RISK ALLOCATION DECISION-MAKING IN PUBLIC PRIVATE PARTNERSHIP DEVELOPMENT PROJECTS IN ZAMBIA

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A THESIS SUBMITED TO THE UNIVERSITY OF ZAMBIA IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN CONSTRUCTION MANAGEMENT

THE UNIVERSITY OF ZAMBIA

LUSAKA

2020

DECLARATION

I, **Peter Mwansa Mukalula,** do hereby declare that this thesis is the result of my own investigation and research, and that it has not been previously submitted for a degree, diploma or other qualification at the University of Zambia or any other University.

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APPROVAL

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ACKNOWLEDGEMENTS

A thesis of this magnitude deserves the acknowledgement of several individuals. I have had the invaluable support of my family while studying in Lusaka at the University of Zambia (UNZA). Of particular note was my late elder sister, Mrs Bernadette Musanda Mukalula Daka and my father who died soon after embarking on my research in October of 2011, Mr Jameson Bornface Harold Mukalula. This research is dedicated to these two for the remembrance of their encouragement and love. My nieces Brenda Mukalula Tembo, Mwansa Mukalula Kalumbi and Chiluba Paula Daka - who always cheered me on during the most difficult time of my life. Cheering me to the finishing line were my adopted young brothers, Chiwala Maipambe and Abedinego Munsanje that enlivened the exhaustive chugging of the final completion process. Dr Kennedy Chola Mulenga deeply awakened in me the desire to complete this research when I visited him and his wife Elizabeth, in Cape Town of South Africa.

I would also like to thank Professor Mundia Muya for shaping my thinking during the supervision of my work in spite of the circumstances around me. The PPP specialised that were interviewed, various firms that answered the questionnaire and those that assisted with the case studies, are owed gratitude for their contribution.

In as much as many individuals assisted me in one way or the other, nonetheless, all noticeable mistakes that the document bears are my responsibility. And lastly, but not the least, I thank God for the 'many' that 'burned the midnight candle' on my behalf. For I recognise that to God alone belongs the glory (For of Him, and through Him, and to Him, are all things: to whom be glory forever' - Romans 11:36, KJV).

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2020

ABSTRACT

In 2009, the Zambian government enacted the Public Private Partnership (PPP) Policy and Act No.14. The act was aimed at reversing stifled development across the country using private financing. Even with legislation in place, prospective developers often weigh risks of implementing PPP projects in Africa. For Zambia, unclear and protracted negotiation procedures have tainted the performance of such executed projects. Consideration of risk allocated to the developer influences decisions made regarding timely execution of projects. The research aimed to determine critical success factors and mitigation impacts used in successfully implemented PPP projects. Data gathered on risk allocation decision-making processes used a mixed research method that included structured interviews, a questionnaire survey and two case studies. Descriptive analysis, Rotated Component Matrix and Pearson Correlation Coefficients were used to establish relationships between independent and dependent variables for allocated risk. The ontological and epistemological philosophical basis of the researcher utilised a positivistic pragmatic constructionist analytical explanation of the PPP phenomena on two projects in Zambia. These were University of Zambia East Park Mall development and the Kasumbalesa Border infrastructure.

The percentage survey response was 46% obtained from 47 analysed questionnaires out of the 120 that were administered. Results indicated professionals' inability to evaluate developer's risks particularly at the proposal assessment stage. The PPP contract outlines risk to the parties involved. Technically, project developers show greater preparedness during negotiations in bargaining for their allocated risk. Decisions made, therefore, were found not to consist of relevant inputs from areas of risk allocation and risk mitigation to ensure project success by those evaluating schemes. The research proposed a decision-making framework for the timely execution of such projects in Zambia. This decision-making framework would limit the time of implementing PPP projects from three to five years to less than two years and would cover all the phases, namely; the proposal submission, negotiation, the construction and operation stages.

Keywords: Decision-making system, Public private partnership, Risk allocation

DEDICATION

To Muso, Muko, Dad and Mum

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ABBREVIATIONS

AICD	Africa Infrastructure Country Diagnostic
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
AVS	Almond Valley and Seafield
BOT	Build, Operate and Transfer
BOOT	Build, Own, Operate and Transfer
CAPM	Capital Asset Pricing Model
COMESA	Common Market for East and Southern Africa
CPF	Contractors Pre-Finance
CSF	Critical Success Factors
CSO	Central Statistical Office
DBOT	Design, Build, Operate and Transfer
DBFO	Design, Build, Finance and Operate
DFBM	Design, Finance, Build and Maintain
DFBOM	Design, Finance, Build, Operate and Maintain
DRC	Democratic Republic Of Congo
DTI	Direct Trader Input
EAZ	Economic Association of Zambia
EIZ	Economic Institution of Zambia
EFA	Exploratory Factor Analysis
EOI	Expression of Interest
ESW	East Of Scotland Water
FDI	Foreign Direct Investment
GDP	Gross Domestic Product

GNP	Gross National per Capital
GPG	Good Project Governance
GNP	Gross National per Capital
IBM	Integrated Boarder Management
ICBT	Informal Cross Boarder Traders
JBC	Joint Border Committee
LDC	Least Developed Countries
LDO	Lease, Develop and Operate
LED	Local Economic Development
LWSC	Lusaka Water and Sewerage Company
MDC	Maputo Development Corridor
MENA	Middle East and North African Countries
MOFPN	Ministry Of Finance and National Planning
MPDC	Maputo Port Development Company
NCC	National Council for Construction
NEPAD	New Partnership for Africa Development
NIE	New Institutional Economics
NPC	Net Present Cost
NPM	New Public Management
NPV	Net Present Value
ODA	Official Development Assistance
OGC	Office of Government Commerce
OPPPI	Office for Promoting Private Power Investment
PFI	Private Finance Initiative
PMBOK	Project Management Body of Knowledge

PPP	Public Private Partnership
PSD	Private Sector Development
RCM	Rotated Component Matrix
RDA	Road Development Agency
REC	Regional Economic Communities
ROT	Rehabilitate, Operate and Transfer
RTSA	Road Transport and Safety Agency
SEO	seasoned Equity offering
SATH	southern African trade hub
SADC	southern Africa development community
SIZ	Surveyors Institute of Zambia
SPSS	Statistical Packages for Social Sciences
SPV	Special Purpose Vehicle
TRAC	Trans African Concessions
UK	United Kingdom
UNZA	University Of Zambia
USA	United States of America
USAID	United States of America International Development
VFM	Value for Money
WACC	Weighted Average Cost Of Capital
ZABS	Zambia Bureau of Standards
ZAMTEL	Zambia Telecommunications Limited
ZCBT	Zambia Cross Boarder Traders
ZDA	Zambia Development Agency
ZIP	Zambia Institute of Planners

ZESCO	Zambia Electricity Services Corporation
ZIA	Zambia Institute of Architects
ZKVC	Zambia Kasumbalesa Venture Capital
ZNTB	Zambia National Tender Board
ZPPA	Zambia Public Procurement Authority
ZRA	Zambia Revenue Authority

CHAPTER 1 : INTRODUCTION

1.1 Background

Governments on a worldwide basis are exploring alternative modes of procurement for major infrastructure projects (Smith et al, 2014; Li et al, 2005; Ndandiko, 2006). This has been necessitated because of high country debt loads and the desire to achieve greater efficiencies in the delivery of infrastructure and services (Cui et al, 2018; Jefferies, 2006). Improved efficiency and accountability is now the accepted norm in open competitive tendering in contractual practices, a method favoured by multilateral lending agencies (Wang et al, 1999). Ping Ho (2009) reported that between 1985 and 2004, there were approximately 1120 public private partnerships (PPPs) accomplished worldwide costing $450bn. Globally, governments are exhibiting a change in philosophy with preference to 'purchasing' infrastructure services as opposed to 'financing', designing and operating the physical infrastructure with its attendant risks (Wu et al, 2018; Jefferies, 2006). Consequently, the concept of PPP has gained prominence over the traditional form of procurement. PPPs came to be recognised as a means of development through the widely utilised Private Finance Initiative (PFI) of the United Kingdom in 1992 (Petersen, 2011; Vickermore, 2017). Emulation of the PFI model has seen the countries engage the private sector in bolstering aggressive infrastructure development in the transport, healthcare institutions, custodial infrastructure, defence utilities as well as educational facilities (Frank and Shen, 2016). Through the PFI concession, the private partner builds the needed facility to required output specifications that have been agreed to by the public agency, operates the facility for a specified time period under a contract or franchise with the public sector client, and then transfers the facility to the latter party when the contract expires (Chinyio and Fergusson, 2003; Munier, 2014). It is due to the combined advantage of competitive tendering and flexible negotiation ensuring that risk is transferred away from the public that makes PPP's attractive (Wu et al, 2018; Li et al, 2005). Cui et al (2018) and Grimsey and Lewis (2002) observed that with such a turn in world events, the word 'procurement' has been redefined being aligned more with the 'provision of services' as opposed to the 'ownership of assets'.

