System

With about 160 million people, Nigeria is the most populous country in Africa⁶⁷, with a GDP second only to South Africa's. As at 2011, Nigerian GDP was \$414.5 billion, the Real GDP

⁶⁵ The debate about the Obasanjo's third term attempt is still unending in Nigeria- see for example <http://dailypost.com.ng/2012/04/08/third-term-agenda-obasanjo-used-govt-funds-to-finance-agenda-ex-minister/>- accessed on May 5, 2012.

⁶⁶ Infact the elections of April 2007 were judged by most observers to fall a long way short of the standards for credible, free and fair elections and to be the worst in Nigeria's post-independence, electoral history. See <http://www.dfid.gov.uk/Documents/publications1/elections/elections-ng-2007.pdf>- accessed on May 5, 2012.

⁶⁷ It is important to note that Africa's economy as a whole is now the second fastest-growing in the world; its population is more than a billion strong (not much behind China's or India's) and its collective GDP of nearly \$2 trillion is bigger than either Russia's or India's (See the Economist, June 2nd, 2012). Generally, perception about this continent is not real. In terms of political instability, one of the risk factors examined in this study, there has been a significant progress. Africa has equally witnessed progress in political reforms (see the report titled: "Investment

growth rate was 6.9% and the per capita GDP as at 2010 was \$1,224 (Bureau of African Affairs, 2012).

Following several years of military rule and poor economic management, Nigeria experienced a prolonged period of economic stagnation, rising poverty levels, and the decline of its public institutions. By most measures, human development indicators in Nigeria were comparable to that of other least developed countries while widespread corruption undermined the effectiveness of various public expenditure programs and the low performance of non-oil sectors, particularly Agriculture.

As a matter of fact, Agriculture had suffered from years of mismanagement, inconsistent and poorly conceived government policies, a lack of basic infrastructure. Still, the sector accounts for about 40% of GDP and two-thirds of employment⁶⁸. Oil dependency⁶⁹, and the allure it generated for sudden wealth through government contracts (creating nouveau riche who become lords over the political hoi polloi), spawned other economic distortions. With the country's high propensity to import, it means roughly 80% of government expenditures are recycled into foreign exchange (Bureau of African Affairs, 2012).

Also, the lack of public investments in previous decades meant that there were severe infrastructural bottlenecks that hindered private sector activities; especially, the poor condition of the power sector prior to economic reforms illustrated the severity of Nigeria's infrastructure deficit. Per capita power consumption in Nigeria was estimated at 82 kilowatts (KW) compared with an average of 456KW in other Sub-Saharan African countries and 3,793KW in South Africa (Okonjo-Iweala and Osafo, 2007).

Although Nigeria must grapple with its decaying infrastructure and a poor regulatory environment, the country possesses many positive attributes for carefully targeted investments

Opportunity: Perception about Africa unreal- Ernest and Young⁷ published on June 2nd, 2012 by the Punch Newspaper).

⁶⁸ Nigeria exemplifies the paradox of penury in the midst of plenty: here is a country so richly endowed, where 82 million hectares out of its total land area of 91 million hectares are arable. Nigeria has an extensive coastline favourable climatic types that can grow a diversity of food crops, cash crops and livestock. Yet according to Oxfam, a British aid group, Nigeria imported \$3 billion worth of food in 2007, rising to \$4 billion in 2008, ...it also spent about N555 billion (about \$5 billion) importing rice, wheat, sugar and fish in 2009..it still spends \$700 million to import rice from Thailand in one year (The Editorial of The Punch, Wednesday, June 20, 2012). This unbridled import dependence continues to put pressure on the Nigerian currency (Naira) and the country's foreign reserves continue to take the bashing.

⁶⁹ Despite the seeming dominance of Agriculture, the Crude Petroleum sub sector still contributes over 80 % of Nigeria's foreign exchange (NBS, 2012).

and could expand as both a regional and international market player.

Nigeria is the second largest oil producer in Africa and the eighth top producer globally, yet most people live on less than on \$1 a day. As noted before, Nigeria's economy is highly dependent on the oil sector to the detriment of other sectors. It is well documented in the literature that most countries with high revenues from oil and other minerals score lower on the United Nations Human Development Index, they exhibit greater corruption, have a greater probability of conflict in any five-year period, have larger shares of their population in poverty, devote a greater share of government budget to military spending, and are more authoritarian than those with more diverse sources of wealth. Nigeria is a perfect example of countries that have shown these patterns - widely referred to as the "natural resource curse"⁷⁰. This is indeed a situation whereby natural resource wealth exacerbates stagnation, corruption and conflicts, instead of economic growth and development. The mono-resource nature of the Nigerian economy and its susceptibility to shocks in resource prices are well documented. For example, Ayadi (2005) and Oaikhenan and Udegbonam (2008) show that oil price fluctuations adversely impacted the output of the industrial sector in Nigeria. This could also affect the ability of governments to meet their obligations under PPPs particularly direct financial obligations (such as the availability payments and viability gap funding) and contingent liabilities arising from projects ex post.

In reviewing the shifting economic system in Nigeria, it is important to bear in mind that prior to 1970, Nigeria's economy was based on agricultural products. Its export earnings were mainly from cash crops such as peanuts, palm produce, cocoa, rubber, hides and skin. However, from the middle 1960's greater emphasis was placed on oil, and by 1980 Nigeria had become a one-commodity economy and a leading member of OPEC. At the peak in 1979, Nigeria produced

⁷⁰ Oil Boom and 'Dutch Disease' are well known concepts in the literature. In the wake of the global petroleum boom of the early 1970s, oil producing countries reflected similar experiences with the advent of 'windfall' gains. Enormous revenue increases from the foreign sector accrued directly to producer governments. The sudden inflow of resources prompted a precipitous increase in the size and activities of the public sector. These states deriving the preponderance of resources from external rents, directed their expenditures toward ambitious development programs, including an expansion of public enterprise and state subsidies. The term 'Dutch disease' (used to describe the series of economic consequences flowing from the Netherlands' natural gas windfall), has been used to characterize the syndrome associated with commodity booms. Non petroleum productive sectors experience relative or absolute decline as investment and employment are attracted to non-traded sectors, notably construction and domestic services. This shift fosters an appreciation of the real exchange rate, which in turn reduces competitiveness of non-petroleum exports and increases incentives for importation- see -the basic features of Nigeria's political economy as articulated by (Lewis, 1992).

2.4 million barrels per day and sold at average of \$40 per barrel.

The discovery of large reserves of oil in Nigeria in the 1960s came as a mixed blessing. The government saw it as a way to increase its export earnings, and to facilitate economic development. However, the increased emphasis on oil led to the neglect of cash crops and other raw materials as sources of foreign exchange. The oil boom also led to crass greed and corruption in the public sector, this in turn led to military coups and counter coups as reviewed above. Moreover, the 1967-70 civil war disrupted production and required expensive reconstruction efforts; this altogether put a lot of fiscal pressures on government.

The discovery of oil specifically in the Niger Delta region of Nigeria (currently made up of the following States i.e. Rivers, Akwa Ibom, Ondo, Edo, Imo, Abia, Delta and Bayelsa States), came with continued agitation for resource control by the Niger Delta people. These States constantly lay on the table the marginalization of their group in the distribution of oil royalties and other revenues accruing from petroleum resources. Since gallons of scholarly ink had been expended on the well-known Niger Delta Crisis⁷¹; this phenomenon is by no means the focus of this study.

During the Second Republic, dependence on oil for 90% of its earnings in the face of dwindling oil revenues, plus large scale mismanagement and corruption obviously led to both economic and social crisis (Chapman 1984). The economy managers had based their budget assumption on \$35 per barrel price with production at two million barrels per day, but prices nosedived to half this level, and production targets were hard to maintain.

It is crucial to note that from 1975-1980, Nigeria had experienced an unprecedented oil boom. It did not however use the new wealth wisely⁷². Again, the outcome was a swollen and over bloated public sector that obstructed private entrepreneurship, coupled with massive foreign debt and highly devalued currency and depleted foreign reserves. A wave of heightened expectations enveloped the nation during the oil boom, as one public leader declared ‘the problem is not how to get money, but how to spend it’ (Okigbo, 1987).

⁷¹ Niger Delta is the oil producing region in Nigeria. It is known for incessant crises that often led to significant disruptions to oil production. At the pick of the crisis, its oil production fell from 2.4 million barrels per day to a little above 1 million barrels.

⁷² Jeffrey Sachs et al. debunked the myth of branding Nigeria as a ‘resource rich’ country in the famous report titled “Ending Africa’s Poverty Trap”. He argues that Nigeria is not (contrary to popular sentiments) a rich country that squandered vast wealth. Rather it is a poor country that squandered a modest inheritance (2004).

An analysis of the shifting economic system of Nigeria will be incomplete without a concise evaluation of four critical macro-economic variables that could affect the affordability and bankability⁷³ of PPP projects: Gini index, inflation rate, exchange rate and interest rate. These variables are discussed briefly below:

Inflation rate: Average inflation rate between 2006 and 2010 was 10.9%. The Composite Consumer Price Index which measures inflation rose to 12.9 percent year-on-year in April 2012 (NBS, 2012)⁷⁴. With inflation rate of this magnitude, prices and tariffs associated with PPP services would also increase thereby making them unaffordable. It then means that the probability of occurrence for any risk associated with price increases is high in the context of Nigeria and this would reflect in the allocation and subsequent pricing of variables that may be impacted.

Interest rate: The prime and maximum interest rates averaged 16.9 % and 20.2 % respectively within the period under review (2006-2010). The two interest rates are still high and could impede investment by both large and small scale investors⁷⁵. It could also make infrastructure projects funded with bank loans to be unaffordable to end users or even make the PPP option unattractive.

Exchange rate moved from N129/USD1 in 2006 to N151/USD1 in 2010⁷⁶. One major factor responsible for this is obviously the import dependent nature of the economy which has continuously put pressure on foreign reserves of the country.

Arguably, this variable could also affect the outcomes of PPP projects- particularly for unhedged foreign loans availed to PPP projects. This is particularly pertinent where you have loans in foreign currencies and you have infrastructure assets that generate cash flows in local currencies- say in Naira (Nigerian currency). To hedge foreign exchange rate risk and interest rate risks, there are however diverse instruments available in the market- discussion of these instruments are not within the scope of this thesis. Nevertheless, it is useful to indicate that the first toll road PPP project executed in Nigeria took advantage of these instruments to hedge the \$85 million loan taken from the African Development Bank (LCC, 2010).

⁷³ Note again that appropriate risk allocation could enhance the bankability of PPP projects; also PPP projects that are not bankable are usually dead on arrival as infrastructure projects are mostly financed with more of debt than equity.

⁷⁴ National Bureau of Statistics-<http://www.nigerianstat.gov.ng/> accessed on May 28, 2012. Although, this pales in comparison to inflation rates in countries like Argentina and Zimbabwe: Argentina's inflation rate is already over 25% (see *The Economist*, June 2nd, 2012) and Zimbabwe had an incredible year-on-year inflation rate of over 23 million% in 2008 (see website of the Reserve Bank of Zimbabwe- <http://www.rbz.co.zw/about/inflation.asp>).

⁷⁵ The prime interest rate is the rate at which commercial banks lend to large scale enterprises while the maximum rate is the rate of lending to small and medium scale borrowers.

⁷⁶ Central Bank of Nigeria, cited in the National Bureau of Statistics' website

Gini index⁷⁷: According to the World Bank, this index increased from 42.93 in 2004 to 48.83 in 2010 (World Bank, 2012). The measure of inequality in terms of income cum consumption distribution is useful in the consideration of willingness to pay criterion, particularly where user fee regime is contemplated. The available data suggests that inequality has worsened in Nigeria between 2004 and 2010- this equally suggests that the poor might be getting poorer while the rich might be getting richer.

To tackle the economic challenges indicated by these worsening macro-economic variables, private sector groups, and technocratic elements within the government have advocated limitations and changes in the state's economic role: government should be focused on creating enabling environment, developing infrastructure with the private sector, safeguarding private sector investments, reducing official bottlenecks and motivating local and international investors (Adesina, 2012). The effectiveness of the successive governments in carrying out this important role in the Nigerian economy remained to be seen; hence these weak institutional settings as outlined above had altogether impacted risk perceptions and the proportion of risks private sector entities are willing to absorb in PPPs.

3.4 Brief History of PPPs in Nigeria

In all economic jurisdictions, infrastructure is crucial to economic development. Economies with inadequate or underdeveloped infrastructure are bound to experience slow economic growth, and, in some cases, social unrest with the attendant human and material casualty. Any economy faced with the challenge of infrastructural deficiency is generally unattractive to capital, domestic or foreign. Such economy could hardly raise the quality of life of the citizenry as the success of any meaningful effort at raising or maintaining the standards of living is heavily contingent on the adequacy of infrastructure services both in terms of their quantity and quality (Esfahani, 2005).

For the Nigerian state, the story is appalling if not tragic. Today, Nigeria's infrastructure is in dire state. Aside from the fact that it does not meet the needs of investors, it inhibits investment and escalates the cost of transacting business in the country (FGN, 2004). In the Global

⁷⁷ This is the most commonly used measure of inequality. The coefficient varies between 0, which reflects complete equality and 100, which indicates complete inequality (one person has all the income or consumption, all others have none).

Competitiveness Report 2009 – 2010, released by the Geneva – based World Economic Forum in August 2009, Nigeria was ranked 99th out of the 133 economies that were surveyed by the global body.

With PPP initiatives, the potential and the zeal of Nigeria to be among the top 20 economies of the world by year 2020⁷⁸ are supported. This is also reinforced by the relative successes of the private participation in the telecommunications sector where private provisions have led to accessible, available and affordable services (Sotola and Ayodele, 2011, World Bank PP1, 2012).

It must be noted at this juncture that there is a dearth of useful scholarly materials on a few PPPs operational in Nigeria. Arguably the history of classical PPPs in Nigeria⁷⁹ could be traced to the concessioning of the Muritala Muhammed Airport in 2003. Thereafter, other attempts have been made to deploy PPPs in other sectors at both the federal and state levels. The ensuing paragraphs will provide some overview of a few projects that have been executed⁸⁰ so far using various forms of PPP models:

3.4.1 Akute Power Project

An independent power plant built by the Lagos State Government along with Oando Plc (an integrated energy company in Nigeria). The objective of the project is to provide uninterrupted power supply at the Lagos State Waterworks in Adiyari/Iju so as to boost the volume of water generated. Since operation, this PPP initiative has helped government to save the sum of N49.2 million (over US \$300,000) monthly by switching from diesel generating to gas powered plant. Similarly, it has improved citizens' access to potable water by 42 per cent, bolstered service

⁷⁸ Some of key goals to achieve Nigeria's vision 20:2020 include the followings (ICRC 2010):

- GDP of not less than \$900bn, currently about \$400 bn (2011)
- GDP per capita of not less than \$4,000, currently about \$2,500
- Power generation of 40,000 Mega Watts, currently less than 4,000 MW
- Sustainable 10% GDP growth, currently less than 8%.