Many African nations, though meshed in the conundrums of under development and unstructured governance systems, have awakened to the fact that their governments alone cannot foster development as these have been overtaken by insufficient public income, increased urban migration and an inadequate social infrastructure (Balog et al, 2017; Shrestha and Ogunlana, 2009). Akintoye (2009) cites three factors which have enabled the stage to be set for PPPs in Africa, that is:

- the changing economic, social and political environment with its globalisation influence;
- instituted measures for control of public sector borrowing; and
- the vital role that modern infrastructure plays in economic growth and poverty alleviation which has been largely crippled by inadequate levels of public sector income in emerging economies.

Aggressive infrastructure development through PPPs in developing countries is envisaged to create employment and income growth as well as improve the lives of the poor (Chinyio and Fergusson, 2003). Consequently, African countries have started recording an increasing number of projects based on the PPP concept in their quest to provide supporting infrastructure for their growing economic activities (World Bank, 2002: Figure 1.1).

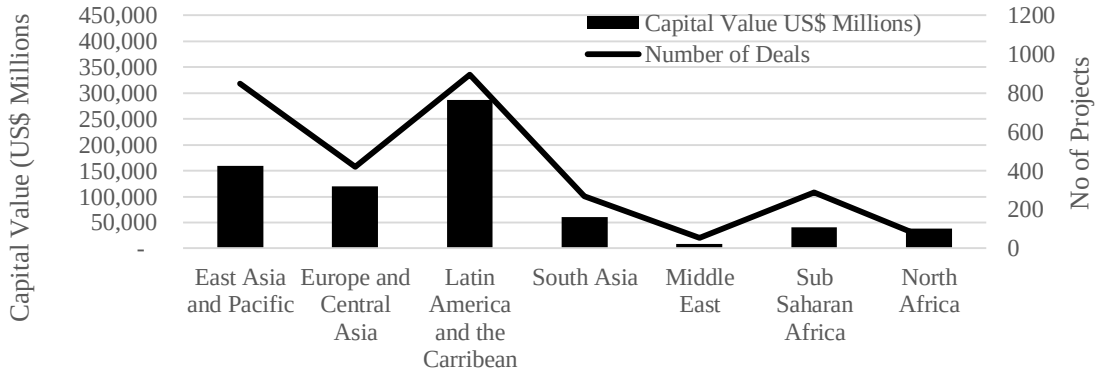


Figure 1.1 : Number and value of private participation in infrastructure projects
(After World Bank, 2002)

With a rapidly increasing urbanised society and an expanding need for basic infrastructure, Zambia has adopted the PPP mode of development in tandem with the African and international community (Mourao, 2018, Zulu and Muleya, 2009).

Infrastructure development remains the key indicator of growth for developed as well as developing countries (Akintoye, 2009; Saad, 2017). However, developing countries face a huge challenge in seeking to provide infrastructure while attending to social and political problems (Belkhir et al, 2017). In addition, budgetary constraints usually hinder sustained infrastructure development. Although governments make every effort to further development on a yearly basis through budgetary allocations, the establishment of key infrastructure remains a daunting task. Many governments have resorted to engaging the private sector in providing facilities and services through public private partnership schemes (PPP's) (Boamah, 2017). Khanom (2010) stated the use of PPP's propounded in the New Public Management (NPM), as being aimed at reducing public expenditure with distribution of responsibilities to the private sector in the provision of public goods. This necessitated a market-friendly type of economy which perceived a reduced role of the state in the creation of an enabling environment (Cedrick and Long, 2017; Ayee, 2005). Advocates of the PPP development strategy elevate it as being the zenith of 'a new generation of reforms especially suited to the contemporary economic and political imperatives for efficiency and quality' (Halachmi, 2010). This was the undergirding philosophy of the 1980 administrations of President Reagan in America and Margaret Thatcher in the UK that allowed a greater role private sector involvement (Kartashova, 2018 and Halachmi, 2010).

The years 1995 to 2010 had also seen the resurgence in PPP projects around the world. Notable projects recorded include capital-intensive road projects such as the Athens ring road (Odeck and Welde, 2017), the massive sports infrastructure as showcased in the Beijing Olympic infrastructure of China (Ke et al, 2010; Wu et al, 2018), Australia's Sydney Super Dome (Jefferies, 2006), coal fired electric power stations in China (Kumaraswamy and Zhang, 2003) and the construction of hydro-electric stations in South Africa (Farlam, 2005). In Bulgaria, housing developments were encouraged by ensuring that land owned by municipalities was given to private developers to ease the

housing problem (Stafylas et al, 2017; Li and Akintoye, 2003). Africa has sought to move in tandem with the rest of the world (Farlam, 2005) in mitigating housing shortages. The World Bank has noted the inert uptake of such projects in Africa even though it boasts of impressive investment inflows which stand in excess of US$38 billion a year as shown in Table1.1 (IBRD, 2009).

Table 1.1: Comparative data: PPP in SADC countries

Country	**GNI $ mil**	**No. of PPP projects**	**Total Invest $ mil**
South Africa	5390	32	25341
Tanzania	350	21	2115
Mozambique	340	15	2241
Mauritius	5450	11	549
Madagascar	280	9	216
Congo Democratic Republic	130	7	915
Malawi	170	6	133
Zambia	630	6	944
Zimbabwe	-	5	841
Namibia	3230	5	104
Angola	180	5	834
Lesotho	1030	3	114
Seychelles	8650	3	94
Total	**25,830**	**128**	**34,441**

(After World Bank, 2002)

In many African countries, governments are willing to implement projects through the PPP model (Li and Akintoye, 2003). South Africa is quoted of having ensured its PPP regulatory framework inspiring private sector investors to undertake many government projects (Farlam, 2005). World Bank data has further indicated that in Sub-Saharan Africa, South Africa has had much experience with handling PPPs as shown in **Table 1.1**.

PPP projects on the African continent continue to rise because of identified investment opportunities in fields such as energy and general industry (Akintoye, 2009; Cedrick and Long, 2017). In 2002, there were 128 PPP projects in Sub-Saharan Africa while in 2009

the number increased to 289 (IBRD, 2009). Despite the increase in the number of projects, a contrary view was expressed by Ndandiko (2006) and Zulu and Muleya (2009). They raised the concerns that in Sub-Saharan Africa, attempting this mode of procurement were faced with challenges of inadequate regulatory frameworks and impoverished public and private sectors. These are the necessary requisites to the success of PPP projects (Joslin, S and Konchitchki, 2018; Zhang, 2005).