⁷⁹ Nigeria has not got a long tradition of PPPs yet. Although it is rather convenient (at least to non-technical readers) to assume that the various arrangements in the oil and gas sector in Nigeria are classical PPPs; given that they entail some form of alliances between the private oil companies (usually the multinational oil companies, such as Shell, Exxon Mobil, and Chevron) and the government. These arrangements are in the form of joint venture and production sharing contracts; that are equally susceptible to all forms of agency problems. To be clear, the history of these alliances dates back to the late 1950s with Shell taking the lead. This sort of arrangements are not within the scope of this study because they are not classical PPPs: recall PPPs are usually for infrastructure projects or services that were hitherto being provided or rendered exclusively by the government; oil exploration activities undertaken for commercial purposes cannot be grouped under this category. Also, it is generally recognized that a PPP programme offers a long-term, sustainable approach to improving social infrastructure, enhancing the value of public assets and making better use of tax payers' money (Li and Akintoye, 2003, in Akintoye, Beck and Harcastle, 2010. Pg.3)

⁷⁹ See The Economist, 2012-The World in Figures

⁸⁰ Only projects that are operational and meet the strict classification of PPPs are featured here.

delivery to end users and ultimately enhanced revenue collection from service users (Dina, 2011⁸¹).

Based on the interaction of this learner with officials of both Oando and Lagos State Government, the major risks in the project were allocated somewhat as follows: demand risk for this captive power plant was completely taken up by Lagos State Government under a Power Purchase Agreement (PPA)⁸². Under this arrangement, the Lagos State Government obligated to pay for the 12 Mega Watts generated from the plant without prejudice to actual power consumed in the four water plants that are linked to the power plant, i.e. Adiyin intake, Adiyin head works, Iju intake and Iju head works. The Special Purpose Vehicle (SPV) in this project, Akute Power Limited (APL) on its part took risks such as: financing risk, design risk, operation and maintenance risk and technology risk. As typical of most PPPs, the allocation of some of these risks played out in the various sub contracts that defined the obligations of various parties in the project as follows⁸³:

- Clarke Energy Nigeria limited – Generator vendor and the Operations and Maintenance (O&M) partner.
- Aklab Nigeria Limited – Mechanical works sub-contractor.
- Ejerry Electrical – Electrical works sub-contractor.
- Manifold Nigeria Limited – Civil works sub-contractor.

3.4.2 Lekki Epe Road Project

Lekki-Epe Road Project is the first toll road PPP in Nigeria- a US\$450 million project between Lekki Concession Company⁸⁴ and the Lagos State Government. The road is a 49km stretch and the deal achieved financial close in the depths of the global recession in 2008. Lekki Concession Company Ltd is the Special Purpose Vehicle (SPV) engaged in executing the 30-year Lekki Toll Road Concession, under a mandate from Lagos State Government⁸⁵. The project is the

⁸¹ See <http://allafrica.com/stories/201103240546.html>

⁸² As expected, due to the confidential and commercially sensitive nature of the agreement, the details of this PPA were not revealed to the learner.

⁸³ Based on some public and non-confidential facts shared with me by officials involved in the project during my visit to the plant and interview- they chose to remain anonymous.

⁸⁴ LCC, an initiative of ARM Group, is a special purpose vehicle (SPV) set up specifically to execute the Lekki toll road concession project. African Infrastructure Investment Fund (AIIF) led by the Macquarie Bank Group of Australia, which is one of the world's largest investors in infrastructure is one of the leading shareholders in the consortium.

⁸⁵ Scope of work includes: Expansion of the Carriageway, Roundabouts, Interchanges, Intersections, Bus-stops, Drainage Systems, Street Lights, Traffic Lights, Underground ducts and Crossings, Fibre optics, Electrical and other

first of its kind in Nigeria, and it is pioneering change in the way road infrastructure is financed and delivered in the country (LCC Website, 2011⁸⁶). With 70:30 Debt-Equity Ratio, the project drew financial resources from multiple sources using some creative financial instruments such as : a Mezzanine loan of N5 billion from the Lagos State Government, N46.8 billion long-term financing syndicated by some commercial banks in Nigeria (including, Standard Bank, First Bank Plc, Fidelity Bank Plc, Zenith International Bank Plc, Diamond Bank Plc and United Bank for Africa Plc) , an \$85 million senior loan hedged in Naira from the African Development Bank (AfDB), and a sovereign guarantee as opposed to the prevalent practice of securing an Irrevocable Standing Payment Order (ISPO) against funds accruing to the State from the Federal Allocation Account (LCC Presentation, 2010⁸⁷).

The touted benefits of the project include: convenience, reduced journey times, safety and security. The State Government had the following responsibilities under the contract:

1. Provide land and remove obstructions from the Right of Way;
2. Resettlement and compensation of affected persons;
3. Relocation of services (e.g. electricity pylons and other infrastructure) from the Right of Way;
4. Construction of Access Roads, and Alternative Routes to bypass Toll Plazas; and
5. Traffic management and security.

The Concessionaire on the other hand had the following key responsibilities:

1. Raise the financing for the project;
2. Construction, project management and execution;
3. Operation and maintenance of the Toll Road infrastructure;
4. Revenue Collection and
5. Transfer of assets to Lagos State at the end of the concession term.

To align the incentives and long term interests of the Concessionaire with the key contractor to the project, a ‘tied-in equity’ arrangement was fashioned out where the Concessionaire exercised the option to pay part of contract value in equity.

Cables, Electronic Toll Equipment, Ambulance Services, Road and Drain Cleaning, Call Centre- Customer Help Line, Routine Maintenance.

⁸⁶ See- www.lcc.com.ng

⁸⁷ See Lekki Toll Road Concession- Case Study: Presentation to Amina Muhtar, John Hopkins University, 25th June 2010.

In spite of these creative frameworks, the project had some challenges- chiefly, public opposition to toll collection - which led to the use of shadow toll regime. For example, Governor Raji Fashola of Lagos State at a budget presentation explained that the state spent about N4 billion as compensation to LCC for suspending toll collections on the road. His argument was that such a huge amount of money could have been spent on other areas of development in the state⁸⁸. However, toll collection has eventually begun on the road and it does appear the project is on course. But there are lessons: proactive stakeholder engagement and securing the buy-in of stakeholders prior to project implementation could possibly have prevented the widely reported backlash and the ensuing financial liability to the government.

3.4.3 Muritala Muhammed Airport (Terminal Two) Project

Following the inferno of May 10, 2000, the Federal Government of Nigeria made a decision to redevelop the Muritala Muhammed Airport (Terminal Two) using private sector investment under a Public-Private Partnership Scheme. The plan completely transferred all development and operating risks to the private sector specifically on a Build-Operate-Transfer (BOT) arrangement. In April 2003, Bi-Courtney Limited, the parent company of Bi-Courtney Aviation Services Limited, was awarded the concession by the Federal Government of Nigeria to design, build and operate the Murtala Muhammed Airport, Lagos Domestic Terminal and ancillary facilities on a land area of 20,000 square meters. This is the first major BOT project in Nigeria (MMA2 Website, 2011). The BOT contract agreement was specifically between the Federal Airports Authority of Nigeria (FAAN), an agency of the Federal Government of Nigeria and Bi-Courtney Limited (BCL) A supplementary agreement was signed in June 2004; mainly to increase construction period from 18 months to 33 months (ICRC, 2010⁸⁹).

No doubt, as the first PPP in Nigeria, this project has succeeded in delivering a terminal that had become the benchmark for other airports in the country⁹⁰. It however has a few challenges: arising from the debacle on the actual concession period, to contract terms that have not been

⁸⁸ See the article titled “Lagos, LCC Justify Payment of Tolls on Lekki-Epe Expressway” published on December 11, 2011 by This Day Newspaper- www.thisdayonline.com accessed on December 11, 2011.

⁸⁹ See Infrastructure Concession Regulatory Commission’s website- a presentation titled: Nigeria: The Most Dynamic PPP Market in Africa? Feb. 2010 i.e. www.icrc.gov.ng.

⁹⁰ See the report titled: “Bi-Courtney celebrates MMA2 at five”, published by The Punch, a Nigerian National Newspaper- on May 26, 2012- www.punchng.com.

strictly adhered to and claims and counterclaims on amounts owed each other under the contract. For example, as at June 2010, FAAN claimed BCL owed the Government \$6.7 Million (mainly 5% of annual turn-over), and Bi-Courtney claimed FAAN owed them \$73 Million (mainly proceeds from the operations at the General Aviation Terminal in Lagos) ICRC, 2010). The obvious factors which shaped the outcome of the project and the lessons learnt include: highly deficient contract arising from inadequate experience in PPPs, being the first of its kind, thus corroborating the lack of capacity challenge; political involvement at the implementation level; asymmetry of knowledge between Concessionaire and Government; not enough due diligence by contracting authority; shallow project preparation and lack of competition.

3.4.4 Ports Concession Projects

In order to improve the hitherto clogged, inefficient, and very expensive ports system in Nigeria, the Bureau of Public Enterprises in 2004 and 2005 engaged through (both competitive and direct negotiated processes) a number of concessions to private entities to manage, operate, and rehabilitate 26 ports. For example, months after the concession of the Apapa-Lagos container terminal (one of the concessioned terminals), delays for berthing space had dwindled, and shipping lines reduced congestion surcharge from \$525 to \$75, saving the Nigerian economy an estimated \$200 million a year (ICRC, 2010).

Notwithstanding the significant improvement in efficiency and productivity at these ports (turning revenue gulping assets into revenue generating assets), these projects did face some challenges, such as : transaction activities targeted at the signing of the concession contracts to the detriment of due process (i.e. particularly with the terminals concessioned using direct negotiations); the risk allocation did not consider the Government's capacity to deliver; and the failure to balance the interests of both parties during negotiations.

3.6 Conclusion

Nigeria as a country has evolved since independence a half century ago; similarly, the practice of PPP as an alternative procurement option is equally evolving. The few PPPs operational in the country have had their success stories as well as their challenges. These challenges could be

linked to the macro level risks discussed above in the context of doing PPPs in Nigeria. How these risks are perceived by stakeholders is an important element that would affect allocation preferences. With homogeneity in risk perceptions among PPP stakeholders in Nigeria, risks should be allocated to the party best capable of managing them. The theoretical explanation for this homogeneity could be situated in the blurring of roles in PPPs; where officials in government due to corruption may also have interest in the companies that bid for PPP contracts. The risk associated with these institutional deficiencies could be framed as those associated with poor public decision-making process. However, the blurring of roles could also have an advantage in that perceptions of risks by stakeholders could converge due to interests that may not necessarily conflict. With the convergence of interests and perceptions due to the blurring of roles, the principle of allocating risks to the party best capable of managing the risk (i.e. optimal allocation) is likely to be respected; and this could arguably enhance the success of PPPs in Nigeria⁹¹.

Overall, it remains clear that these few projects discussed in the light of the weak institutional conditions in Nigeria would have performed better in terms of meeting the stated goals and delivering improved benefits to all parties: with better and more proactive risk management and stakeholder engagement, less political interference, more respect for the sanctity of contract, more competitive, transparent and accountable bidding processes, and more attention being focused on continued capacity building.

⁹¹ It is to be noted however that an agreement on risk perception is a **necessary condition** but not a **sufficient condition** for optimal risk allocation and by extension; a necessary condition for PPP success.

Chapter Four: Methodology

4.1 Introduction

This research project involved PPP project participants in both the private and public sectors spanning major groups such as Bankers, Public Officials in Ministries, Departments and Agencies, Project Managers/Consultants/Contractors and Operators of Special Purpose Vehicles for PPPs. This chapter commences with the rationale for the research method, design and procedures, including the population, sample, and instruments. In addition to these, data collection, analysis of the data, validity and reliability and ethical considerations are discussed.

4.2 Research Design Strategy and Data Collection Procedures

Convenience sampling technique (non-probability) was used to draw participants to the study. Here, sampling was done on the basis of availability and ease of data collection while also paying close attention to the suitability of participants. The “captive samples” (group of individuals who are accessible to the investigator) for the survey in this study was drawn largely from the banking sector⁹², although participants cut across the three selected stakeholder groups: Financiers, Clients (Public Sector) and Operators (Private Sector). This type of sampling method is called judgement sampling and is a variant of purposive sampling or non-probability sampling technique.

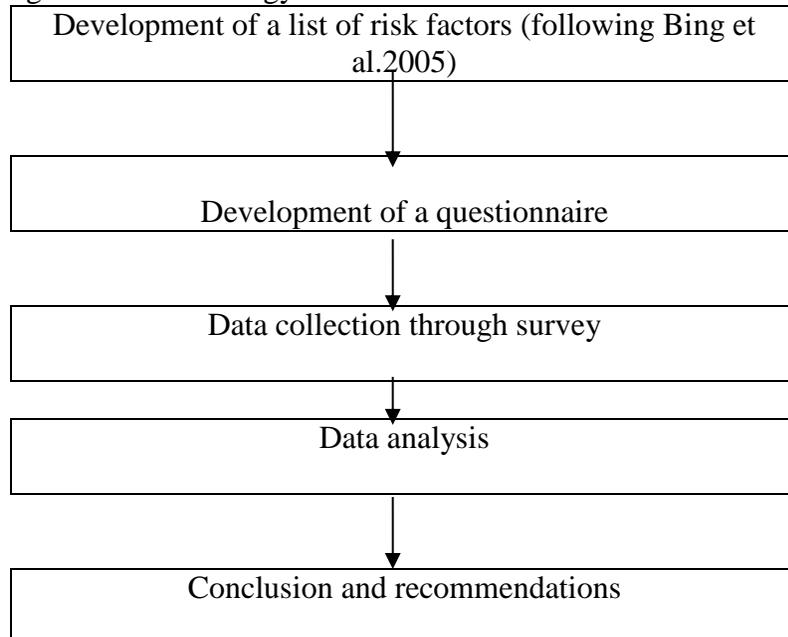
Questionnaire survey is the most common research method used to obtain a risk-allocation scheme in PPPs. For instances, Li et al. (2005) developed a preferred risk allocation scheme for PPP projects in the United Kingdom based on an opinion survey with 53 suitable responses; Rouboutsos and Anagnostopoulos (2008) conducted a similar survey using the same questionnaire in Greece and compared the findings to those in the UK; Jin and Doloi (2008) gathered data from an industry-wide survey to test the theoretical framework for understanding risk allocation practice in PPP projects. To increase the confidence level, the sample size for the survey was pegged at a minimum of two hundred (200) survey participants.

⁹² For further description of this and other nonprobability sampling techniques in quantitative research, see Henry (1990), and for qualitative research, see Patton (1990) ---all cited in Tashakkorie and Teddlie (1998). Henry, G.T. (1990). *Practical Sampling*. Newbury Park, CA: Sage. Patton, M.Q. (1990). *Qualitative evaluation and research methods* (2nd ed.) Newbury Park, CA: Sage

4.3 Phases of the Research Program

Based on the research traditions chosen for this work, the research methodology distributed into various phases of the research program is shown in a flowchart in Figure 3 below:

Figure 2: Methodology Flowchart



Source: Author

The forty six (46) factors developed in Li, et al. (2005) were used for the quantitative aspect of this study.

4.4 Population and Sample

The target population for this study was stakeholders/experts in the PPP sector who were involved in infrastructure projects using the PPP model. The small sample size is due to the following reason: only individuals with some experience, knowledge and interest in infrastructure projects were contacted to preserve the quality of the opinions gathered in the survey. A brief description of the participants who participated in this study is as follows:

4.4.1 Financiers

Given that the bulk of financing required for infrastructure projects using PPP is usually sourced in form of loans, the perspectives of bankers who participated in PPP transactions were considered. From this group, participants were drawn from local banks and multilateral financing institutions such as the African Development Bank.