The issue of cost and time savings arising from PPPs remains a matter of debate owing to the various methods applied in the implementation of projects (Li and Akintoye, 2003). Akintoye et al (2005) and Belkhir et al (2017) argued that wherever PPP procurement had been used, the way in which associated risks were handled and treated had become an important issue. Widen and Olander (2003) stated that risk and risk allocation were issues that are 'naturally more difficult to manage in the context where PPPs are new'. The need for an appropriate risk transfer strategy is a matter receiving much attention owing to the complexities of a PPP project (Smith et al, 2014; Munier, 2014). Zhang (2009) stated that critical to a project's lifecycle and sustainable development, is its dependency on the length of the concession period. It is the concession period that delineates the rights and obligations between the public and private sectors (Toumi et al, 2018). In all this, Smith et al (2014) noted how impractical it is to fully identify the full range of risks associated to a project. This is because of the effect of these risks in having the project completed and operational. Risks, inevitably affect, the entire investment process in terms of its projected economic life i.e. the concession period (Zhang and AbouRizk, 2006; Heider et al, 2015). In an attempt to assist developers with the difficulty of handling risk over its projected life, Zhang and AbouRizk (2006) proposed a concession period formula. Their mathematical definition of a concession period was given as follows:

$$\boldsymbol{T = T_c + T_o}$$

Where T_c = project completion time; T_o = operation period; and T_c and T_o must satisfy the following conditions:

$$\boldsymbol{T_c \leq T_{c\,max}}$$

$$\boldsymbol{T_o \leq T_{oe}}$$

$$\boldsymbol{NPV_I\ (1 + R_{min}) \leq NPV \parallel T_{o=t} \leq NPV_I \times (1 + R_{max})}$$

Where $T_{c\,max}$ = maximum allowable project completion time;

T_{oe}= designed economic life of the project;

NPV = net present value of the total project development cost;

R_{min} = minimum rate of return required by the private sector in the development of a certain type of projects;

R_{max} = maximum rate of return to the total project development cost that is acceptable to the public sector; and

NPV ‖ = net present value of net revenues generated from an operation period T_o = t.

Admittedly, Zhang and AbouRizk (2006) did not in any way solve the difficulties of risk over the concession period. This is due to the fact that various risks make significant impacts on the total project outlook (Smith et al, 2014). How such impacts are mitigated on projects, has exercised financial institutions hence the use of the term 'hedging' (Jean-Loup, 2017; Saunders and Cornett, 2008). Hedging brings the concept of controlling risks attributable to a project. Although risks are 'estimated' by the inclusion of applicable allowances to the project, they must be controlled. PPPs are couched around project objectives that drive development. Often, PPPs pursue a multiplicity of objectives to augment government's effort of social and economic growth. To implement development, these objectives fall within the overarching themes of time, cost, quality, environment and safety which exact risk. Risk impacts to any project are measured by their effect on these enlisted factors or a few of them (Smith et al, 2014; Wang et al, 2000). The general list of risks that emanate from these overarching themes, as reviewed from literature; include political, legal, financial, revenue, project implementation, technology as well as operational risks (Wang et al, 1999; Hardcastle and Boothroyd, 2003; Kusi et al, 2017 and Tiong and Anderson, 2003). Risk coverage has several financial instruments which are issued depending on whether risk is gauged

as low or high on a project (IBRD, 2009; Smith et al 2014). Public capital, senior debt/bonds, subordinated debt and equity are the common financial instruments that are used (IBRD, 2009; Angelides and Xenidis, 2009) to hedge against low, medium and high risks. Smith et al (2014) surmised the difficulty of hedging from low to high by delineating risk as 'local', 'global' and 'extreme'. The common feature in the nomenclature of 'low to high' or 'local', 'global' and 'extreme'; are risks due to finances - which must be controlled (Davies and Giovannetti, 2018).

Studies in construction risk have been extensively covered and particularly those that affect PPPs by Cui et al (2018); Cohen (2007) and Akintoye et al (2003). The matrices of risk that are adopted evince differing autoptic characteristics such as are displayed in Schaufelberger and Wipadapisut (2003), Grimsey and Lewis (2002) and Li et al (2003). The most common classification of risks views them as either 'external' or 'internal' (Smith et al, 2014; Li et al, 2003; Schaufelberger and Wipadapisut, 2003 and Grimsey and Lewis, 2002). Ke et al (2010), Chan et al (2010), Miti (2018), Xu et al (2010) and Roumboustsos and Anagnostopoulos (2008) utilise an adapted version of the Li et al (2003) list. The bifurcation of risk is therefore a matter of preferred preference. However, such taxonomy must be holistic (Munier, 2014 and Zou et al, 2005) and more importantly, it must note the source of the risk (Balog et al, 2017; Zou et al, 2005). Smith et al (2014) noted three probable sources of risk:

- influences that are indigenous to the scheme;
- international (or worldwide) ones; and
- factors that threaten the life of the project.

Although a risk management process may be in place, not all risks may be 'harmful' to the project (Gehner, 2006). The essence of the risk management process is to ensure that all risks are identified together with their consequences (Manelele, 2008). In short, the concept of uncertainty is at the helm of risk (Ward and Chapman, 2003; Cui et al, 2018). At times risk is perceived as a negative event by many project owners. Risk is a combination of the probability - extent to which the event is likely to occur and its consequence - outcome of an event (Gehner, 2006). Wu et al (2018) suggested that

ambiguity and subjectivity - which are the hallmark of uncertainty - must be considered in risk analysis estimations for PPP projects to succeed. Balog et al (2017) listed a compendium of data to help assist in dealing with ambiguity and subjectivity in the analysis of risk. Among them are the (Gehner, 2006):

- absence of clarity in utilised data;
- deficiency of details with essential elements of construction;
- lack of structure for issues to be considered, and
- non-existence of clarity about the nature and variety of assumptions employed in estimations encapsulates ambiguity.

The insufficiency of risk estimation data sets raises uncertainty in a project. Xu et al (2010) studied such dearth of data using fuzzy logic analysis that was aimed at assembling 'estimates' into quantifiable objectives. Estimates must achieve acceptable levels of certainty that must be used by the developer in embarking on the project.

The literature reviewed stated that risk will surface at different points of the project cycle (Jean-Loup, 2017; Pantouvakis and Vandoros, 2004; Rwelamila et al, 2003). The risk management process, therefore, enables project players to maximise opportunities while minimising the consequences of a risk event. According to the Guide to the Project Management Body of Knowledge (PMBOK, 1998), risk management in a project consists of three processes. These are (Smith et al, 2014):

- identification of risk;
- assessment of risk; and
- responding to the risk(s).

Managing risk is considered as taking deliberate actions to shift 'uncertainty' or the odds in favour of the actors or parties to a contract (Shrestha et al 2017; Pun-hing, 2003). Inevitably, this means increasing the odds of good outcomes and reducing the odds of bad outcomes. Ceric (2006) and Smith et al (2014) underscored the identification of risk as the most important phase of the risk management process.

For any investment, there is need to ensure that care is taken on how exactly risk is transferred (Rwelamila et al, 2003; Shrestha et al 2017) between among contracting partners. If a partner is not able to 'absorb' the risk, that partner should exhaust all means to minimise losses and transfer the risk back to the employer which would result in a lose/lose situation (Xu et al, 2010). Insolvency of a contractual partner may also have similar results (Ahadzi and Bowles, 2004; Smith et al, 2014). The employer or client may face the dilemma of re-nominating a new partner or contractor to have the project completed with unavoidable loss of resources and time (Bracey and Moldovan, 2006). When PPPs get to this stage, project lenders could intervene (Deleze and Korkeamaki, 2018; Yescombe, 2007).

It is important that risk is identified, assessed, responded to and controlled. In other words, a risk management system must be put in place. The principle of control suggests that the party which has the better ability of control be given the risk (Bracey and Moldovan, 2006). The principle of capability transfers the risk to the party which is most capable to absorb it (Shrestha et al 2017, Xu et al 2010). These two principles are not mutually exclusive (Xu et al, 2010). Each of these principles will come in play at their own times (Gehner, 2006). For controllable risks such as design changes, work extent, management quality and how disputes will be resolved, the principle of control will be utilised (Cui et al, 2018; Bracey and Moldovan, 2006). But as for uncontrollable risks such as natural disasters, inclement weather, changes in legislation and currency fluctuations, the principle of capability will be applied, which in almost all cases, is taken on by the client (Belkhir et al, 2017). Ke's et al (2010) research proved that the UK private industry was capable of handling a lot of risks that their counterparts in Greece, Hong Kong and China were not able to. Additionally, the research proved the necessity of having a PPP law that protected the developer from risks that they could not control (Ke et al, 2010; Xu et al, 2010; Smith et al, 2014; Baghdadi and Kishk, 2015).