4.4.2 Public Officials in Ministries, Departments and Agencies (MDAs)

These individuals represent the stakeholders usually regarded as the Client in PPP transactions (public sector). They were drawn from government agencies involved in PPP projects as both the State and the Federal levels of government, Lagos State PPP Office and the Infrastructure Concession Regulatory Commission.

4.4.3 Consultants/Contractors

These individuals represent the private sector that designs, builds and operates the infrastructure assets, manages the revenues from the assets throughout the life of the PPP contract and transfers the assets to the Client at the end of the agreement.

4.5 Development of a Comprehensive Questionnaire: The Measuring Instrument

An online-administered questionnaire (hosted by qualtrics) was used to collect the data regarding risk allocation preferences and other important considerations. This measuring instrument was divided in sections: section one was geared towards collecting general demographic data of the participants. The second section focused on risk factors, their measurement and allocation preferences, partly using a 6-point Likert scale to rank the likelihood of risks crystallizing and their potential impact on PPP projects.

The questionnaire was used over other methods of collecting data from participants for the following reasons:

The survey allowed the learner to reach out to a much larger number of participants than was otherwise possible; participants had a chance to collect facts and respond at their own time; also more impersonal, therefore providing more anonymity and not susceptible to interview errors and bias.

To deal with the general problem of non-response in survey administration, the following measures were taken by the researcher to have reasonable and acceptable survey returns:

A brief explanation of the purpose of the study was made. Follow up emails were sent to participants after one week of non-response. Repeated phone calls were made to survey participants across Nigeria from June-November 2011.

4.6 Validity and Reliability of Study

To ensure the validity of the survey instrument, participants were asked to indicate the level of their knowledge or experience or interest with PPP. To make the work more robust and reliable, it was also ensure that only respondents in management cadre in their organizations were invited to participate in the survey as they are better equipped to answer questions relating to strategic matters such as project risk management. They were equally asked to indicate their level in management: low level, middle level and high level management. To specifically test for agreement in the responses of participants and the consistency of respondents' perceptions within a particular group, Kendall's concordance test was carried out extensively and the results enhanced the validity and reliability of the study.

4.7 Ethical Issues in the Research

The overarching goal of ethics is to ensure no one is harmed or suffers adverse consequences as a result of participation in research activities (Fowler, 2002, p.147, cited in Amposah, 2010). According to Fowler (2002), survey research is voluntary co-operation. In planning and conducting this research as well as reporting its findings, several obligations were fulfilled to meet the ethical standards.

The rigorous ethical standards of the University of Calgary were strictly complied with prior to setting out to collect data. The research project was carefully planned to meet strict ethical acceptability of the conjoint faculty's research ethics board of the University of Calgary. Some of these standards include, making known upfront the rationale for conducting the survey, the sponsorship, issues of confidentiality and anonymity, and contact details of ethics officer should they have any concerns about the way they have been treated as participants. Before participation, respondents were asked to consent appropriately before starting the survey without which they will not be able to proceed.

4.8 Data Analysis and Results

The data obtained out of the responses from the survey participants on probability of occurrence, impact of risk factors on PPP projects and the risk significance are analyzed in tables in Chapter

five. Robson (2002) provides measurement scales in quantitative approaches such as the Likert⁹³, Thurstone, Guttman, and Semantic types. Each of these provides some form of numeric indicator for the research process; however Likert was used specifically in this study. The latest version of Statistical Package for the Social Sciences (SPSS), 20.0 formed part of the research analysis tool for determining the risk significance based on risk rankings and tool for hypotheses testing. Three-level analytical framework was adopted: i.e. descriptive statistics, Kendal's Coefficient and Mann Whitney U tests.

4.9 Summary

Overall this chapter articulated the rationale for the research method, the research design and sampling procedures, including the population and instruments. It also presented the procedures for data collection, analysis of the data using a three-level analytical framework. It equally showed the validity, reliability and ethical considerations of the study.

⁹³ The well-known Likert scale was developed by an American educator and organizational psychologist Rensis Likert in 1932 as an attempt to improve the levels of measurement in social research through the use of standardized response categories in survey questionnaires. Six-point scale was adopted in this study to make participants commit to either the positive or negative end of the scale in terms of the measurement of perceptions and opinions on various risk allocation issues under examination.

Chapter Five: Results and Discussions

5.1 Introduction

This Chapter presents the results of the survey administered to PPP stakeholder groups in Nigeria. It is divided into two sections. The first section considers the question of risk perceptions using a three level analytical framework, while the second section presents the results on risk allocation preferences. The results of similar studies conducted in other jurisdictions on the questions of risk perceptions and allocation preferences were compared and discussed.

The survey was used to ascertain the relative significance (rating) of different risk factors and to analyze how to allocate each risk factor to different parties under PPPs. Precisely, the questionnaire was divided into two sections. The first section asks respondents to give their consent for voluntary participation in the study and draws key background information from respondents such as: sector, experience with PPP, managerial experience and PPP sectoral experience. The main purpose of this section is to collect useful background information of the respondents to conduct subsequent comparative analyses in the study.

The second section solicits information on risk probability, risk impact and specific allocation preferences of the 46 risk factors between private and public sectors. For robustness, a six-point Likert scale is used as a measurement scale for both the gauging of risk probability and risk impact. Regarding the probability of occurrence a six-point Likert scale ranges from 0-5, where, nil = 0, 1 = remote, 2= occasional, 3= probable, 4 = frequent and 5= very frequent. Regarding the severity of each risk factor, a six-point Likert scale ranges from 0-5 where, 0 = the impact is nil, 1= impact is negligible with no serious influence on the project, to 5= where impact is catastrophic, where the project would be aborted.

Regarding the risk allocation, participants were asked to allocate the 46 risk factors to either the private or the public sector, or describe it as preferably 'shared' between the public and private sector, where PB = public sector, PV = private sector, and SH = shared. Table 4 shows the background information of the respondents as per section one. The respondents needed to meet two criteria before being invited to participate in the survey, which include (1) having extensive working experience within the infrastructure industry in Nigeria , and (2) having been involved in the management of PPP projects in Nigeria or at least have some knowledge and/or interest in

the topic of PPP as practitioners. To be sure the participants are knowledgeable and have some experience in PPPs, all respondents were required to currently hold or to have held management positions in the past either in the private, public or banking sectors. The varied practical working experience and relevant organizations of the identified practitioners as analysed below indeed uphold and reinforce the validity of this study.

5.2 Research Participants and Sampling Procedure

Out of about 285 questionnaires administered to respondents between June and November 2011 through Qualtrics⁹⁴, 45 responded and 1 of the respondents is invalid. Although only 45 samples were collected, the number of samples was deemed adequate and representative when compared with other similar studies on risk management in infrastructure projects. For example, 35 responses were obtained in Kartam and Kartam (2001)'s questionnaire survey on risk management in the Kuwaiti construction industry; and 92 survey responses were collected by Rahman and Kumaraswamy (2004) on joint risk management in Hong Kong. In the only similar study carried out (to the learner's knowledge) in Nigeria so far (i.e. Ibrahim et al. 2006), only 42 questionnaires were returned out of the 150 distributed, of which only 36 are usable. This represents a 24% effective response rate. Moreover, 70 responses were collected in El-Sayegh (2008)'s research on risk assessment and risk allocation in the construction industry of the United Arab Emirates. Also in a recent and similar study i.e. (Ke et al. 2010) a total of 47 completed questionnaires were returned representing a response rate of 23% in China's PPP projects. Lastly, in the most recent study (also in China's PPP projects), Chan et al. (2011) sent out a total of 580 questionnaires and received a total of 105 valid responses for data analysis representing 18% response rate.

The respondents comprise 18.2% from the public sector, 15.9% from the private sector and 65.9% from the banking sector (local and international). The respondents from International Banks cuts across: African Development Bank and African Finance Corporation. While respondents from leading local banks were drawn from banks in Nigeria with substantial

⁹⁴ Qualtrics is an online survey platform used by scholars from different institutions including Haskayne School of Business at the University of Calgary.

experience in project finance: these include: United Bank for Africa Plc, Citi Bank Nigeria, Guaranty Bank Plc, and First Bank Plc.

From the responses, it was discovered that 15 respondents (34.1%) of the 44 have current practical experience in PPP, 9 respondents (20.5%) have been involved in PPP, 16 respondents (36.4%) have no practical experience but have interest and knowledge in PPP while 4 respondents (9.1%) have no practical experience in PPP and their interest and knowledge is at beginner's level.

Moreover, an analysis of the sectoral participation of stakeholders reveals the following characteristics: 44.4% have experience in PPP transport, 33.3% have been involved in power and energy, 8.9% in hospital, 8.9% in housing and office, 6.7% in water and sanitary; while no respondent had been involved in police and prison project in Nigeria.

Also, an analysis of the managerial experience of various PPP stakeholders shows that 50% of the total respondents have top level management experience, 43.2% middle level management, and 6.8% have low level management experience. Our analysis equally reveals that 15.6% of the organizations of private sector respondents have an average turnover of between USD \$ 6-40 million, 15.6% of these organizations have an average turnover of between USD \$ 40-100 million, and 12.5% of the organizations have an average turnover of between USD \$ 101-250 million, while 56.3% made an average turnover above USD \$ 250 million.

5.3 Results of Risk Perceptions of PPP Stakeholders

A three-level data analysis framework was adopted similar to Chan et al. (2011) using the Statistical Package for Social Science (SPSS) for window version 20. At the first level, the individual risk factors are ranked in descending order of the mean scores on the perceived risk significance (i.e. the product of risk probability and risk impact) to identify the important risk factors. This indicates an overall picture of the perceptions of different respondents on the risk significance. At the second level, the agreement cum consistency of respondents' perceptions within a particular group is checked by the Kendall's concordance analysis. Lastly, at the third level, the Mann–Whitney U test is applied to enable two-group comparisons to identify if there is any individual risk factor on which different perceptions between any two groups of respondents are placed.

Overall, the ranking of PPP risk factors in Nigeria is based on arithmetic mean scores; where a lower value indicates a lower level of importance. Analysis was also performed to test whether the values on each risk factor were equal for each of the identified groups.

In testing the hypotheses of heterogeneity of risk perceptions, extensive and rigorous statistical analyses were undertaken and detailed analysis was also performed to test whether there are statistically significant differences in the perceptions of risks across each of the following groups:

- Respondents working in the public and private sectors ;
- Respondents who have been practically involved in PPP projects and those with PPP knowledge; and
- Respondents with different levels of management experience.

5.3.1 Hypotheses of the Study

The theory being tested in this study is that there will be a difference between the risk (rankings) perceptions of private and public sector partners in PPPs stemming from the principal agent framework of goal incongruence. In examining the research questions, a three level data analysis framework was used consisting of: (a) descriptive statistics, (b) Kendall's Concordance test and (c) Mann Whitney U test. Since the data distribution was not normal, nonparametric tests were used to investigate the hypotheses.

Following the descriptive statistics, Kendall's Concordance test was used to assess unanimity or consistency among the various responses within the same group. This statistical test aims to determine whether the respondents within a particular group respond in a consistent manner or not (Kvam and Vidakovic, 2007 cited in Chan et al. 2011). The value of W ranges from 0 to 1, where 0 reveals perfect disagreement and 1 reveals perfect agreement. A significant value of W ($p\text{-value} < 0.05$) can reject the null hypothesis that there is a complete lack of consensus amongst the respondents within one group on the ranking of risk factors (Chan, 1998, cited in Chan et al. 2011). Meanwhile, Mann-Whitney *U* test was used to test the hypotheses flowing from the second research question in this study.

The test compares variables measured at an ordinal level between two groups at three levels (Public and Private sector partners (PBPV, Public and Banking Sector Partners (PBBK) and

Private and Banking Sector Partners (PVBK)) on 46 risk factors extracted from the literature. The Mann-Whitney U test is a nonparametric test that is employed with ordinal (rank-order) data in a hypothesis testing situation involving a design with two independent samples. It tests whether two independent samples represent two populations with different median values (Sheskin, 2007).

A p value was calculated for each of the Mann-Whitney U tests performed for each risk factor under each of the three pair-groups. A p value is the smallest level of significance at which the null hypothesis will be rejected. For the purpose of this study, p values that are less than 0.05 will be considered statistically significant. If the p value for a specific test is less than 0.05 the null hypothesis will be rejected and there is a significant difference between the risk perceptions of the private and public sector partners.

5.3.2 Hypotheses Testing and Results

Comparisons of Risk Rankings for the PPP Projects in Nigeria among Private, Public, and Banking Sectors

Rigorous investigations were carried out to ascertain whether significant differences existed between perceptions of the private and public sectors, between private and banking sectors and between public and banking sectors on the 46 risk factors for the PPP projects in Nigeria. *The hypothesis here is that risk perceptions will be different based on the sector of each respondents: such that the risk perceptions of respondents from the banking sector are to be significantly different from those from the private and public sector.*

Mann-Whitney U tests were performed across these three paired-groups. The Mann-Whitney U test is a nonparametric test that is employed with ordinal (rank-order) data in a hypothesis testing situation involving a design with two independent samples. It tests whether two independent samples represent two populations with different median values (Sheskin 2007). If the result of this test is significant (the significance level is lower than 0.05), it can be concluded that there is significant statistical difference between two sample medians.

A similar analytical framework has been used to compare the perceptions of Hong Kong and western respondents on construction project briefing (Yu et al. 2008); to compare the perceptions of financial criteria between different groupings (Zhang 2005) and most recently to compare the

perceptions of Chinese respondents in a PPP study focusing on risk assessment and allocation (Chan et al., 2011).

Table 7 shows that contrary to agency theory assumption of goal incongruence, which predicted divergence in risk rankings, there are no significant statistical differences between the public and private sectors on the risk rankings (perceptions) of PPP projects in Nigeria.

The results also show that the views of private and public sector PPP practitioners and bankers on all the risk factors for PPP projects in Nigeria were not statistically significantly different at 5% significance level, except for the risk factor of poor quality workmanship: this indicates that the banking sector perceived the risk of poor quality workmanship more critical than the public sector practitioners. Whereas in Chan et al. (2011), the views of academic and industrial practitioners on all the risk factors for PPP projects in China were not statistically significantly different at 5% significance level, except for the risk factor of government corruption. In this case, the industrial practitioners perceived the risk of government corruption more critical than the academic practitioners.

Table 7 shows the mean rank of the private and public sector practitioners and the results of the Mann-Whitney U test, while Table 8 shows the mean rank of the public and banking sector practitioners and the Mann-Whitney U test results; and Table 9 shows the mean rank of the private and banking sector practitioners and the results of the Mann-Whitney U test.

Comparisons of Risk Rankings for the PPP Projects in Nigeria among Respondents with Varied PPP Experience and Knowledge

Further rigorous investigations were carried out to ascertain whether significant differences existed between perceptions of the practitioners with PPP experience (i.e. those with E-group) and those with little experience but not lacking in PPP knowledge (i.e. those with K-group). *The hypothesis here is that risk perceptions will be different based on the level of PPP experience: such that the risk perceptions of more experienced practitioners are to be significantly different from those with little PPP experience, but with knowledge of PPP.* Consequently, Mann-Whitney U tests were performed across two paired-groups (E and K groups). The results of this analysis show that the views of practitioners with experience and practitioners with knowledge on all the risk factors for PPP projects in Nigeria were not statistically significantly different at

5% significance level, except for 12 risk factors (26%) out of the 46 risk factors: geotechnical conditions, residual risks, operation cost overrun, construction time delay, design deficiency, unproven engineering technique, material/labour availability, poor quality workmanship, late design changes, low operating productivity, maintenance more frequent than expected and staff crises. In all of these, practitioners who are knowledgeable on PPP (but with little experience) perceived all of these risks to be more significant than those with more PPP experience. With this level of significant differences, it could be concluded that indeed the risk perceptions of PPP practitioners with experience are significantly different from the views of those with little experience but with some PPP knowledge. It is however assumed here that those who have PPP experience equally have considerable knowledge of PPP, hence, with their experience and knowledge; they are more conservative about their assessment of risk significance.

In Chan et al. (2011), independent two-sample t-test was applied to test the agreement on the risk assessment of each listed risk factor between the experienced group and non-experienced group adopting Ke et al. (2010). The result of their statistical test indicated that there are no statistically significant differences on the risk assessment of each of the risk factors in construction projects between the experienced group and non-experienced group. Our results are similar except for the 12 risk factors where the risk perceptions are significantly different.

Table 10 shows the mean rank of the respondents with PPP experience and those with PPP knowledge and the results of the Mann-Whitney U test.

Comparisons of Risk Rankings for the PPP Projects in Nigeria among Respondents with Varied Management Experience

Participants were asked to indicate their level in the management hierarchy of their respective organisations: high, middle and low level of management. 50% of the respondents belong to the high management cadre with the reasonable expectation that they will be the most risk averse. While about 43.18% belong to middle level management and only about 6.82% belong to low level management. For the purpose of this analysis, two distinct groups were used: high and middle (with those at the low level assumed to be part of the middle level management).

The hypothesis here is that risk perceptions will be different based on the managerial experience of PPP practitioners irrespective of their sectors: such that the risk perceptions of high level

management practitioners are to be significantly different from those with middle level management experience. Consequently, Mann-Whitney U tests were performed across two paired-groups (H and M groups). The results of this analysis show that the views of practitioners with high and middle level management experience on all the risk factors for PPP projects in Nigeria were not significantly different at 5% significance level.

A further analysis was done to test whether the views of practitioners with high level management experience are different from those with low level management experience. Again, the hypothesis is that *that risk perceptions will be different based on the managerial level cum experience of PPP practitioners irrespective of their sectors: such that the risk perceptions of high level management practitioners are to be significantly different from those with low level management experience.* Consequently, Mann-Whitney U tests were performed across two paired-groups (H and L groups). The results of this analysis show that the views of practitioners with high and low level management experience on all the risk factors for PPP projects in Nigeria were not significantly different at 5% significance level.

Table 11 shows the mean rank of respondents with high and medium level management experience and the results of the Mann-Whitney U test, while Table 12 shows the mean rank of respondents with high and low level of management experience and the Mann-Whitney U test results.

5.4 Analysis of Significant Risk Factors (Risk Rankings)

Following from the premise that risk perceptions could manifest in the ranking of risks by stakeholders, an identification and analysis of risks that are considered most important in PPPs was carried out. In the survey results, the mean rating was calculated for each risk factor of PPP projects in Nigeria on the basis of the corresponding Probability of Occurrence and Risk Impact (Shen et al. 2001; and El-Sayegh 2008).

The rating of the Risk Significance is calculated by the product of Risk Probability of Occurrence and Risk Impact:

$$\text{Risk Significance} = \text{Risk Probability} \times \text{Risk Impact}$$

Table 5 shows the ranking of top 15 risk factors for the PPP projects in Nigeria on the basis of the value of mean rating of Risk Significance (scales 1–46). The results show that the three most

important risk factors in Nigeria are: *Excessive Contract Variation* with the value of mean rating of Risk Significance equal to 19.34. The second risk factor is *Construction Time Delay* with the value of mean rating of Risk Significance equal to 19.29. The third risk factor is *Construction Cost Overrun* with the value of mean rating of Risk Significance equal to 19.21. These run contrary to the results of the only Nigerian study done in this field by Ibrahim et al. (2006); where the following are considered the three most important risk factors: a) Unstable Government; b) Inadequate Experience in PPP and c) Availability of Finance. The top two risk factors indicate that excessive contract variation by the Nigerian Government (this was supported by the experience in the Lekki Road Project) and construction time overrun put the PPP projects in high risks. This might be caused by weak institutional frameworks⁹⁵ for PPPs and the tendency to change the contract terms for ‘non-Pareto optimal’ gains. The second risk factor and the third are quite related; when often time overrun will lead to cost overrun in projects. These two factors are the natural consequences of excessive contract variation, which further exacerbate project risks; and they may be the major obstacles to the success of PPP projects in Nigeria.

The major causes of time and cost overruns in PPP projects have been examined in the literature⁹⁶: due to competitive pressures in awarding projects, contractors are often overly optimistic in estimating future costs (and the time required to complete a project), as empirically shown by Flyvbjerg, Skamris Holm and Buhl, (2002) and Gannuza (2007).

High Finance Costs was ranked the fourth risk factor. The finance costs are high because of the overall perception of infrastructure projects as highly risky based on the limited experience of bankers in financing these under PPPs. Crucially too, it corroborates the high interest rates in Nigeria (consistently in double digit and usually biased towards funding short term transactions⁹⁷).

This method of deriving risk significance has been previously used by Chan et al. (2011). The detailed survey results are shown in Table 6 below.

⁹⁵ Note in particular that weak capacity in government can result in: poorly-executed tender process, poorly drafted PPP contracts and frequent re-negotiation.

⁹⁶ No doubt, PPPs are not immune to cost overruns, though no clear evidence exists as to whether cost overruns under PPPs are more or less likely than under traditional procurement (Iossa and Martimort, 2008).

⁹⁷ See more details in the Central Bank of Nigeria’s website, 2012- www.cenbank.org

In conclusion, one striking outcome of this analysis is the fact that the three most significant risks are all endogenous and project-specific in nature; whereas the three most significant risk factors in the only study done in Nigeria so far on risk allocation in PPPs (again, to the best of this learner's knowledge) are all exogenous and macro-level risks. As a matter of fact, the exogenous risks identified in Ibrahim et al. (2006) could constitute important triggers for the crystallization of the significant risks identified in this study. In other words, unstable government and inadequate PPP experience could easily lead to cost and time overruns and excessive contract variation by the government.

One important suggestion from this result is that the quality of the country's institutions may after all not be that significant in the consideration of risks that are considered important as country-level risks do not feature as one of the three most significant risk factors. Interestingly, one of the important sources of country-level risk (i.e. expropriation of PPP assets was ranked 41), meaning that the probability of its occurrence and its impact on projects should they occur are deemed minimal.

5.5 Results of Risk Allocation Preferences in PPPs

The preferred risk allocation of PPP projects in Nigeria between mainly the public and private sectors and other important stakeholder groups is analysed based on the calculated mean ratings, as shown in Table 5. The mean responses under each factor with corresponding standard deviations are equally presented. These mean responses range between 1 and 3: with 1 representing public, 2 shared and 3 private. Note however that the mean value and standard deviation of possible responses on each risk factor are 2 and 1 respectively.

The formula below, which is based on the assumed distribution⁹⁸ of the normal distribution curve, is used to calculate the ranges within which PPP risks in Nigeria should be allocated to the contracting parties, i.e., 1 = mainly to the public sector, 2 = equally shared between the public and private sectors, and 3 = mainly to the private sector, corresponding to PB, SH and PV

⁹⁸ The normal distribution is the most common continuous distribution used in statistics. Assumed normal distribution is used here because the data used in the analysis of risk allocation do not have an infinite range. The data at best depicts a uniform distribution where each value has an equal probability of occurrence anywhere in the range between the smallest value, 1 and the largest value 3. Sometimes referred to as the rectangular distribution, the uniform distribution is symmetrical and therefore the mean equals the median i.e. 2 (for excellent discussion of Normal Distribution, see for example Berenson et al. 2009).

respectively in the survey (Selvanathan et al. 2004; Berenson et al. 2009; Bowerman et al. 2009 and Chan et al. 2011):

$$X_{10\%} = U \pm Z^* \sigma$$

Where $X_{10\%}$ = the values of upper and lower limits within which the risk should be allocated to a specified party; U = the mean value of the population, Z = corresponding Z value as computed from the normal curve table; σ = population standard deviation. Here, the mean value is 2, and the range for 'equally shared' is between 1.875 and 2.125. Therefore, taking 0.125 as the corresponding Z value and standard deviation of 1 for this calculation, the lower and upper limits for the range are 1.875 scores and 2.125 scores, respectively. Hence, if the mean value is lower than 1.875 scores, the risk should be mainly borne by the public sector. If the mean value is between 1.875 scores and 2.125 scores, then the risk should be equally shared between the public and private sectors. If the mean value is greater than 2.125 scores, the risk should be mainly borne by the private sector.

Some sensitivity tests were carried out to see if the risk allocation preferences would alter significantly, using two standard deviations as opposed to using only one. Still following the logic of normal distribution curve, with the mean value remaining at 2, the range of 'equally shared' risk factors represent mean scores lying between 1.836 and 2.164. Hence, if the mean value of any risk factor is lower than 1.836 scores, the risk should be borne exclusively by the public sector. If the mean value lies between 1.836 and 2.164 scores, then the risk should be equally shared between the public and private sectors. However, if the value is greater than 2.164 scores, then the risk should be borne by the private sector. The results of these tests show that risk allocation preferences remain largely the same and merely altered for 6 out of the 46 risk factors considered in this study.

This approach for determining risk allocation preferences is considered more reliable and accurate than those applied in similar studies (Li et al. 2005; Andi 2006; El-Sayegh 2008). Their method of determining risk allocation preferences is dependent on whether the risk factors receive more than 50% agreement from the respondents (i.e. preponderance of opinion). If a risk does not receive more than 50% agreement, it will be christened as "undecided." Such a classification is purely hypothetical and does not reflect the industry practice (Chan et al. 2011).

Table 5 shows that a total of 27 out of the 46 risk factors are preferred to be allocated to the private sector, representing 59% of the total risk factors; these risk factors are: (1) poor financial market, (2) lack of tradition of private provision of public services, (3) geotechnical conditions, (4) weather, (5) level of demand for project, (6) availability of finance, (7) financial attraction of projects to investors, (8) high finance costs (9) residual risks, (10) design deficiency, (11) unproven engineering techniques (12) construction cost overrun, (13) construction time delay, (14) material/labour availability, (15) late design changes, (16) poor quality workmanship, (17) excessive contract variation, (18) insolvency/default of sub-contractors or suppliers (19) operation cost overrun, (20) operational revenues below expectation, (21) low operating productivity, (22) maintenance costs higher than expected, (23) maintenance more frequent than expected, (24) organization and coordination risk, (25) differences in working method and know-how between partners, (26) third party tort liability, and (27) staff crises).

A total of 8 risk factors (i.e. 17% of the 46 risk factors) are to be allocated to the public sector; these factors are: (1) unstable government, (2) expropriation or nationalisation of assets, (3) poor public decision-making process, (4) strong political opposition/hostility, (5) legislation change, (6) change in tax regulation (7) level of public opposition to project, and (8) delay in project approvals and permits. Perhaps as expected, all these risk factors are exogenous (Ibrahim et al., 2006) and fall either directly within government policy arena such that government is a position to manage the events when they crystallize. These results also corroborate with previous findings of Zhang et al. (1998) and Li et al. (2005) for studies carried out in Hong Kong and UK respectively.

A total of 11 risk factors (i.e. 24% of the 46 risk factors) are to be equally shared between the private and public sectors; the risk factors are as follows: (1) inflation rate volatility, (2) interest rate volatility, (3) influential economic events, (4) industrial regulatory change, (5) force majeure, (6) environment, (7) site availability, (8) inadequate experience in PPP/PFI, (9) inadequate distribution of responsibilities and risks, (10) inadequate distribution of authority in partnership, and (11) lack of commitment from either partner. Some of these risks are exogenous some are equally endogenous. This outcome contradicts the core empirical finding of relevant studies reviewed: where less than 10 of the identified risk factors were shared while

others are either assigned to the public or to the private sector partner exclusively (see Zhang et al.; 1998, Li et al.,2005; Ibrahim et al. 2006 etc.).

One possible reason for the variation in our results and the only comparable study done in Nigeria (i.e. Ibrahim et al., 2006) is the fact that about 80% of the total respondents in this study are from the private sector (banking 64% and other private sectors 16%), whereas in Ibrahim et al. (2006) bankers were not included at all. Even though by the reason of their core business they should in principle be more risk-seeking than other stakeholders; though with caution as the experience of the Nigerian bankers with PPPs is still not very deep as expected in all new PPP environments.

The analyses above show clearly the allocation preferences among the private and the public sectors in Nigeria. The results indicate the impact of the differing level of involvement and experience in PPP in Nigeria; where most of the risk factors are still preferred to be shared between the public and the private sector, contrary to previous studies, particularly a comparable study by Ibrahim et al. (2006) probably because of the composition of the survey respondents where most of the respondents are from the private sector and tend to be relatively more risk-averse. The analysis equally shows that with differing levels of expertise between the private sector operator and the public sector, the allocation preferences suggest that risks should be borne by the party best able to actually reduce the likelihood and impact of the bad outcomes.

When viewed across the various groups, the opinions of all stakeholders are unanimous on 6 out of the 8 risk factors to be allocated to the public sector except, for the risk of change in tax regulation and level of public opposition to project. The risk of public opposition to project is germane and highly significant in Nigeria considering the outcome of the flagship PPP project in Nigeria (i.e. Lekki Road Project), where due to public opposition, Lagos State Government had to cough up the sum of N4 Billion (\$25 million) in 2010 from its budget due to shadow toll regime put in place as a result of public opposition to the project (Guardian Newspaper, November 15, 2011).

Likewise, the views of all stakeholders are unanimous on 17 out of the 27 risk factors to be allocated to the private sector, while their opinions are unanimous in only 1 out of the 11 risk factors to be equally shared: i.e. the risk of influential economic events.

5.6 Results of the Test for Internal Consistency of Risk Ranking

The values of Kendall's coefficient of concordance were calculated by using the Statistical Package for the Social Sciences (SPSS) 20.0 to measure the internal agreement within the same group of respondents on the rankings of different risk factors of PPP projects in Nigeria. A high or significant value of W indicates that different respondents rank the risk factors consistently. The values of W for the rankings of Risk Probability, Risk Impact, and Risk Significance (Risk Probability \times Risk Impact) of 46 risk factors for PPP projects in Nigeria were 0.223, 0.118, and 0.205, respectively. The computed values of the Ws were all statistically significant at 1% significance level (see Table 4). It can be interpreted that there is significant agreement among the respondents on the ratings of the Risk Probability, Risk Impact, and Risk Significance of the PPP projects in Nigeria.

5.7 Analysis of Test Results in the Context of Weak Institutions

This section considers the results presented above in the context of weak institutions, typified by Nigeria. Countries that could fall into this category would seem to have the following general characteristics: huge infrastructure gap (i.e. deficit arising from infrastructure available and infrastructure requirements); corruption displayed in the mould of opaque, non-transparent, non-competitive and non-accountable PPP procurement processes, shallow PPP experience, and relatively high political risk. This political risk could manifest in the prerogative of government officials to make sweeping changes in investment rules or regulations-through measures such as protracted tariff freezing-that undermine a PPP project's market value. Essentially, broad political risk can constitute the biggest threat to project outcome⁹⁹.