1.2 Defining constructs

PPP is a partnership which leverages private funding and the strengths of the sector entrepreneurship and management, for the maximum provision of the public services in a climate of scarce public resources (OECD, 2008; Heider et al, 2015). The debate for

application of PPPs falls into five categories (Khanom, 2010; Dziadosza and Rejment, 2015; Davies and Giovannetti, 2018):

(a) that they are used as a management tool;

(b) that they are used as a governance tool;

(c) that they are used as a development strategy;

(d) that they are used as a language game; and

(e) that they are used as a tool for financial arrangements on projects.

This study, therefore, applied PPPs in three ways: as a governance, management tool, as well as a development tool.

Concession PPPs are described as long term contracts in which a public authority would permit the private party to design, build, and finance and then operate the infrastructure owned by a designated authority (Smith, 2015; Yescombe, 2007). Modalities of ensuring that the private party recoup their investment are then agreed upon. Such contracts place much of the risk on the private party (the developer) (Smith et al, 2014). Upon completion, the project is commissioned and operationalised but this marks the inception of inimitable demand risks that come in various forms (Wang et al, 1999; Kusi et al, 2017). Lack of clientele is one such demand risk that must be envisaged during the negotiation stage (Yescombe, 2007). The client can participate in dissipating this risk by underwriting minimum levels of usage (Miti, 2018; Anjos, 2010). Underwriting guarantees amounts of expected revenue were hopes are too high owing to the nature of the project. Toll roads normally use this type of contract (Odeck and Welde, 2017).

Infrastructure is defined as ‘structures that are means of ensuring the delivery of goods and services that promote the prosperity and growth and contribute to the quality of life including the social well-being, health and safety of the citizens and the quality of their environments’ (OECD, 2007). Sectors such as housing, electricity, water, transport and telecommunication are key areas that this definition covers. These are sectors that governments are committed to evaluate and ensure growth (Matei and Antonie, 2014).

Decision-making in a PPP contract regards the way the project is framed to enable rules relating to the development, construction, financing and operation of PPPs (IBRD, 2009; Smith et al, 2014). Zhang (2005) stated that decision-making is a tool that assists public procurement authorities. In general, decision-making affects the governance of the contract which comes under the ambit of project and contract management (Calder, 2009). The success of a project has various facets that are holistically considered. Factors such as the allocation, identification and mitigation of risk, form the embryo of project decision-making (Aritua et al (2009). There are other intricate aspects of how communities are sensitised before and after a projects' implementation as well as financial lending modalities, are essential factors to full-orbed decision-making (Ke et al, 2010; Heider et al, 2015; Rwelamila et al, 2003; Yescombe, 2007).

Although risk and uncertainty are used synonymously, their meanings are different (Smith et al, 2014). Risk is variously defined though its essential element is the distinction between reality and possibility (Gallimore et al, 1997). Risk arises out of uncertainty. Smith et al (2014) classified 'uncertainty' as an 'unknown' and hence categorised risk as 'epistemic' (essentially unspecified) and 'aleoteric' (or an acceptable) threat. Once risks are identified, they become management matters. Knowing the consequence and probability of the risk helps in deciding its priority and assessment (Deleze and Korkeamaki, 2018; Fewings, 2005). Understanding the likelihood of the risk materialising is crucial to assessing its relative importance (OGC, 2008). In view of the foregoing, the working definition adopted for 'risk' for purposes of this study 'is the expected outcome of an uncertain event', i.e. uncertain events lead to the existence of risks. Risk takes the 'soft system view' recognising the complications that can influence the project (Chong and Brown, 2000; Jean-Loup, 2017). These 'uncertain events' are called risk events (Manuj and Mentzer, 2008; Munier, 2014). The two components of risk are what are covered under knowing the consequence and probability of the risk which are (Smith et al 2014; Manuj and Mentzer, 2008):

- potential losses – if the risk is realised, what losses will result and what is the significance of the consequences of the losses; and

- likelihood of those losses – the probability of the occurrence of an event that leads to the realisation of the risk.

The study therefore sought to establish the likely risks affecting the studied PPP projects and their consequences to the envisaged objectives by the contracting parties.

1.3 Research problem

Although the law regarding PPPs was enacted in 2009 in Zambia, there were projects executed by the private sector between 1995 and 2005 (Ngoma et al., 2014). Projects such as the Luburma and Cha Cha Cha markets of Lusaka stand out as examples stated by Kalemba, (2011) and Khanda (2011). In 2013, the Kasumbalesa border post was completed while the University of Zambia East Park Mall was opened for business in 2016. Other projects involved the energy sector which included the Kafue Gorge expansion project and the Ithezi-thezi hydro project. Several other projects have been earmarked to utilise the PPP concept such as the building of hostels at the Copperbelt University and the University of Zambia. Problems with PPP projects that have been implemented do not affect the matter of affordability. It is clear that those willing to invest are ready to finance the projects they have embarked on. However, from the above mentioned projects, the matter of risk allocation and the ability for projects to attract notable investors to enable them to be 'bankable' have raised concerns. This is in view of the fact that three of the above mentioned projects had their concession periods revised suggesting that the investor got more than was eligible. The Zambia National Building society renovations (along Cairo Road) were reported to be over-budgeted (Nkolomba, 2011). The relevant question to ask is, '*what risk allocation decisions were made on the PPP concessions to ensure success of the projects?'*

1.4 Purpose of the study

Several factors affect the successful operation of PPPs (Wu et al, 2018; Ke et al, 2010). Apart from ensuring good policy structures, Belkhir et al (2017), Petersen (2011) and; Zulu and Muleya (2009) singled out risk management and procurement as well as economics and finance as some of the critical areas that need careful attention when formulating PPP projects. Knutson and Huettel (2018) and Akintoye (2005) stated that developing countries lag behind in terms of PPP experience. Ndandiko (2006) and

Boamah et al (2017) suggested that for developing countries, PPPs would not work due to their lack of strong public and private sectors. Despite this contravening view, the use of PPPs is still on the rise because budgetary deficits are the norm for Sub-Saharan Africa (Zulu and Muleya, 2009; Cui et al 2018). PPPs are therefore known as an 'off the budget means of saving' (Davies and Giovannetti, 2018; Saunders and Cornett, 2008) for governments that have adopted them as a solution for the provision of infrastructure (Frank and Shen, 2016; and Widen and Olander, 2010).

Risks must be managed if a project is to succeed (Smith, 2015; Ke et al, 2010). As the hallmark of PPP projects is risk allocation, Ke et al (2010) and Shrestha et al (2017) gave caution about the necessity of ensuring that such is allocated effectively so that intended objectives would succeed. The nomenclature of the pattern of risks particularly for developing countries embarking on using this mode for development is a factor that has not been studied (Balog et al, 2017; Akintoye, 2009; Zulu and Muleya, 2009). Furthermore, decisions being made regarding projects, take into consideration a cluster of issues. Owing to the renewed resurgence in PPPs as the adopted means of providing the much needed local economic development (LED) in most developing countries, the likely impact of various risks that projects are exposed to, need studying. Knutson and Huettel (2018) and Chan et al (2011) noted that there was limited research work regarding fair risk allocation mechanisms which are essential for the success of PPP projects.

1.5 Main research objective

The main objective of this research was to propose a risk allocation decision-making framework for evaluation and monitoring of allocated risk on PPP projects.

1.5.1 Specific objectives

The main objective was achieved through the following specific objectives:

(i) to determine critical success factors (CSF's) utilised in decision making in PPP projects;

(ii) to establish risk allocation practices considered in risk management for PPP projects;

(iii) to evaluate how risk allocation impacts decision-making on PPP projects;

(iv) to establish the relationship between risk mitigation decisions and PPP project success;

(v) to establish the relationship between risk allocation and PPP project success, and

(vi) to design a decision-making framework for evaluation and monitoring of allocated risk PPP projects.

1.5.2 Research questions

The following research questions fostered the investigation:

(i) Which Critical Success Factors (CSFs) are utilised in decision making in PPP projects?
(ii) What risk allocation practices are considered in risk management for PPP projects?
(iii) How does risks allocation impact decision-making on PPP projects?
(iv) What mitigation methods are used to hedge against risks on PPP projects?
(v) Is there a relationship between risk allocation and PPP project success in Zambia?

1.6 Importance and benefits of the study

This study sought to synthesise various literature and theories around risk allocation decision-making in public private partnerships. To date, there has never been a study of whether the enactment of the PPP law encourages investors to take up projects in Zambia. Arriving at the decision of investment is a critical factor that enhances the confidence of investors not just in the law but the entire economy as a whole. The review of secondary data from academic journals served to bring to the fore issues that need be implemented in the way PPPs are being conducted in Zambia. Although various studies have been done regarding PPPs in Zambia, these have been of a feasibility nature. For example, Mukela (2006) laid the foundation for the establishment of PPPs in Zambia that was supported by the government under the National Council for Construction. Banda (2004) researched on private sector participation in the water and

sanitation industry. The study showed the lack of participation by investors in this key sector of the Zambian economy. One aspect observed from this research, was how investors opted to target easier PPP projects than ones exacting huge resources. Another study made an assessment of value for money determination of projects undertaken by the Lusaka City Council (Kalemba, 2011).

This study is pivotal in that it established the fact that risk identification, evaluation and allocation in the cases studied, were never conducted (Kalemba, 2011). Based on the urgent list of PPPs needed for implementation, the amount of investment stood at juxtaposition with the concession periods that was agreed for the Build, Operate and Transfer (BOT) project. This prompted a huge public outcry to the concession period of 65 years that was almost overturned a few years after the project was commissioned. A more recent study dealt with critical success factors for PPP infrastructure development (Khanda, 2011). The study established the need for the use of PPPs as a vehicle to foster development but did not consider individual projects in the establishment of the CSF's (Khanda, 2011). Chambwe (2017) established another set of critical success factors. Inevitably, there has been recognition of investors undertaking 'easier projects'.

In view of the foregoing, this study not only examined whether CSF's underlie PPP contracts projects as well as ascertain provided solutions for risks allocated therein. As at now, there is not a single study that has evaluated risks on PPP projects undertaken in Zambia. The case studies of the University of Zambia – East Park Mall and the Kasumbalesa Border Post infrastructure projects, therefore, give an insight into the risks that were considered prior to implementation. Hence, this study could benefit stakeholders particularly at the implementation stage of PPP contracts with regard to risk awareness. It was therefore necessary from an ontological perspective to know what understanding professionals had. This enhanced the epistemological analysis of the researcher's instruments in obtaining data essential in the field.

1.7 Structure of the thesis

The essence of this **introductory chapter** was to outline the research problem addressed by this study. It also set out the objectives of the study and includes a brief description of the research methodological approach that was used.

The second chapter discussed the theoretical frameworks that underlie critical success factors (CSFs), risk allocation modalities; risk identification and mitigation methods employed in the successful implementation of public private partnerships.

The third chapter discussed various research methods used to gather data regarding risk allocation decision-making.

The fourth chapter reported on the research findings.

The fifth chapter discussed the research findings and drew implications in line with the set objectives of the study as well as the literature review.

The sixth chapter discussed the conclusions and recommendations. The research further ensured to validate the process for the implementation of PPPs in light of the numerous risks considered in the questionnaire survey. These raised difficulties regarding the time it took for a project to be implemented once it was proposed. The process of having the project established had at times ranged between five (5) to 10 (ten) years or even more. Evidently, this had discouraged would-be investors wishing to invest in a developing country in view of the many risks their projects have to be shielded from to achieve success.

1.8 Summary

This chapter discussed the introduction of the study. The conditions upon which the research was undertaken were pondered upon as well as the outcomes from the study summarised. Whereas the enactment of the PPP law has been a welcome gesture in view of globalisation, prospective developers have been over-cautious in making the vital decision to invest. With the implementation of the project, the developer often takes up much of the risk in the PPP project. In seeking to limit risk and not have the project run into losses, the investor looks for avenues in the PPP law to enable them meet the goal.

Incidentally, once risk is allocated to the investor and the project is sanctioned to precede, evaluation of risks remains as the only option open to use. Often times, threats to the project are over-priced to lack of information as well as the erratic way economic policies may be enacted.

CHAPTER 2 : LITERATURE REVIEW

2.1 Introduction

The first chapter presented the background to risk allocation decision-making in Zambia, the justification, aims and objectives of the study. This chapter presents literature review on concepts associated with risk allocation and decision-making. The basic theories that have been used to drive the PPP agenda, namely, under the New Public Management (NPM) have been discussed. Previous studies and literature, key definitions and structures of various PPP forms that have been adopted in infrastructure decision-making have also been explained. The chapter also presents the focus of the current debate on risk allocation in the development of national infrastructure.

Zambia's Sixth National Development Plan (SNDP, 2011) is couched around the theme of infrastructure development. Infrastructure development makes significant contribution towards the country's economic growth (Chimanse, 2017; Alfen et al, 2009). To fulfil the development agenda, many countries are using PPPs as a procurement mode (Jefferies, 2006). PPPs offer governments the opportunity to develop the private sector because of the numerous gains that accrue to an economy (Mourao, 2018; Akintoye, 2009). Among such gains are efficiency and improved performance that are often cited as reasons the private sector are allowed to participate in development projects (Cui et al, 2018; Guasch, 2004). For instance, modern economies thrive on the efficient operation of infrastructure services such as electricity, water, sanitation, telecommunications, roads, railroads, ports and airports (Akintoye, 2009; Odeck and Welde, 2017). These consist of the necessary inputs that actuate goods and services and are therefore important to a nation's economic competitiveness, productivity and cost (Ngoma et al, 2014; Farlam, 2005). Yet there is deficiency in the delivery of services by government enterprises. In an effort to foster development, government utilise various modes particularly through the private sector. Although various models of development have been used, industrial reforms in infrastructure for many developing countries have lamentably failed to ensure that efficiency gains filter to users (Munier, 2014). This is because governments handle numerous competing needs which require enormous investment through partnering with the private sector. Sufficient resources are needed to

provide and improve infrastructure performance. Private sector participation often takes various forms, from management contracts to concessions, to mention but a few of the specialised approaches (Cui et al, 2018; Banda, 2004).

2.2 Literature review

Literature review explored existing works to identify knowledge gaps. In order to get a thorough understanding of the subject, data from researchers was used (Nkhata, 1997). Before the problem of risk allocation in PPPs was laid out, all relevant literature was surveyed. With literature review, ideas are developed and discussed. Owing to the numerous pieces of published literature, the review process for the entire research culminated in suggesting future areas of further investigation (Nkhata, 1997).

2.2.1 Advantages of literature review

Kothari (2011) and Kumar (2005) stated that literature review leads to the following advantages:

- it enriches the background to the study;
- further understanding is provided for what was being proposed from earlier studies hence refining the research methodology;
- brings clarity to the research problem under investigation;
- it is used as a source for making comparisons;
- it is able to provide questions for initial observations and interviews and also to supplement them;
- the results of the review are able to show what specific contribution the research work is accomplishing; and
- it enables study's findings to be contextualised into the existing body of knowledge.

2.2.2 Disadvantages of literature review

According to Kumar (2005), literature review has the following disadvantages:

- it is a tedious and laborious process going through the paper work;
- using secondary data creates problems of context; and
- time of publication distanced from application.