The findings and results of this study suggest that in spite of the theoretical goal incongruence between the government and private sector entity and the concomitant heterogeneity in risk perceptions (i.e. typical of jurisdictions with strong institutions), with weak institutions

⁹⁹ Global PPP experience suggests a number of other factors that can heighten political risk include the following:

1. The quality and transparency of the system of contracting.
2. The capacity of government and state-owned enterprises to coordinate projects and bear some risks, especially fiscal risk.
3. The capacity of off-takers and customers to pay tariffs.
4. The political and public acceptability of the project, as well as the extent of public consultation performed for the project.

homogeneity of risk perceptions are plausible. This homogeneity in risk perceptions suggest that stakeholders are likely to agree on the proportion of risks that each of them should manage in PPPs and would make them to prefer to share more risks. In weak institutions therefore, it is expected that the level of risks that would be shared between government and private sector would be higher, while strong institutions would tend to have most of the risks either allocated wholly to the private sector or the government as showed in the Table 3 above: In other words, this study suggests that there is somewhat positive relationship between the magnitude of institutional hazards or country risk that could derail PPP projects¹⁰⁰ and the proportion of risks that would be shared in PPP arrangements.

Drawing from the insights provided in Feinberg and Gupta (2009), private sector companies who participate in PPPs in high-risk countries are likely to deploy a combination of political and operational strategies to deal with macro-level risks in PPPs. These strategies could serve to reduce the actual level of exogenous hazards that could come from these weak institutions. Operational strategies would include a propensity to share maximum risks with the government in PPP arrangements. In other words, sharing maximum risks possible with the government in PPPs could serve as a safeguard against weak external institutions.

While political strategies would entail proactive attempts to influence the decisions and actions of political actors. Such strategies reduce the actual level of exogenous hazards. Paralleling Zhao's (2006) arguments and findings that internal technology linkages immunize MNCs against threats emanating from weak intellectual property regimes, it could be argued that operational strategies such as sharing maximum risks with the government could immunize private sector players against the institutional hazards that remain even after the deployment of political strategies.

¹⁰⁰ Following the insights from Feinberg and Gupta (2009), country risk could affect PPP projects in diverse ways: They increase the risk that a firm's asset investments in PPPs can be expropriated at less than full market value. They also increase the risk that the firm may find itself unexpectedly constrained in the range of business opportunities that it can pursue and/or increase the risk that weak enforcement of contracts creates situations in which end-users and/or even government agencies may unreasonably delay payment or even choose not to pay for infrastructure services the firm has sold and delivered to them. Finally, institutional hazards increase the risk that the value of a firm's asset investments may depreciate at a faster than anticipated rate as a result of government-imposed impediments to the firm's ability to access complementary assets. Given the impact of country risk on PPP assets and anticipated revenue streams, the potential of the institutional environment to shape the decisions and actions of firms is widely accepted and has been empirically documented (e.g., Borner, Brunetti, & Weder, 1995; Henisz, 2000; Knack & Keefer, 1995; Murtha & Lenway, 1994; North, 1990; North & Thomas, 1973; Olson, 1996; Rodrick, 1993 all cited in Feinberg and Gupta (2009)).

5.8 Summary

Overall, this chapter shows the findings of this study; which provide clear and unambiguous answers to the two research questions posed at the onset as follows:

- a. How do private and public sector partner prefer risks to be shared (or allocated) in PPPs in Nigeria?
- b. Are there significant differences in risk perceptions of different stakeholder groups involved in PPPs in Nigeria?

Risk allocation preferences were showed with most risks being allocated to the private sector; consistent with the results of similar empirical studies. Moreover, based on risk rankings, the most significant risk factors in the context of Nigeria became evident. The assumption of heterogeneity stemming from the goal incongruence between private and public sector partners (one of the theoretical pillars of agency theory) was found not to be applicable; as near complete homogeneity in risk perceptions between relevant stakeholder groups was found to be the case in this study.

Table 4: Background Information About The Participants

Sectors	Responses in (%)	Frequencies
Public sector	18.2	8
Private sector	15.9	7
Banking sector	65.9	29
Total	100	44
Past practical experience	34.0	15
Present practical experience	20.5	9
No experience, but knowledge and interest	45.5	20
Total	100	44

Source: Fieldwork

Table 5: Results of Risk Allocation Preferences

Risk Factors				All Preferred			Public Preferred			Private Preferred			Banking Preferred			
	N	Mean	SD	Allocation	N	Mean	SD	Allocation	N	Mean	SD	Allocation	N	Mean	SD	Allocation
Unstable Government	44	1.48	0.63	Public	8	1.50	0.76	Public	7	1.57	0.53	Public	29	1.45	0.63	Public
Expropriation or Nationalisation of assets	44	1.52	0.79	Public	8	1.50	0.93	Public	7	1.57	0.98	Public	29	1.52	0.74	Public
Poor public decision-making process	44	1.50	0.63	Public	8	1.25	0.46	Public	7	1.29	0.49	Public	29	1.62	0.68	Public
Strong political opposition/hostility	44	1.43	0.55	Public	8	1.50	0.53	Public	7	1.29	0.49	Public	29	1.45	0.57	Public
Poor financial market	44	2.23	0.64	Private	8	2.00	0.76	Equally Shared	7	2.71	0.49	Private	29	2.17	0.60	Private
Inflation rate volatility	44	1.91	0.68	Equally Shared	8	1.88	0.83	Equally Shared	7	1.86	0.38	Public	29	1.93	0.70	Equally Shared
Interest rate volatility	44	2.11	0.69	Equally Shared	8	2.25	0.71	Private	7	2.43	0.53	Private	29	2.00	0.71	Equally Shared
Influential economic events	44	1.98	0.51	Equally Shared	8	2.00	0.00	Equally Shared	7	2.00	0.58	Equally Shared	29	1.97	0.57	Equally Shared
Legislation change	44	1.57	0.73	Public	8	1.38	0.74	Public	7	1.57	0.79	Public	29	1.62	0.73	Public
Change in tax regulation	44	1.86	0.88	Public	8	1.75	0.89	Public	7	1.86	1.07	Public	29	1.90	0.86	Equally Shared
Industrial regulatory change	44	1.95	0.83	Equally Shared	8	1.88	0.83	Equally Shared	7	1.71	0.76	Public	29	2.03	0.87	Equally Shared
Lack of tradition of private provision of public Services	44	2.16	0.68	Private	8	2.00	0.76	Equally Shared	7	2.29	0.76	Private	29	2.17	0.66	Private
Level of public opposition to project	44	1.84	0.61	Public	8	1.63	0.74	Public	7	1.71	0.49	Public	29	1.93	0.59	Equally Shared
Force majeure	44	2.05	0.53	Equally Shared	8	1.88	0.35	Equally Shared	7	2.14	0.38	Private	29	2.07	0.59	Equally Shared
Geotechnical conditions	44	2.23	0.48	Private	8	2.50	0.53	Private	7	1.86	0.38	Public	29	2.24	0.44	Private
Weather	44	2.16	0.37	Private	8	2.13	0.35	Equally Shared	7	2.00	0.00	Equally Shared	29	2.21	0.41	Private
Environment	44	2.00	0.43	Equally Shared	8	2.13	0.35	Equally Shared	7	1.71	0.49	Public	29	2.03	0.42	Equally Shared
Land acquisition (site availability)	44	1.89	0.84	Equally Shared	8	1.50	0.76	Public	7	2.00	1.00	Equally Shared	29	1.97	0.82	Equally Shared
Level of demand for project	44	2.25	0.58	Private	8	2.13	0.64	Equally Shared	7	2.43	0.53	Private	29	2.24	0.58	Private
Availability of finance	44	2.43	0.59	Private	8	2.38	0.74	Private	7	2.57	0.53	Private	29	2.41	0.57	Private
Financial attraction of project to investors	44	2.52	0.55	Private	8	2.38	0.52	Private	7	2.71	0.49	Private	29	2.52	0.57	Private
High finance costs	44	2.50	0.55	Private	8	2.38	0.74	Private	7	2.57	0.53	Private	29	2.52	0.51	Private
Residual risks	44	2.25	0.58	Private	8	2.13	0.35	Equally Shared	7	2.57	0.53	Private	29	2.21	0.62	Private
Delay in project approvals and permits	44	1.66	0.71	Public	8	1.13	0.35	Public	7	1.57	0.79	Public	29	1.83	0.71	Public
Design deficiency	44	2.45	0.66	Private	8	2.63	0.74	Private	7	2.29	0.76	Private	29	2.45	0.63	Private
Unproven engineering techniques	44	2.57	0.62	Private	8	2.75	0.71	Private	7	2.43	0.53	Private	29	2.55	0.63	Private
Construction cost overrun	44	2.32	0.60	Private	8	2.50	0.53	Private	7	2.43	0.53	Private	29	2.24	0.64	Private
Construction time delay	44	2.32	0.56	Private	8	2.50	0.53	Private	7	2.29	0.49	Private	29	2.28	0.59	Private
Material/labour availability	44	2.57	0.50	Private	8	2.63	0.52	Private	7	2.86	0.38	Private	29	2.48	0.51	Private
Late design changes	44	2.32	0.56	Private	8	2.50	0.53	Private	7	2.29	0.49	Private	29	2.28	0.59	Private
Poor quality workmanship	44	2.48	0.66	Private	8	2.75	0.71	Private	7	2.43	0.98	Private	29	2.41	0.57	Private
Excessive contract variation	44	2.16	0.75	Private	8	2.25	0.89	Private	7	2.29	0.95	Private	29	2.10	0.67	Equally Shared
Insolvency/default of sub-contractors or suppliers	44	2.64	0.61	Private	8	2.63	0.74	Private	7	2.57	0.79	Private	29	2.66	0.55	Private
Operation cost overrun	44	2.45	0.63	Private	8	2.50	0.76	Private	7	2.43	0.79	Private	29	2.45	0.57	Private
Operational revenues below expectation	44	2.36	0.61	Private	8	2.13	0.64	Equally Shared	7	2.29	0.76	Private	29	2.45	0.57	Private
Low operating productivity	44	2.43	0.59	Private	8	2.50	0.53	Private	7	2.29	0.76	Private	29	2.45	0.57	Private
Maintenance costs higher than expected	44	2.41	0.58	Private	8	2.25	0.71	Private	7	2.57	0.53	Private	29	2.41	0.57	Private
Maintenance more frequent than expected	44	2.39	0.62	Private	8	2.63	0.52	Private	7	2.14	0.69	Private	29	2.38	0.62	Private
Organization and co-ordination risk	44	2.34	0.61	Private	8	2.50	0.53	Private	7	2.29	0.76	Private	29	2.31	0.60	Private
Inadequate experience in PPP/PFI	44	2.07	0.50	Equally Shared	8	2.38	0.52	Private	7	2.29	0.49	Private	29	1.93	0.46	Equally Shared
Inadequate distribution of responsibilities and risks	44	2.05	0.57	Equally Shared	8	1.88	0.35	Equally Shared	7	1.86	0.38	Public	29	2.14	0.64	Private
Inadequate distribution of authority in partnership	44	2.11	0.58	Equally Shared	8	1.75	0.46	Public	7	2.14	0.38	Private	29	2.21	0.62	Private
Differences in working method and know-how between partners	44	2.16	0.61	Private	8	2.25	0.46	Private	7	2.00	0.58	Equally Shared	29	2.17	0.66	Private
Lack of commitment from either partner	44	2.00	0.61	Equally Shared	8	2.00	0.00	Equally Shared	7	2.29	0.76	Private	29	1.93	0.65	Equally Shared
Third Party Tort Liability	44	2.20	0.63	Private	8	2.38	0.52	Private	7	2.00	0.82	Equally Shared	29	2.21	0.62	Private
Staff Crises	44	2.32	0.60	Private	8	2.38	0.52	Private	7	2.43	0.79	Private	29	2.28	0.59	Private

Table 6: Risk Ranking of PPP Projects and Kendall's Test

Risk Factors	Risk Probability	Risk Impact	Risk Significance	Rank
	Mean	Mean	Mean Product	
Unstable Government	3.52	4.39	15.45	17
Expropriation or nationalisation of assets	2.77	4.16	11.53	41
Poor public decision-making process	4.45	4.14	18.43	7
Strong political opposition/hostility	3.77	3.86	14.58	22
Poor financial market	3.77	4.11	15.52	15
Inflation rate volatility	4.05	3.98	16.09	12
Interest rate volatility	4.16	3.95	16.45	10
Influential economic events	3.86	3.89	15.02	18
Legislation change	3.48	4.32	15.02	18
Change in tax regulation	3.05	3.52	10.73	43
Industrial regulatory change	3.34	3.64	12.15	38
Lack of tradition of private provision of public services	4.18	3.70	15.49	16
Level of public opposition to project	3.57	3.93	14.03	29
Force majeure	2.93	4.09	11.99	40
Geotechnical conditions	2.86	3.27	9.37	45
Weather	2.68	3.05	8.17	46
Environment	3.05	3.39	10.31	44
Land acquisition (site availability)	3.34	3.59	12.00	39
Level of demand for project	3.59	3.64	13.06	35
Availability of finance	3.98	4.36	17.36	9
Financial attraction of project to investors	3.80	3.93	14.92	20
High finance costs	4.50	4.18	18.82	4
Residual risks	3.77	3.34	12.60	37
Delay in project approvals and permits	4.57	4.09	18.69	6
Design deficiency	3.64	3.98	14.46	23
Unproven engineering techniques	3.45	3.95	13.66	31
Construction cost overrun	4.57	4.20	19.21	3
Construction time delay	4.61	4.18	19.29	2
Material/labour availability	3.59	3.70	13.30	33
Late design changes	3.59	3.75	13.47	32
Poor quality workmanship	3.93	4.14	16.26	11
Excessive contract variation	4.39	4.41	19.34	1
Insolvency/default of sub-contractors or suppliers	3.55	4.16	14.75	21
Operation cost overrun	4.16	4.25	17.68	8
Operational revenues below expectation	3.55	4.05	14.34	24
Low operating productivity	3.64	3.93	14.30	25
Maintenance costs higher than expected	3.93	4.02	15.82	13
Maintenance more frequent than expected	3.68	3.82	14.06	28
Organization and co-ordination risk	3.93	3.95	15.55	14
Inadequate experience in PPP/PFI	4.34	4.32	18.74	5
Inadequate distribution of responsibilities and risks	3.82	3.73	14.23	26
Inadequate distribution of authority in partnership	3.75	3.70	13.89	30
Differences in working method and know-how between partners	3.73	3.55	13.21	34
Lack of commitment from either partner	3.39	4.16	14.08	27
Third Party Tort Liability	3.39	3.73	12.62	36
Staff Crises	3.20	3.43	11.00	42
Kendall's W ^a	.223	.118	.205	
Chi-Square	441.113	233.762	406.339	
Df	45	45	45	
Asymp. Sig.	.000	.000	.000	

a. Kendall's Coefficient of Concordance Source: Fieldwork

Table 7: Comparisons of Risk Rankings for the PPP Projects in Nigeria between Private and Public Sector Partners

Risk Factors	Public	Private	Mann-Whitney U	Z	P-Value
Unstable Government	7.88	8.14	27.00	-.116	.907
Expropriation or nationalisation of assets	9.00	6.86	20.00	-0.934	.350
Poor public decision-making process	8.75	7.14	22.00	-.701	.483
Strong political opposition/hostility	7.75	8.29	26.00	-0.237	.813
Poor financial market	7.13	9.00	21.00	-.818	.413
Inflation rate volatility	6.94	9.21	19.50	-1.015	.310
Interest rate volatility	6.44	9.79	15.50	-1.465	.143
Influential economic events	7.69	8.36	25.50	-.293	.770
Legislation change	8.56	7.36	23.50	-0.539	.590
Change in tax regulation	7.25	8.86	22.00	-.716	.474
Industrial regulatory change	7.88	8.14	27.00	-.119	.906
Lack of tradition of private provision of public services	9.44	6.36	16.50	-1.349	.177
Level of public opposition to project	7.88	8.14	27.00	-.116	.907
Force majeure	8.50	7.43	24.00	-.466	.641
Geotechnical conditions	8.75	7.14	22.00	-.701	.484
Weather	7.38	8.71	23.00	-0.587	0.558
Environment	8.06	7.93	27.50	-.061	.951
Land acquisition (site availability)	8.31	7.64	25.50	-.291	.771
Level of demand for project	7.25	8.86	22.00	-.699	.484
Availability of finance	7.75	8.29	26.00	-.239	.811
Financial attraction of project to investors	7.81	8.21	26.50	-.176	.860
High finance costs	8.69	7.21	22.50	-0.651	.515
Residual risks	8.94	6.93	20.50	-.883	.377
Delay in project approvals and permits	8.50	7.43	24.00	-.467	.640
Design deficiency	9.00	6.86	20.00	-0.933	.351
Unproven engineering techniques	9.19	6.64	18.50	-1.118	.264
Construction cost overrun	8.25	7.71	26.00	-.238	.812
Construction time delay	7.88	8.14	27.00	-.117	.907
Material/labour availability	6.69	9.50	17.50	-1.233	.218
Late design changes	8.13	7.86	27.00	-.118	.906
Poor quality workmanship	7.31	8.79	22.50	-.641	.522
Excessive contract variation	7.94	8.07	27.50	-.059	.953
Insolvency/default of sub-contractors or suppliers	8.00	8.00	28.00	.000	1.000
Operation cost overrun	7.38	8.71	23.00	-.585	.558
Operational revenues below expectation	6.63	9.57	17.00	-1.299	.194
Low operating productivity	7.63	8.43	25.00	-.350	.726
Maintenance costs higher than expected	7.44	8.64	23.50	-.536	.592
Maintenance more frequent than expected	7.00	9.14	20.00	-0.958	.338
Organization and co-ordination risk	8.94	6.93	20.50	-.874	.382
Inadequate experience in PPP/PFI	8.94	6.93	20.50	-.874	.382
Inadequate distribution of responsibilities and risks	8.63	7.29	23.00	-0.592	.554
Inadequate distribution of authority in partnership	8.94	6.93	20.50	-0.885	.376
Differences in working method and know-how between partners	8.19	7.79	26.50	-0.177	.860
Lack of commitment from either partner	8.31	7.64	25.50	-.294	.768
Third Party Tort Liability	7.19	8.93	21.50	-.765	.444
Staff Crises	7.38	8.71	23.00	-.590	.555

Source: Fieldwork

Table 8: Comparisons of Risk Rankings for the PPP Projects in Nigeria between Public and Banking Sectors

Risk Factors	Public	Banking	Mann-Whitney U	Z	P-Value
Unstable Government	13.94	20.40	75.500	-1.501	.133
Expropriation or nationalisation of assets	19.06	18.98	115.500	-.019	.985
Poor public decision-making process	20.25	18.66	106.000	-.375	.708
Strong political opposition/hostility	21.19	18.40	98.500	-0.654	.513
Poor financial market	16.69	19.64	97.500	-0.690	.490
Inflation rate volatility	17.13	19.52	101.000	-.560	.576
Interest rate volatility	16.31	19.74	94.500	-0.798	.425
Influential economic events	18.38	19.17	111.000	-.187	.852
Legislation change	20.06	18.71	107.500	-0.317	.751
Change in tax regulation	18.94	19.02	115.500	-.019	.985
Industrial regulatory change	19.69	18.81	110.500	-.204	.838
Lack of tradition of private provision of public services	19.75	18.79	110.000	-.222	.824
Level of public opposition to project	22.50	18.03	88.000	-1.038	.299
Force majeure	18.63	19.10	113.000	-.111	.911
Geotechnical conditions	20.31	18.64	105.500	-.393	.694
Weather	23.50	17.76	80.000	-1.346	.178
Environment	20.63	18.55	103.000	-.484	.628
Land acquisition (site availability)	20.19	18.67	106.500	-.353	.724
Level of demand for project	19.38	18.90	113.000	-.111	.911
Availability of finance	22.06	18.16	91.500	-.915	.360
Financial attraction of project to investors	23.25	17.83	82.000	-1.263	.206
High finance costs	21.63	18.28	95.000	-.783	.433
Residual risks	20.69	18.53	102.500	-.502	.615
Delay in project approvals and permits	20.13	18.69	107.000	-.335	.738
Design deficiency	18.25	19.21	110.000	-.223	.824
Unproven engineering techniques	17.06	19.53	100.500	-.576	.565
Construction cost overrun	16.75	19.62	98.000	-.675	.500
Construction time delay	17.38	19.45	103.000	-.485	.627
Material/labour availability	16.63	19.66	97.000	-.711	.477
Late design changes	16.00	19.83	92.000	-.899	.369
Poor quality workmanship	12.38	20.83	63.000	-1.974	.048
Excessive contract variation	16.56	19.67	96.500	-0.726	.468
Insolvency/default of sub-contractors or suppliers	15.50	19.97	88.000	-1.040	.298
Operation cost overrun	12.94	20.67	67.500	-1.802	.072
Operational revenues below expectation	18.63	19.10	113.000	-.111	.911
Low operating productivity	17.50	19.41	104.000	-.447	.655
Maintenance costs higher than expected	14.88	20.14	83.000	-1.237	.216
Maintenance more frequent than expected	13.63	20.48	73.000	-1.600	.110
Organization and co-ordination risk	20.25	18.66	106.000	-.371	.711
Inadequate experience in PPP/PFI	21.75	18.24	94.000	-.823	.411
Inadequate distribution of responsibilities and risks	20.50	18.59	104.000	-.447	.655
Inadequate distribution of authority in partnership	20.13	18.69	107.000	-.334	.738
Differences in working method and know-how between partners	19.50	18.86	112.000	-.149	.881
Lack of commitment from either partner	15.75	19.90	90.000	-.966	.334
Third Party Tort Liability	15.25	20.03	86.000	-1.116	.264
Staff Crises	16.81	19.60	98.500	-0.650	.516

Source: Fieldwork

Table 9: Comparisons of Risk Rankings for the PPP Projects in Nigeria between Private and Banking Sectors

Risk Factors	Private	Banking	Mann-W.U	Z	P-Value
Unstable Government	13.71	19.66	68.000	-1.345	.179
Expropriation or nationalisation of assets	14.64	19.43	74.500	-1.089	.276
Poor public decision-making process	15.14	19.31	78.000	-.952	.341
Strong political opposition/hostility	21.71	17.72	79.000	-.910	.363
Poor financial market	18.36	18.53	100.500	-.041	.968
Inflation rate volatility	19.71	18.21	93.000	-.344	.731
Interest rate volatility	21.36	17.81	81.500	-.805	.421
Influential economic events	16.00	19.10	84.000	-0.710	.478
Legislation change	16.71	18.93	89.000	-.505	.614
Change in tax regulation	20.79	17.95	85.500	-.649	.516
Industrial regulatory change	19.64	18.22	93.500	-0.322	0.747
Lack of tradition of private provision of public services	13.79	19.64	68.500	-1.328	.184
Level of public opposition to project	23.07	17.40	69.500	-1.286	.198
Force majeure	16.86	18.90	90.000	-.461	.645
Geotechnical conditions	16.64	18.95	88.500	-0.527	.598
Weather	23.14	17.38	69.000	-1.313	.189
Environment	19.00	18.38	98.000	-.141	.888
Land acquisition (site availability)	18.57	18.48	101.000	-.020	.984
Level of demand for project	21.79	17.71	78.500	-0.925	.355
Availability of finance	22.79	17.47	71.500	-1.210	.226
Financial attraction of project to investors	23.29	17.34	68.000	-1.349	.177
High finance costs	19.36	18.29	95.500	-.242	.808
Residual risks	17.50	18.74	94.500	-.282	.778
Delay in project approvals and permits	17.64	18.71	95.500	-.242	.809
Design deficiency	14.21	19.53	71.500	-1.207	.227
Unproven engineering techniques	12.43	19.97	59.000	-1.713	.087
Construction cost overrun	15.00	19.34	77.000	-0.994	.320
Construction time delay	18.71	18.45	100.000	-.061	.952
Material/labour availability	21.07	17.88	83.500	-.726	.468
Late design changes	16.07	19.09	84.500	-.689	.491
Poor quality workmanship	15.71	19.17	82.000	-0.786	.432
Excessive contract variation	16.79	18.91	89.500	-.484	.628
Insolvency/default of sub-contractors or suppliers	14.86	19.38	76.000	-1.024	.306
Operation cost overrun	15.43	19.24	80.000	-0.865	.387
Operational revenues below expectation	22.07	17.64	76.500	-1.008	.314
Low operating productivity	18.93	18.40	98.500	-.122	.903
Maintenance costs higher than expected	16.36	19.02	86.500	-0.611	.541
Maintenance more frequent than expected	16.64	18.95	88.500	-.527	.598
Organization and co-ordination risk	15.36	19.26	79.500	-.886	.376
Inadequate experience in PPP/PFI	16.29	19.03	86.000	-.629	.530
Inadequate distribution of responsibilities and risks	17.36	18.78	93.500	-.324	.746
Inadequate distribution of authority in partnership	14.57	19.45	74.000	-1.112	.266
Differences in working method and know-how between partners	17.07	18.84	91.500	-.405	.686
Lack of commitment from either partner	14.36	19.50	72.500	-1.166	.244
Third Party Tort Liability	16.57	18.97	88.000	-0.544	.586
Staff Crises	18.07	18.60	98.500	-0.121	.904

Source: Fieldwork

Table 10: Comparisons of Risk Rankings for the PPP Projects in Nigeria between Respondents with PPP Experience and those with PPP Knowledge

Risk Factors	Experience	Knowledge	Mann-Whitney U	Z	P-Value
Unstable Government	20.69	24.68	196.50	-1.030	.303
Expropriation or nationalisation of assets	21.94	23.18	226.50	-0.320	.749
Poor public decision-making process	21.44	23.78	214.50	-.609	.542
Strong political opposition/hostility	21.48	23.73	215.50	-0.585	.558
Poor financial market	20.08	25.40	182.00	-1.383	.167
Inflation rate volatility	20.02	25.48	180.50	-1.420	.156
Interest rate volatility	21.00	24.30	204.00	-.855	.393
Influential economic events	20.13	25.35	183.00	-1.359	.174
Legislation change	22.04	23.05	229.00	-0.262	.793
Change in tax regulation	21.73	23.43	221.50	-.442	.658
Industrial regulatory change	21.15	24.13	207.50	-.772	.440
Lack of tradition of private provision of public services	21.00	24.30	204.00	-0.853	.394
Level of public opposition to project	22.19	22.88	232.50	-.178	.859
Force majeure	21.71	23.45	221.00	-.449	.653
Geotechnical conditions	18.52	27.28	144.50	-2.277	.023
Weather	20.02	25.48	180.50	-1.416	0.157
Environment	21.02	24.28	204.50	-.845	.398
Land acquisition (site availability)	21.75	23.40	222.00	-.427	.670
Level of demand for project	20.58	24.80	194.00	-1.090	.276
Availability of finance	21.63	23.55	219.00	-.501	.616
Financial attraction of project to investors	20.73	24.63	197.50	-1.010	.313
High finance costs	20.23	25.23	185.50	-1.299	.194
Residual risks	18.71	27.05	149.00	-2.163	.031
Delay in project approvals and permits	21.04	24.25	205.00	-.832	.406
Design deficiency	18.58	27.20	146.00	-2.228	.026
Unproven engineering techniques	18.75	27.00	150.00	-2.138	.033
Construction cost overrun	19.29	26.35	163.00	-1.844	.065
Construction time delay	18.15	27.73	135.50	-2.490	.013
Material/labour availability	18.92	26.80	154.00	-2.051	.040
Late design changes	18.92	26.80	154.00	-2.051	.040
Poor quality workmanship	17.79	28.15	127.00	-2.683	.007
Excessive contract variation	19.23	26.43	161.50	-1.867	.062
Insolvency/default of sub-contractors or suppliers	19.54	26.05	169.00	-1.684	.092
Operation cost overrun	17.73	28.23	125.50	-2.715	.007
Operational revenues below expectation	19.38	26.25	165.00	-1.783	.075
Low operating productivity	18.29	27.55	139.00	-2.404	.016
Maintenance costs higher than expected	20.00	25.50	180.00	-1.440	.150
Maintenance more frequent than expected	18.98	26.73	155.50	-2.018	.044
Organization and co-ordination risk	19.65	25.93	171.50	-1.625	.104
Inadequate experience in PPP/PFI	20.60	24.78	194.50	-1.085	.278
Inadequate distribution of responsibilities and risks	20.88	24.45	201.00	-0.929	.353
Inadequate distribution of authority in partnership	20.08	25.40	182.00	-1.380	.168
Differences in working method and know-how between partners	20.50	24.90	192.00	-1.144	.252
Lack of commitment from either partner	19.13	26.55	159.00	-1.921	.055
Third Party Tort Liability	18.98	26.73	155.50	-2.007	.045
Staff Crises	18.58	27.20	146.00	-2.233	.026

Source: Fieldwork

Table 11: Comparisons of Risk Rankings for the PPP Projects in Nigeria between Respondents with High and Medium Level Management Experience

Risk Factors			Mann-Whitney		P-Value
	Private	Banking	U	Z	
Unstable Government	22.75	22.25	236.500	-0.130	.897
Expropriation or nationalisation of assets	19.84	25.16	183.500	-1.383	.167
Poor public decision-making process	23.52	21.48	219.500	-.535	.593
Strong political opposition/hostility	22.82	22.18	235.000	-0.166	.868
Poor financial market	20.95	24.05	208.000	-0.807	.420
Inflation rate volatility	20.09	24.91	189.000	-1.260	.208
Interest rate volatility	20.07	24.93	188.500	-1.265	.206
Influential economic events	22.02	22.98	231.500	-.249	.803
Legislation change	21.16	23.84	212.500	-0.701	.484
Change in tax regulation	21.82	23.18	227.000	-.357	.721
Industrial regulatory change	20.73	24.27	203.000	-.923	.356
Lack of tradition of private provision of public services	23.84	21.16	212.500	-.696	.486
Level of public opposition to project	24.23	20.77	204.000	-.896	.370
Force majeure	19.89	25.11	184.500	-1.355	.176
Geotechnical conditions	20.55	24.45	199.000	-1.021	.307
Weather	20.45	24.55	197.000	-1.067	.286
Environment	20.16	24.84	190.500	-1.221	.222
Land acquisition (site availability)	23.45	21.55	221.000	-.496	.620
Level of demand for project	20.82	24.18	205.000	-.873	.382
Availability of finance	23.36	21.64	223.000	-.452	.652
Financial attraction of project to investors	22.84	22.16	234.500	-.177	.859
High finance costs	23.20	21.80	226.500	-.368	.713
Residual risks	22.61	22.39	239.500	-.059	.953
Delay in project approvals and permits	22.00	23.00	231.000	-.260	.795
Design deficiency	20.18	24.82	191.000	-1.204	.229
Unproven engineering techniques	21.07	23.93	210.500	-.745	.456
Construction cost overrun	22.39	22.61	239.500	-.060	.952
Construction time delay	22.36	22.64	239.000	-.071	.943
Material/labour availability	23.36	21.64	223.000	-.451	.652
Late design changes	22.86	22.14	234.000	-.190	.849
Poor quality workmanship	21.95	23.05	230.000	-0.284	.777
Excessive contract variation	23.05	21.95	230.000	-0.284	.776
Insolvency/default of sub-contractors or suppliers	22.14	22.86	234.000	-.189	.850
Operation cost overrun	24.27	20.73	203.000	-0.921	.357
Operational revenues below expectation	21.25	23.75	214.500	-.651	.515
Low operating productivity	21.82	23.18	227.000	-.356	.722
Maintenance costs higher than expected	22.45	22.55	241.000	-0.024	.981
Maintenance more frequent than expected	20.61	24.39	200.500	-0.987	.324
Organization and co-ordination risk	22.70	22.30	237.500	-.106	.915
Inadequate experience in PPP/PFI	23.91	21.09	211.000	-.736	.462
Inadequate distribution of responsibilities and risks	22.14	22.86	234.000	-.190	.850
Inadequate distribution of authority in partnership	22.07	22.93	232.500	-.225	.822
Differences in working method and know-how between partners	19.70	25.30	180.500	-1.460	.144
Lack of commitment from either partner	20.86	24.14	206.000	-.850	.395
Third Party Tort Liability	19.86	25.14	184.000	-1.372	.170
Staff Crises	20.52	24.48	198.500	-1.029	.304