2.3 Definitions

Public Private Partnerships (PPPs) have several definitions. Most definitions often retain the central feature of participation of the public and private parties. Munier (2014) and Hodge and Greve (2007) called for the re-examination of the different meanings and definitions given to PPPs. Akintoye (2009) and Cui et al (2018) defined PPPs as contractual agreements of shared ownership between public agencies and private companies, whereby as partners, they pool resources together and share risks and rewards, to create efficiency in the production and provision of public and private goods traditionally provided by the public sector. Koppenjan (2005) opined that it is 'A form of structured cooperation between public and private partners in the construction or maintenance and operation of construction and infrastructural facilities in which the partners share or re-allocate risks, costs, benefits, resources and responsibilities over a long period'. Ahadzi and Bowles (2004) stated that it is essentially 'a form of collaboration between the public and private sectors'.

Smith (2015) and Becker and Patterson (2005) added the concept of 'collaborative efforts between the public sector and for-profit or non-profit organisations in the private sector' in their definition of PPPs. Ultimately, they recognised the end of the 'collaborative efforts' as being one of provision of enhanced services so as 'to accelerate economic growth or to supplement government revenue' (Becker and Patterson, 2005; Wu et al, 2018). The Australian PPP Guidelines (2008) defined a PPP as 'a long term contract between the public and private sectors where government pays the private sector to deliver infrastructure and related services on behalf, or in support, of government's broader service responsibilities'. This was an unembellished meaning of the application of PPPs. Neufville and Barton (1987) described PPPs as 'myths…which have found rationality in public life'. According to Neufville and Barton (1987), PPPs were untenable at some point in time. However, the need for development was deemed

to bring rationality as the private sector became involved. Rationality was the outcome of the negotiation process which was a dynamic process by which parties would adjust their mutual objectives in order to reach a satisfying agreement (Boamah, 2017; Ahadzi and Bowles, 2004). Evidently, the public and private sector came to a settled understanding that provides 'benefit' and 'profit' to the parties of the PPP contract.

Such partnerships attained various accreditations in countries leading to innumerable definitions of the PPP concept. Li and Akintoye (2003) and Cedrick and Long (2017) reported how the concept is viewed as ambiguous by academics and industrial participants. In view of the lack of consensus on the definition of PPP, they listed five characteristics that are hallmarks of PPPs. They opined that these would be the bare essentials needed for a PPP contract. These characteristics were that (Chimanse, 2017; Li and Akintoye, 2003):

a) two or more entities would be involved in a PPP;
b) PPP participants become principals that subsist in a stable and enduring relationship;
c) the relationship entails that participants contribute something to it which necessitates shared responsibility; and
d) that parties share in the risks, gains and losses of the proposed enterprise.

The working definition for PPPs underlying this research study is that ***they are long term partnerships by two parties with the intention of accelerating economic growth while sharing risks, gains and losses of the combined entity***.

Researchers always distinguish between 'risk' and 'uncertainty' (Smith et al, 2014; Grimsey and Lewis, 2002). Admittedly, in both cases, the future cannot be predicted with certainty (Gehner, 2006). The crucial distinction made in the case of 'risk' is that outcomes of future probabilities are known while those of 'uncertainty' are deemed as 'wild guesses' (Toumi, 2018; Grimsey and Lewis, 2002). PPP entrepreneurs in their project endeavours face a lot of uncertainty yet yield profits. Bull and McNeill (2007) noted the increase in foreign direct investment (FDIs) in developing economies during the advent of 'globalisation'. According to them, the competitive environments in

developed countries, shifted their focus to 'greenfield markets', with Africa being at the fore front. Perceived 'risky factors' were removed such as barriers for 'the movement of capital, new technological developments in communications and information, and changes in both national and global policy' (Vickermore, 2017). This explains why PPPs have become a conduit for development encouraging various prospectors to venture out in what has come to be known as 'enabling environments' (Mukalula, 1995). As these private partners enter developing countries, they use several techniques to assess risks before undertaking floated projects. These private partners are assisted by multi-lateral institutions, firms and individuals. Infrastructure development has been identified by these organisations as capable of generating profits from Greenfield investments (Bull and McNeill, 2007; Gidman et al, 1995; Kartashova, 2018).

2.4 Rationale of using Public Private Partnerships

Governments around the world have relied on the private sector for the provision of infrastructure (Cui et al, 2018; Hood and Young, 2003; Cheung et al, 2010). There is a general admission amongst researchers of lack of a standard method of PPP implementation (Alfen et al, 2009). Smith et al (2014) and Yescombe (2009) have provided modalities of implementation for developers using modern decision-making techniques. These techniques use operations research mathematical analysis. Gallimore et al (1997) and Stafylas et al (2017) reported that a major motivation for public sector agencies actively seeking to participate in Private Finance Initiative (PFI) projects was the expectation that capital spending was likely to fall by 12 per cent in real terms for the project. With this expected fall come profits from already implemented investments.

Adams et al (2006) and Cui et al (2018) suggested three reasons why PPPs are being used. These are:

- that they reduce the burden on taxpayers in the delivery of both capital and long term service contracts by the introduction of private capital, expertise and competitive business practices to the provision of public services;

- the private sector has a higher level of efficiency and effectiveness than the public sector which is hindered by its highly bureaucratic and politicised operative processes; and

- risks associated with the provision of such infrastructure can be spread between the private and public partners hence relieving taxpayers of some of the costs incurred by decision taken long ago.

Demand for public services coupled with the fiscal crisis in the public sector has led to a new set of circumstances. The OECD (2008) predicted that the world economy is expected to grow at about 3 percent per annum to the year 2030. Much of this growth will be in developing countries hence the need for vital services to support industry. Latham (2006) pointed out that government intervention does not necessarily mean direct provision of services but can be brought into effect via:

- managing the market,

- intervening directly to ensure public outcomes or

- contracting non-state providers.

Governments have to undertake such service delivery through the option of decentralised management and market mechanisms (Cui et al, 2018 and Pongsiri, 2002). Governance is therefore a matter of concern. Stoker (1998) defined governance as the development of governing styles where the principles of accountability, transparency, fairness, efficiency, participation and decency are embraced. On the other hand, Alfen et al (2009) and Frank and Shen (2016) defined governance as a decision-making process. Governance must therefore embrace transparency in all its decision-making processes. Since developers are allocated a greater part of the risks in implementing development, adherence to the tenets of good governance are non-negotiable (Hueskes et al, 2017).

Abednego and Ogunlana (2006) developed the good project governance (GPG) concept that was aimed at evaluating performance under the PPP procurement mode. They further argued that proper risk allocation was only achievable through good governance

which in turn leads to better project performance or success. The suggested project governance concept comprises eight characteristics that included the following (Abednego and Ogunlana, 2006):

- making the right decisions at the right time, recognising the active participation of the parties involved;
- ensuring that there is contract fairness that recognises the rule of law invoking impartiality in application of rules between the parties;
- that there is information transparency that will be availed to those affected by project decisions;
- there must be effective responsiveness to have the opportunity to carry out decisions within a specific timeframe;
- project control and monitoring must be continuous so as to ensure achieving common goals amongst stakeholders;
- that all parties to the contract are equal;
- effectiveness and efficiency which would ensure that results produced meet people's needs as well as make best use of available resources; and
- accountability in having to fulfil the twofold objective of user satisfaction and community participation

Abednego and Ogunlana (2006) suggested that a contractor's pre-finance (CPF) as the best risk allocation strategy. This strategy automatically shifts the responsibility of financing the project from the owner to the contractors. This also means that other cash-flow and liquidity problems subsisting with the owner could be circumvented. This is due to the fact that the loan would be made directly between the financial institutions and the contractors (Hueskes et al, 2017).

2.5 Public private partnership theories

Public management in Africa has evolved a number of theories that influence its initiatives (Ayee, 2005). Three theories underscore the adoption of PPPs as a mode of procurement in a developing world context. These are the new institutional economics, development and new public management theories (Ayee, 2005; Kartashova, 2018).

2.5.1 New Institutional Economics

The New Institutional Economics (NIE) is dabbed several names but the most common ones are 'neo-institutional economics' and 'new economic theory'. NIE is aimed at customising modern development theories in ensuring that they become relevant to the local economic situation. In order to do this, two theories are utilised namely, (i) agency theory; and (ii) transaction cost theory.

2.5.1.1 Agency theory

The focus of agency theory is the relationship between the principals and agents. The design of the contract that binds the principal and agent is conditioned by agency theory. Agency theory recognises the inter-temporal nature as well as the complexity of the relationship's agreement. Jean-Loup (2017) and Ayee (2005) argued that the principal-agent theory is 'constitutive of public policy-making in democracy'. It is in light of this that principals perform two basic acts with regard to choosing their agents. Firstly, they must select the best agents and secondly provide incentives for them to behave as desired. This necessitates monitoring the performance of tasks of the agent. Although the principal will face the problem of lack of complete knowledge of the agent, he must satisfy himself with regards to the agent's qualifications as well as with his past record.

Two advantages are enumerated pertaining to the principal-agent theory. The first is that transaction costs arising out of collective action are handled by this method. In the second place, public activities by means of the state should result in a double principal-agent relationship in a democracy.

2.5.1.2 Transaction theory

The focus of the transaction cost theory is the contract. Transaction cost theory views parties attempting to engage in exchange (a transaction) as contracting both in terms of

exchange and execution. The theory focuses on the role of the state in defining the basics of contractual arrangements which depend on existing technologies and natural endowments (Wu et al, 2018; Stoll and Whaley, 1983). It is a recognised fact that the contracting process is costly. Several elements are part and parcel of this process. There are the structuring, monitoring and residual loss costs of agency including the costs of negotiation (Mourao, 2018; Ayee, 2005).

There are three important problems that contribute to the costs of contracting. First there is a cooperation problem which arises when a contract could offer all parties gain relative to its absence. Beneficial contracts often come when both parties have expended resources. Secondly, there is the division problem which arises when different mutually beneficial contracts offer different relative gains. And thirdly, there is the defection problem normally arising when there is no adherence by any of the parties to the contract (Ayee, 2005; Subramanyam and Haridharan 2017).

2.5.2 Development theory

Development is aimed at reducing poverty and inequality while ensuring the total emancipation of the individual through the provision of social and national structures. The direction of development has been one factor that many African countries have had to deal with. There are two development perspectives that find application (Wu et al, 2018; Ayee, 2005):

- the economic or modernisation perspective; and
- the dependency perspective.

2.5.2.1 Economic/modernisation perspective

Post Second World War thinking envisaged under-development as a force propelled by inadequate income that could be countered by a large-scale ‘big push’ effort. The process of economic development consisted in transforming social behaviour patterns. Much of the interpretation of development then consisted in ensuring that societies were not ascriptive, particularistic and functionally diffused. Various measuring indicators for development were advanced such as the gross national per capita (GNP) as well as the

gross domestic product (GDP). The most popular indicator among them is the GNP. But this was found to be an unreliable indicator in that it did not measure items that were important to welfare such as the distribution of income and wealth, employment status, job security and opportunities for advancement (Szymanski, 2017).

2.5.2.2 Dependency perspective

Dependency theory came in the wake of rejection of the modernisation doctrine which attributed under-development to a deficiency in appropriate values. Underdevelopment, in the dependency perspective was a function of dependence. In this view, underdevelopment is an external factor that is necessitated by internal colonisation with a dependent country. External factors were viewed as negative and growth in the periphery is a function of the expansion of the centre (Wang et al, 2016).

2.5.3 The New Public Management

The New Public Management (NPM) has been defined by Batley and Larbi (2004) as a set of management approaches and techniques, borrowed mainly from the private sector and applied in the public sector. NPM characteristics from the private sector included (Dent et al, 2004; World Bank, 2016):

(a) greater 'disaggregation' of public sector organisations into separately managed units;

(b) enhanced competition and use of private sector managerial techniques;

(c) emphasis on discipline and parsimony in resource use;

(d) increased 'hands on management';

(e) adoption of measurable standards of performance; and

(f) use of 'pre-set output measures'.

Ultimately, the provision of public services is finding expression in the public private partnership model. Consequently, the PPP style of management is termed as 'social learning' whose task is to 'establish relationships and forums of interaction between

government, business and non-profit organisations' (Cui et al, 2018; Neufville and Barton, 1987).

2.6 Importance of infrastructure

Economic growth and poverty alleviation are affected by levels and quality of investments in infrastructure (Hueskes et al, 2017). Guasch (2004) postulated that a 1 percent increase of a country's level in any type of infrastructure would cause a corresponding increase of 0.20 percentage points of the gross domestic product (GDP). Frank and Shen (2016) and Arts et al (2008) gave some infrastructure investment characteristics which were noted as follows:

(a) sunk investment: investment in infrastructure is irreversible;

(b) long lead times: investment in infrastructure has a long time between start and use;

(c) lumpy: infrastructure development needs decisive, discrete steps;

(d) inelastic demand: demand for general residential infrastructure is fairly predictable being a function of the number of consumers and income levels.

Vickermore (2017) noted that inelastic demand decreases investment risk. Other characteristics such as interest rate fluctuation and an unstable market increase the investment risk and cast doubt on the viability of the services provided by PPPs (Arts et al, 2008). Poor infrastructure contributes to the high cost of capital associated with inventories as well as logistics. Inventories, which are buildings that are used in business enterprise, utilise huge sunk costs in the development process (Joslin and Konchitchki 2018; Byrne, 2005; Akintoye, 2009). Logistics refer to roads and telecommunications that facilitate business. Sunk costs cannot be easily be recovered from investments particularly in times of economic downturns (Boamah, 2017; Guasch, 2004). Expropriation risk is often realised when governments take opportunistic actions in form of changing regulations during election times hence abrogating concessions (Cedrick and Long, 2017; Alfen et al, 2009; Guasch, 2004; Byrne, 2005). Investors would increase premiums to also cover the regulatory risk. In the case that they are at an advantage with the information they hold over government, their negotiation leverage is

heightened. Often attempts will be made to re-negotiate the concession resulting in monopoly abuse which can be detrimental to the public (Hueskes et al, 2017).

There is also the effect of certain events not induced by the government or those providing a service which may be construed as neutral (Belkhir et al, 2017; Zou et al, 2006). Internal and external macroeconomic shocks can affect the financial capacity of private companies in meeting their concessionary obligations. This is due to the fact that infrastructure revenues are collected in local currency while investments, equity and debt utilise foreign currency (Saad and Samet, 2017; Guasch, 2009). Such neutral events must have clear guidelines for adjustments to be made when such conditions arise. Re-negotiations have occurred due to changes occasioned by guarantees, annual fees, investment plans, tariffs, service standards and concession periods. A study from 1000 concessions of compiled data on renegotiation established that 30 percent of the contracts evidenced this practice (Davies and Giovannetti, 2018; Guasch, 2004; Alfen et al, 2009). Transport concessions were re-negotiated more than others. However, telecommunications and energy owing to the competitive nature of the sector had less re-negotiation practices (Vickermore, 2017; Akintoye, 2009; Guasch, 2004).