Source: Fieldwork

Table 12: Comparisons of Risk Rankings for the PPP Projects in Nigeria between Respondents with High and Low Level Management Experience

Risk Factors	Public	Private	Mann-Whitney U	Z	P-Value
Unstable Government	12.93	13.50	31.50	-.126	.899
Expropriation or nationalisation of assets	13.00	13.00	33.00	0.000	1.000
Poor public decision-making process	13.89	6.50	13.50	-1.681	.093
Strong political opposition/hostility	13.32	10.67	26.00	-0.597	.550
Poor financial market	12.68	15.33	26.00	-.594	.552
Inflation rate volatility	12.68	15.33	26.00	-.596	.551
Interest rate volatility	12.61	15.83	24.50	-.716	.474
Influential economic events	12.45	17.00	21.00	-1.020	.308
Legislation change	12.57	16.17	23.50	-0.809	.419
Change in tax regulation	12.23	18.67	16.00	-1.456	.146
Industrial regulatory change	12.32	18.00	18.00	-1.275	.202
Lack of tradition of private provision of public services	13.00	13.00	33.00	0.000	1.000
Level of public opposition to project	13.73	7.67	17.00	-1.346	.178
Force majeure	13.02	12.83	32.50	-.042	.966
Geotechnical conditions	12.36	17.67	19.00	-1.189	.234
Weather	12.36	17.67	19.00	-1.184	0.236
Environment	12.02	20.17	11.50	-1.819	.069
Land acquisition (site availability)	12.68	15.33	26.00	-.591	.554
Level of demand for project	12.73	15.00	27.00	-.505	.613
Availability of finance	13.14	12.00	30.00	-.260	.795
Financial attraction of project to investors	13.20	11.50	28.50	-.381	.703
High finance costs	13.32	10.67	26.00	-0.593	.553
Residual risks	13.18	11.67	29.00	-.339	.735
Delay in project approvals and permits	12.77	14.67	28.00	-.423	.673
Design deficiency	12.41	17.33	20.00	-1.096	.273
Unproven engineering techniques	12.23	18.67	16.00	-1.450	.147
Construction cost overrun	12.66	15.50	25.50	-.644	.520
Construction time delay	12.66	15.50	25.50	-.643	.520
Material/labour availability	13.23	11.33	28.00	-0.428	.669
Late design changes	12.77	14.67	28.00	-.425	.671
Poor quality workmanship	12.84	14.17	29.50	-.297	.766
Excessive contract variation	12.91	13.67	31.00	-.169	.866
Insolvency/default of sub-contractors or suppliers	13.02	12.83	32.50	-.042	.966
Operation cost overrun	13.70	7.83	17.50	-1.312	.190
Operational revenues below expectation	13.20	11.50	28.50	-0.380	.704
Low operating productivity	13.55	9.00	21.00	-1.017	.309
Maintenance costs higher than expected	13.18	11.67	29.00	-.342	.733
Maintenance more frequent than expected	12.86	14.00	30.00	-0.254	.799
Organization and co-ordination risk	12.95	13.33	32.00	-.084	.933
Inadequate experience in PPP/PFI	13.16	11.83	29.50	-.298	.765
Inadequate distribution of responsibilities and risks	13.11	12.17	30.50	-0.212	.832
Inadequate distribution of authority in partnership	12.82	14.33	29.00	-0.340	.734
Differences in working method and know-how between partners	12.25	18.50	16.50	-1.391	.164
Lack of commitment from either partner	12.82	14.33	29.00	-.339	.735
Third Party Tort Liability	12.05	20.00	12.00	-1.781	.075
Staff Crises	12.59	16.00	24.00	-.761	.447

Source: Fieldwork

Chapter Six: Summary, Conclusion, and Recommendations

6.1 Introduction

Due to the goal incongruence between public and private sector partners in PPPs, it is expected that their risk perceptions will be significantly different. The results to be discussed in this chapter shows that perceptions of stakeholders are indeed homogenous in the case of Nigeria in spite of its weak institutions. It is equally useful to see how different stakeholders in PPPs would prefer risks in PPP projects to be shared. This chapter presents the applications and extensions of the results of this research, key conclusions and major recommendations, additions to PPP body of knowledge and the contribution of this research to the practice of PPPs. This chapter concludes with a presentation of the limitations of the research and suggests areas of future research.

6.2 Summary of Results

The main purpose of this research was to determine partners' risk perceptions and the preferred allocation of PPP risks with a view to enhance infrastructural projects delivery in Nigeria. To answer the two research questions, the views of 285 practitioners were sought but only 45 responded. The target population members were experts in the few PPP transactions consummated so far in Nigeria. Participants were drawn from each of the identified groups namely: PPP sponsors, project managers, consultants/ contractors, financiers and operators. The relatively small sample size is mainly attributed to two reasons. First, only those with interest and/or experience in PPPs and who are key players on PPP transactions were approached in order to preserve the quality of the opinions gathered in the survey. Secondly, some experienced practitioners might be reluctant to participate in the survey because of the commercial cum political sensitivity of underlying PPP transactions in which they had participated. A few participants opted out because they felt that their participation might make them run fowl of the confidentiality clause in the PPP contracts to which they signed on behalf of their

organisations¹⁰¹; notwithstanding the repeated assurance that their opinions would not be attributed to them directly.

The research comprised of a pure quantitative study. The whole concentration of the research was on acquiring knowledge through extensive literature review about risk factors and the most significant risk factors in the context of Nigeria were identified using the 46 risk factors developed by Li et al. 2005.

Data collected by means of the survey was separated and screened for different project participants. A three level analytical framework (using the latest statistical analysis tool (SPSS 20.0)) was deployed for detailed and rigorous analyses: descriptive statistics, Mann Whitney U test and the Kendal test of concordance.

These analyses assisted us to identify the most significant risk factors, comparisons of perceptions among various stakeholder groups and allocation preferences. The most significant risk factors are: excessive contract variation, construction time delay and construction cost overrun. These results are not entirely surprising because of issues pertaining to lack of capacity and limited PPP experience in Nigeria: which serve to make whatever targets (for example, cost, time etc.) agreed ab initio to be extremely fluid and unrealistic. This may be due to optimism bias and the tendency to rush into projects without adequate preparation. Politicians with finite political terms are likely to short-circuit or even compromise PPP processes in order to quickly start PPP projects and the consequences would be contract renegotiation; particularly when the three related risks above do eventually crystallize. Invariably, the projects may end up becoming white elephant projects¹⁰².

The risk of cost overruns had been examined thoroughly in the literature because infrastructure projects delivered through PPPs and the traditional procurement method regularly experience cost and time overruns. Research efforts led by Flyvbjerg (see for example Bent Flyvbjerg, Mette Skamris Holm, and Søren L. Buhl, *Transport Reviews*, Vol. 26, Issue 1, 2006, pp. 1–24) has suggested that misrepresentation and optimism bias are primary causes for cost and time

¹⁰¹ Equally germane is the fact that most of the private sector organisations are private companies that are not in any way obligated to publish their accounts e.g. concessionaires like Lekki Concession Company and Bi-Courtney Limited.

¹⁰²What could make these projects ‘white elephants’ is that they potentially become expensive to maintain because of poor design, confused role and lack of what may be best described as a ‘business case’ for their very initiation- see http://epress.anu.edu.au/anzsog/imp/mobile_devices/ch05s04.html.

overruns. While Flyvbjerg's research has made a significant contribution to ameliorating understanding as to why economic infrastructure projects experience overruns, it does not adequately explain why this is the case in the case of social infrastructure. This thesis suggests that weak institutions could generally aggravate cost overruns in PPP projects. Cost overruns could occur from opportunistic tendencies that may be exhibited by government agencies that regulate infrastructure projects delivered through PPPs.

Moreover, it is crucial to note the factors that could be responsible for cost and time overruns: (1) inattention to risk inside government; (2) biases in decision-making in the evaluation and use of information; and (3) uncertainty in PPP project management and administration. These factors could be distilled into ex-ante and ex-post elements. Ex-ante factors could be as a result of a systematic and deliberate under-estimation of costs in budgeting for infrastructure projects by bidders in PPP projects, while ex-post could be as a result of uncertainty in project management and administration; exhibiting in the form of : excessive contract variation, excessive design changes, inability to manage critical stakeholders etc.

In general, while weak institutions could be a factor in aggravating cost overruns, available evidence shows that cost escalation in projects appears a global phenomenon, existing across 20 nations on five continents; such that the projects that are made to look best on paper are the projects that amass the highest cost overruns and benefit shortfalls in reality (Flyvbjerg et.al. 2003). Therefore, cost overruns cannot be linked to only weak institutions.

It should also be noted that the consideration of various events that may deter stakeholders from achieving the established objectives of projects in terms of cost, revenue, time and quality usually take the front burner both ex-ante and ex-post. When private and public sector come together as partners with incongruent goals, it is theoretically expected that their perceptions of the probability of occurrence of these events and their consequences on projects would differ significantly. This research found that the perceptions of these stakeholders are not significantly different in the case of Nigeria. It is argued that with homogeneous perceptions, risks are likely to be allocated to the party best capable of managing them in Nigeria. These findings indeed suggest that PPPs have a chance to succeed in the country in spite of its weak institutional

conditions. Weak institutional conditions should therefore not be a hindrance to the promise of PPPs to help in tackling the huge infrastructure deficit in the country, rather a blessing in disguise. The findings equally suggest that two factors could be responsible for homogenous risk perceptions in Nigeria: corruption and the convergence of interests that could occur as a result of politicians having vested interests in business entities that are set up to enter into long term partnership arrangements with the government.

While appropriateness or otherwise of risk allocation preferences is not the primary focus of this study, the hypotheses of heterogeneity in risk perceptions suggest that stakeholders would equally have less disparity in the way and manner they prefer risks to be allocated. The risk allocation preferences of stakeholders hypothesized suggest that while most of the endogenous risk factors could be assigned to the private sector partner, the public sector should retain political and site acquisition risks, while relationship-based risks should be shared between the partners. This hypothesis was confirmed as key endogenous risks such as level of demand for project, availability of finance, construction cost overrun, construction time delay etc. were preferred to be allocated to the private sector, while such risks as legislation change, level of public opposition to project among other were allocated to the public sector and relationship-based risks such as: inadequate distribution of responsibility of responsibilities and risks, inadequate distribution of authority in partnership and lack of commitment from either party were preferred to be shared between the partners.

6.3 Application and Extension of Results

The research confirmed that most risks in PPPs are preferred to be allocated to the private sector following the general principle of transferring risks to party in the best position to control the events that may occur: 58% of the risk factors used in this study were to be transferred to the private sector, while 17% of the risks are to be allocated to the public sector, while only 24% of the risks are meant to be shared between the two parties. It means that it is recognized that private sector has better control over events that may deter the achievement of established objectives of PPP projects.

Generally, the principle is to *allocate PPP risks to the party best able to control its occurrence or manage their consequences as well as to the party in the best position to assess the*

probability of the risk crystalizing within a context commercially acceptable to the private sector. However, risk allocation may vary between projects; for example, the tunnelling section of a road construction project may be an unacceptable risk for the contractors, lenders, and investors due to the probability and the impact of the risk as a result of unknown geological conditions.

Risk allocation may also vary between markets depending on the appetite (risk preferences) and the level of competition among players. In some jurisdictions, certain risks may be allocated by law to the public or private sector for political or historical reasons and any contractual arrangement to the contrary will have no legal effect. Therefore, in practice, legal constraints and the ability of the relevant party to assume a given risk must be taken into account regardless of which party is more efficient at controlling and managing the risks (Farquharson, 2011). Also whilst risk allocation in PPPs generally forces the private sector to bear a significant part of the construction and operational risks, the actual risk allocation may differ from what was originally planned. In fact, empirical evidence supports that risk allocation in practice often departs from what is laid out in theory (see e.g. Lobina and Hall, 2003). As stressed by The World Bank, “whether PPPs perform better than full provision by state-owned enterprises depends in particular on whether performance risk is effectively shifted from taxpayers to the private shareholders of the company that enters into a concession-type arrangement” (World Bank, 2002: 23-24).

Overall, since issues and dynamics of risk allocation may have some similarities across projects, it is preferable and highly recommended for the public sector to have a consistent approach and a clear framework for contracting as well as soliciting and evaluating bids from the PPP contractors. This framework should be enshrined in the policy document and guidelines for PPPs at every level of government that seeks to engage with the private sector in PPPs.

It should also be noted that PPPs are by no means a panacea to all infrastructure challenges. This thesis concedes that private sector engagement in the provision of infrastructure should in theory improve the quality of projects get undertaken. However, it is highly unlikely that a politically expedient but financially dubious project would be able to generate enough money to incentivise private sector partners. Experience shows that cost-benefit estimates can sometimes prove wildly optimistic; such that when projects go bad, leaving half-built roads and schools-they become a

public problem. Private investments might well end up being recouped in higher user charges (The Economist, May 12, 2012¹⁰³).

One of the practical policy recommendations to this challenge is to run a truly transparent, accountable and competitive PPP tender process. Prior to the commencement of a procurement process, it is germane for the government to strategically approach the market with a well-defined, well-structured and ‘well-derisked’ PPP projects; failure to do this will result in bidders making bids that are either incomparable with each other or deliberately present low bids with a view to resolving uncertainties through post-bid negotiation or through post-contract renegotiation.

6.4 Additions to PPP Body of Knowledge and To the Industry

The research results specifically contributed to the PPP industry in Nigeria and the existing PPP body of knowledge by:

- Providing a general overview of essential risk factors in PPPs and perceptions of stakeholders on each of the risk factors;
- Providing a better understanding of significant risk factors in the context of Nigeria;
- Enhancing a better understanding of the risk allocation preferences of major contracting parties; and
- Helping to empirically analyze the perceptions of stakeholders and thereby contributing to an effort to reduce lengthy negotiation processes in PPPs; also helping to improve general contracting relationships and bidding processes.

6.5 Limitations of Research

There are a few limitations relating to this research study in terms of the methodology deployed, the results and findings. These limitations are highlighted as follows:

First, the results of this study reflected the perspectives of those who participated in the survey. Thus the generalization of the results is limited by the population used. However, to generalize the modest conclusions reached in this study, it may be necessary to plan and implement a

¹⁰³ See Article titled “Investing in Infrastructure: A question of Trust, Chicago Pioneers a New Way of Paying for Infrastructure”.

research agenda that would require data to be drawn from participants in developing countries with comparable institutional conditions and PPP experience as Nigeria's. Such an expedition may require some modifications to the main research work. Nevertheless, the results of this study could still help policy makers and PPP private sector players to better understand how stakeholders prefer risks to be allocated.

Second, this research dealt with the views of three major stakeholder groups: banking, private and public sectors. The limitation here is that some of the participants straddle more than one of these three groups in terms of classification. For instance, participants from international financial institutions such as the African Development Bank (AfDB) could be categorized as belonging to both the public and private sector stakeholder groups. Also the views of an important stakeholder group, i.e. end-users of projects/services, were not taken on board in this study. Although it is important to acknowledge that this group is highly dispersed depending on which infrastructure project one is focusing attention and risks may not be allocated directly to them in PPPs.

Third, this study considered the views and opinions of stakeholders selected mostly on a convenience sampling method due to the dearth of PPP practitioners in Nigeria thus susceptible to selection bias. Also, this sampling method could limit the diversity of the information and data. Although, reasonable diligence was exercised to ensure that participants had some experience and/or knowledge of PPPs.

Fourth, this study also generally lumps all private sector players together- to whom risks may be allocated disproportionately: i.e. the sub-contractors, investors, third party specialists such as the insurers. It is assumed that risks are shared mainly between the public sector partner (grantor) and a single private sector entity (the concessionaire) to fit the mould of the agency theoretic framework used in this study. It may be useful to examine this in the context of agency problems that could occur even among the multiple private sector participants e.g. between the concessionaire and a sub-contractor with assumption of goal congruence.

Lastly, this study tends to underplay some other important considerations that may impact PPPs apart from the issue of risk allocation, such as the role of institutions, although these considerations were largely accounted for under the exogenous risk factors used in this study: such as poor public decision making process, corruption and lack of respect for rules etc. As

much as it is important to design contracts to optimize PPP risk allocation, getting the state's institutions right to be able to enforce contractual terms is equally germane. It may therefore be useful to analyze specifically the role of institutions in shaping the outcomes of PPPs (perhaps as a critical success factor), in the context of Nigeria; specifically examining the impacts of weak institutions on projects using a case study approach. This is important as it is yet to be established that PPPs are indeed helping to address the problem of infrastructure in the country and indeed in other developing countries.

6.6 Suggested Areas of Future Research

This research verified the significant risk factors in PPPs and validated that the perceptions of contracting parties are not significantly different as to warrant a lengthy negotiation process. It also confirmed the views that most risks are meant to be allocated to the private sector partner, while government should still retain some risks such as political risks and site availability. Suggested areas of further research include, but not limited to the following areas:

- The practical validation of the suggested risk allocation preferences in real life situations and circumstances to see if actual risk allocation will conform to the preferences showed in this study;
- The practical implications of supporting projects with Viability Gap Funding: perhaps it will be interesting to see if this could even compound agency problems in PPPs;
- To test whether cost overruns under PPPs are more or less likely than under traditional procurement using an agency theoretic framework;
- To examine the factors that could make risk allocation preferences differ across projects; and
- To implement a risk allocation framework that takes into account the views of end users of infrastructure services.

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Appendices

Appendix A- Informed Consent Form

Introduction

My name is Femi Tolani, a citizen of Nigeria, and currently a PhD candidate at the University of Calgary, Canada. My experience in Nigeria regarding poor infrastructure, coupled with my exposure outside of the country has aroused my interest and passion in exploring the issues on how to make Public-Private Partnerships (P3) work better to tackle huge infrastructure challenges in Nigeria. The purpose of this research is to understand the risk allocation preferences in Nigeria and the factors that shape those preferences, with a view to providing recommendations, which will improve the delivery of infrastructure projects through the P3 model in Nigeria. This study will help in shaping appropriate risk allocation framework for P3s, which can also help to attend to problems of infrastructure deficits around the world. Study data and findings may also be presented in academic platforms including a doctoral dissertation and published academic papers.

Procedures

The questionnaire will take approximately 30 minutes or less. Questions are designed to determine risk allocation preferences in P3 infrastructure projects as well as the factors that shape these preferences based on your past experience. This questionnaire will be conducted with an online Qualtrics-created survey.

Risks/Benefits

Rest assured, the survey is completely anonymous so your name will not be attached to your responses or used in the analysis of the research data, hence there are no risks to you for participating in the survey. Likewise, there are no direct benefits for participants. However, it is hoped that through your participation, this researcher will learn more about risk management issues in P3 in Nigeria.

Confidentiality

All data obtained from participants will be kept confidential and will only be reported in a conglomerate format (only reporting combined results and never reporting individual results). All questionnaires will be concealed, and no one other than the primary investigator and his

supervisor - Dr Jack Mintz (Palmer Chair in Public Policy) will have access to these materials. The data collected will be stored in the computer of the investigator and Qualtrics-secure database until it has been deleted by the primary investigator.

Participation

Participation in this research study is completely voluntary. You have the right to withdraw at any time or refuse to participate entirely in this questionnaire.

Questions/Concerns

Please note that The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study. If you have any concerns about the way you've been treated as a participant, please contact Russell Burrows, Senior Ethics Resource Officer, Research Services, University of Calgary at (403) 220-3782; e-mail:rburrows@ucalgary.ca Also, if you have questions regarding this study, you may contact Mr. Femi Tolani, The School of Public Policy, 403-890-6768, otolani@ucalgary.ca or Dr. Jack Mintz, 403-220-7661, jmmintz@ucalgary.ca

I have read and understood the above consent form and desire of my own free will to participate in this study.

- Yes

Appendix B- Questionnaire

Q3 Section one Questions about respondents' individual and organisational background What best describe your sector?

- Public Sector (Ministries, Department and Government Agencies)
- Private Sector (Construction companies, Infrastructure concessionaires, Project consultants etc)
- Banking (local, international and development banks etc)

Q4 Describe your knowledge or experience with P3?

- I am currently involved in P3 project
- I have been involved in the past in P3 project
- I do not have practical experience dealing with P3 projects but I have interest and knowledge of the topic

- I do not have practical experience in dealing with P3 projects and my knowledge and interest in the topic is at beginner's level

Q5 What type of P3 projects have you been involved?

- Hospital
- Transportation (Road/Airport)
- Water and Sanitary
- Power and Energy
- Housing and Office
- Security (Police and Prison)
- School and Other education
- Others

Q6 What is your level in your organization?

- Top Level Management
- Middle Level Management
- Low level Management
- Q7 When was your company established? (Private sector respondents only)
- Before 1980
- 1981-2000
- 2001-2010

Q8 What's the number of employees in your organization?

- < 100
- 101-500
- >500

Q9 What's the average annual turnover in your organisation in USD \$ million? (Private sector respondents only)

- 6-40
- 41-100
- 101-250

Q10 Section Two Risk factors and risk allocation preferences Please assign estimated probability of occurrence to the risks listed below (where, probability of occurrence is nil = 0, 1 = remote, 2= occasional, 3= probable, 4 = frequent and 5= very frequent)

	0 (1)	1 (2)	2 (3)	3 (4)	4 (5)	5 (6)
Unstable Government)	<input type="radio"/>					
Expropriation or nationalisation of assets	<input type="radio"/>					
Poor public decision-making process	<input type="radio"/>					
Strong political opposition/hostility	<input type="radio"/>					
Poor financial market	<input type="radio"/>					
Inflation rate volatility	<input type="radio"/>					
Interest rate volatility	<input type="radio"/>					
Influential economic events	<input type="radio"/>					
Legislation change	<input type="radio"/>					
Change in tax regulation	<input type="radio"/>					
Industrial regulatory change	<input type="radio"/>					
Lack of tradition of private provision of public services	<input type="radio"/>					
Level of public opposition to project	<input type="radio"/>					
Force majeure	<input type="radio"/>					
Geotechnical condition	<input type="radio"/>					
Weather	<input type="radio"/>					
Environment	<input type="radio"/>					
Land acquisition (site availability)	<input type="radio"/>					
Level of demand for project	<input type="radio"/>					
Availability of finance	<input type="radio"/>					
Financial attraction of project to investors	<input type="radio"/>					
High finance costs	<input type="radio"/>					
Residual risks	<input type="radio"/>					
Delay in project approvals and permits	<input type="radio"/>					
Design deficiency	<input type="radio"/>					
Unproven engineering techniques	<input type="radio"/>					
Construction cost overrun	<input type="radio"/>					
Construction time delay	<input type="radio"/>					
Material/labour availability	<input type="radio"/>					
Late design changes	<input type="radio"/>					
Poor quality workmanship	<input type="radio"/>					
Excessive contract variation	<input type="radio"/>					
Insolvency/default of sub-contractors	<input type="radio"/>					

or suppliers						
Operation cost overrun	<input type="radio"/>					
Operational revenues below expectation	<input type="radio"/>					
Low operating productivity	<input type="radio"/>					
Maintenance costs higher than expected	<input type="radio"/>					
Maintenance more frequent than expected	<input type="radio"/>					
Organization and co-ordination risk	<input type="radio"/>					
Inadequate experience in PPP/PFI	<input type="radio"/>					
Inadequate distribution of responsibilities and risks	<input type="radio"/>					
Inadequate distribution of authority in partnership	<input type="radio"/>					
Differences in working method and know-how between partners	<input type="radio"/>					
Lack of commitment from either partner	<input type="radio"/>					
Third Party Tort Liability	<input type="radio"/>					
Staff Crises	<input type="radio"/>					

Q11 Please assign estimated impact of the risks listed below: Using 0-5 qualitative Likert scale (where, 0 = the impact is nil, 1= impact is negligible with no serious influence on the project, to 5= where impact is catastrophic, where the project would be aborted).

	0 (1)	1 (2)	2 (3)	3 (4)	4 (5)	5 (6)
Unstable Government (1)	<input type="radio"/>					
Expropriation or nationalisation of assets (2)	<input type="radio"/>					
Poor public decision-making process (3)	<input type="radio"/>					
Strong political opposition/hostility (4)	<input type="radio"/>					
Poor financial market (5)	<input type="radio"/>					
Inflation rate volatility (6)	<input type="radio"/>					
Interest rate volatility (7)	<input type="radio"/>					
Influential economic events (8)	<input type="radio"/>					
Legislation change (9)	<input type="radio"/>					
Change in tax regulation (10)	<input type="radio"/>					
Industrial regulatory change (11)	<input type="radio"/>					
Lack of tradition of private provision of	<input type="radio"/>					

public services (12)						
Level of public opposition to project (13)	<input type="radio"/>					
Force majeure (14)	<input type="radio"/>					
Geotechnical conditions (15)	<input type="radio"/>					
Weather (16)	<input type="radio"/>					
Environment (17)	<input type="radio"/>					
Land acquisition (site availability) (18)	<input type="radio"/>					
Level of demand for project (19)	<input type="radio"/>					
Availability of finance (20)	<input type="radio"/>					
Financial attraction of project to investors (21)	<input type="radio"/>					
High finance costs (22)	<input type="radio"/>					
Residual risks (23)	<input type="radio"/>					
Delay in project approvals and permits (24)	<input type="radio"/>					
Design deficiency (25)	<input type="radio"/>					
Unproven engineering techniques (26)	<input type="radio"/>					
Construction cost overrun (27)	<input type="radio"/>					
Construction time delay (28)	<input type="radio"/>					
Material/labour availability (29)	<input type="radio"/>					
Late design changes (30)	<input type="radio"/>					
Poor quality workmanship (31)	<input type="radio"/>					
Excessive contract variation (32)	<input type="radio"/>					
Insolvency/default of sub-contractors or suppliers (33)	<input type="radio"/>					
Operation cost overrun (34)	<input type="radio"/>					
Operational revenues below expectation (35)	<input type="radio"/>					
Low operating productivity (36)	<input type="radio"/>					
Maintenance costs higher than expected (37)	<input type="radio"/>					
Maintenance more frequent than expected (38)	<input type="radio"/>					
Organization and co-ordination risk (39)	<input type="radio"/>					
Inadequate experience in PPP/PFI (40)	<input type="radio"/>					
Inadequate distribution of responsibilities and risks (41)	<input type="radio"/>					
Inadequate distribution of	<input type="radio"/>					

authority in partnership (42)						
Differences in working method and know-how between partners (43)	<input type="radio"/>					
Lack of commitment from either partner (44)	<input type="radio"/>					
Third Party Tort Liability (45)	<input type="radio"/>					
Staff Crises (46)	<input type="radio"/>					

Q12 Please allocate the risks listed below to either the private or the public sector, or describe it as preferably 'shared' between the public and private sector. (Where PB = public sector, PV = private sector, and SH = shared)

	PB (1)	PV (2)	SH (3)
Unstable Government (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expropriation or nationalisation of assets (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor public decision-making process (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong political opposition/hostility (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor financial market (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inflation rate volatility (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interest rate volatility (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Influential economic events (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Legislation change (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Change in tax regulation (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industrial regulatory change (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of tradition of private provision of public services (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Level of public opposition to project (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Force majeure (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Geotechnical conditions (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weather (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environment (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Land acquisition (site availability) (18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Level of demand for project (19)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of finance (20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial attraction of project to investors (21)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High finance costs (22)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Residual risks (23)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Delay in project approvals and permits (24)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design deficiency (25)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unproven engineering techniques (26)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Construction cost overrun (27)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Construction time delay (28)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Material/labour availability (29)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Late design changes (30)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor quality workmanship (31)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excessive contract variation (32)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insolvency/default of sub-contractors or suppliers (33)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operation cost overrun (34)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operational revenues below expectation (35)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Low operating productivity (36)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Maintenance costs higher than expected (37)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintenance more frequent than expected (38)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organization and co-ordination risk (39)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate experience in PPP/PFI (40)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate distribution of responsibilities and risks (41)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate distribution of authority in partnership (42)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Differences in working method and know-how between partners (43)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of commitment from either partner (44)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Third Party Tort Liability (45)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staff Crises (46)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix C: Letter of Introduction



Hi,

My name is Femi Tolani, a citizen of Nigeria, and currently a PhD candidate at the University of Calgary, Canada. My experience in the country regarding poor infrastructure, coupled with my experiences outside of Nigeria has aroused my interest and passion in exploring the issues on how to make Public-Private Partnerships (P3) work better to tackle infrastructure challenges in the country.

I am currently working under the supervision of Dr. Jack Mintz (Palmer Chair in Public Policy) at the University of Calgary. I am contacting you as a possible participant in this research because you are presently engaged actively in P3 project delivery process in Nigeria. The purpose of my research is to understand the risk allocation preferences in Nigeria and the factors that shape those preferences, with a view to providing recommendations, which will improve the delivery of infrastructure projects through the P3 model in Nigeria.

Participation in this study involves completing a questionnaire and/or interview; lasting approximately one hour and thirty minutes for the two activities respectively.

I would like to assure you that this study has been reviewed and received ethics clearance at the University of Calgary. However, the final decision about participation is yours.

If you are interested in participating, please contact me at otolani@ucalgary.ca and I will get in touch with you immediately to know your availability.

Sincerely,

Femi Tolani