2.7 The PPP/PFI argument

Neufville and Barton (1987) made the case concerning the genesis of PPPs that 'history is essential to making sense of contemporary public problem definitions'. The fulcrum of their argument is that PPPs are a remodelled story (Smith, 2015). Further, Neufville and Barton (1987) called the emergence of the PPP concept as 'the new myth' ushering in a host of unresolved problems. Neufville and Barton (1987) stated that:

> *'Policy makers and analysts explicitly pieced together a new myth to justify and encourage a restructuring of the responsibilities of the government and the private sector. The myths allowed policy makers to rationalise a change in their positions, in a way that linked it to enduring values and beliefs and made it politically acceptable. Practical problems remained, such as how this cooperation could be designed within the framework of a democratic process, but the myth glossed over such contradictions and practical questions. But the myth had an important*

> *function in reframing the policy problem to make legitimate a view of the relationship between government and private sectors which represented a significant change from one predominant since the New Deal.'*

The Carter Administration popularised the term 'public private partnership' through the urban policy program (Neufville and Barton, 1987). The USA government's conviction then was to be a 'catalyst' that would set in motion 'a chain reaction' (Neufville and Barton, 1987). The Federal Administration postulated that the private sector was innovative, technically skilled and capable of getting the job done efficiently, heedless of profit (Neufville and Barton, 1987). They perceived that the problem was the harnessing of private capabilities to work for public interest hence developing a sense of civic responsibility (Cui et al, 2018; Neufville, 1987). Eventually, government and the private sector would learn from each other, developing holistic community interest (Frank and Shen, 2016). Government is seen to be inflexible, with much bureaucratic mechanisms, exhibiting unresponsiveness to individual and community needs while the private sector is flexible and caring but lacks authority and resources (Boamah, 2017). With interests coinciding, all three parties find harmony in a three-way partnership (Cedrick and Long, 2017). Neufville (1987) stated:

> *"The Carter administration began the official process of developing the story that partnerships would somehow produce all those outcomes, through a different mechanism. The idea of public private partnership maintained the legitimacy of public control over development."*

The PPP concept dealt with changes in the economy, in the role of government and national priorities hence emphasising the positiveness of institutions (Neufville and Barton, 1987; Belkhir, 2017). Munier (2017) and Hood and Young (2003) also acknowledged that outsourcing of works poses risks and restricts the amount of control and oversight. But best value, public private partnership and corporate governance would be the way to improve outsourcing risk management (Kartashova, 2018; Hood and Young, 2003).

Neufville and Barton (1987) argued that though the partnership concept has inspired collaborations between the public and private sectors, its focus has not assured that public goals would be met in a democratic manner. Neufville and Barton (1987) warned that the myth of partnership has a persuasiveness which makes it seem as if all that is necessary is to get partners together for them to solve the problems of the cities. The conclusion that they arrived at was that PPP was not really for urban development but for rationalising new roles for urban actors (Cui et al, 2018; Neufville and Barton, 1987). But such a conclusion was wrong. Although seminal aspects of PPPs are notable in Neufville and Barton (1987), the current forms of PFI/PPP have been generated with success in the UK (Cheung et al, 2010). Neufville and Barton (1987) were right in the sense that PPPs would essentially need partnerships. In other words, there is a lot that gets done within the context of partnerships in taking up projects that are floated by governments in various sectors, particularly in Sub-Saharan Africa.

2.8 The Worldview of PPPs

The quest for governments to involve the private sector in the development of infrastructure is one that is encouraged worldwide (Wu et al, 2018; Li and Akintoye, 2003). Various avenues of development are thus utilised to enable governments develop their economies (Ayee, 2005). Among such avenues are privatisation, concessions and public private partnerships (Shrestha et al, 2017; Guasch, 2004). PPPs were viewed as advantageous since they integrate the public and private sectors in a long term partnership. Two factors have enabled governments to take on board private investors. The first reason is that basic infrastructure is fundamentally capital-intensive while the second is the competitive demands for government budgetary resources (Cui et al, 2018; Alfen et al, 2009). In a bid to reduce the widening demand-supply infrastructure gap, governments seek to fulfil social commitments amid fiscal constraints (Pongsiri, 2002). Public provision of services in developed countries using PPPs has included projects for education, waste water management, public buildings and health services (Alfen et al, 2009). Developing countries have further seen the extensive infrastructure use of PPPs on projects for water, power and road sector projects (Alfen et al, 2009; Akintoye, 2009). Ayee (2005) expanded this list by adding the telecom sector as being recipients of huge investments in physical infrastructure. Angelides and Xenidis (2009) and Wu et al

(2018) postulated that private sector participation in infrastructure in developing countries would persist owing to favourable investment conditions.

Byrne (1984) gave a comprehensive definition of infrastructure development that is in line with this research, in fostering PPPs as a governance, management and development tool. He enumerated the characteristics of development as the:

- perception and estimation of demand for new buildings of different types;
- identification and securing of sites on which buildings might be constructed to meet that demand;
- design of accommodation to meet the demand on the sites identified;
- arrangement of short- and long-term finance to fund site acquisition and construction;
- management of design and construction; and
- letting and management of the completed buildings.

Infrastructure development has been the key driving factor for PPPs across the world (Hueskes et al, 2017). Shaoul (2009) acknowledged that countries around the world have turned to PPPs to finance the much needed infrastructure. Li and Akintoye (2003) and Kartashova (2018) counter the asseveration that PPP usage is 'uneven and recent'. They cite examples of the increasing use of the Build-Operate-Transfer (BOT) contract by financiers and construction companies aimed at financing, constructing and maintaining economic infrastructure. Other methods being used are outsourcing that contract out general and technical services to a third party (Pongsiri, 2002). There is advantage in such a contract in that government alliance with a third party ensures control. France is rated as having the longest history of private sector involvement for public goods provision. Li and Akintoye (2003) adduce evidence that show that private sector involvement for the water infrastructure increased from 31% in 1854 to nearly 61% in 1980 and 75% in 1991. There is greater willingness in the French public transferring the construction and operating risk to the private sector mainly through the use of the BOT model. Chinyio and Gameson (2009) reported of the extensive use of PPPs for tunnels, roads, stadiums and prisons.

Efficiency gains or advantages have earned PPPs the attention due to the following reasons (Cui et al, 2018):

- to remove the responsibility of funding the investment from the government balance sheet;
- to introduce competition;
- to adopt managerial practices and experience of the private sector;
- to restructure public sector service by embracing private sector capital and practices; and
- to achieve greater efficiency than traditional methods of providing public services.

Governments are thus focused on the creation of an enabling environment so as to attract private sector investment (Belkhir et al, 2017). In the UK, PPP is pivotal to the delivery of modern social services and has utilised several business structures and partnerships. The most common and popular is the PFI model but alongside it are concessions, joint ventures and outsourcing. Through the PFI model, there has been an exploration of the full breadth of private sector management, commercial and creative skills. The PFI model utilises the Design Build Finance Operate (DBFO) model through the annual payment by government for the use of privately owned facilities designated over an agreed concession period. Hardcastle and Boothroyd (2003) and Boamah (2017) pointed out that the aim for the UK government introducing PFI was essentially to replace its direct involvement in the provision of basic infrastructure. The PFI policy has been increasingly justified in terms of delivering value for money (VFM). This is known as the VFM or the risk transfer argument (Shrestha et al, 2017; Shaoul, 2009).

2.9 PPP accomplished projects in the world

The USA has also seen an increase in the use of PPPs encouraged by private sector investment (Hueskes et al, 2017). Smith (2005) cited the Trans-continental Railroad example which was completed in 1869. Many Asian Pacific countries are using the PPP concept amongst who are China, Australia and Japan. China has undertaken projects such as the Yan'an Donglu tunnels, Shajaio B Power Plant in Guangdong Province and

the first approved BOT project, the Laibin B in Guangxi Province (Wang and Ke, 2009). Wang and Ke (2009) studied the adequacy of contract clauses in documentation used as well as the critical success factors that influenced Laibin B project. Tariff adjustment, expropriation and exchange rate & convertibility risks were the three most adequate contract clauses in terms of criticality while different CSF's were identified for the three phases of the project procurement (Wang and Ke, 2009). Clauses covering risks on financial closing, change in law and dispatch control were rated as least adequate (Wang and Ke, 2009). The Laibin B project set China's risk allocation benchmarks with a risk management framework to aid promoters being suggested by Wang et al (1999). The seven main areas of allocated risk covered political, operating, market/revenue, finance, and legal and competition risks (Wang and Ke, 2009; Belkhir et al, 2017). Wang and Ke (2009) summarised the main experiences learned and applied to other projects as being:

- the use of competitive bidding to select investors;
- innovative use of initiatives from government such as guarantees and incentives;
- implementation of a reasonable risk-sharing scheme; and
- determination to raise the standard of contract practice.

The modernisation of China was the theme that radiated from the construction of the National stadium under PPP (BOT) form of contract during the 2008 Beijing Olympic Games (Zhao and Wang, 2009). Risk management was a critical factor that ensured congruity between the private and public sector interests that were enforced in the contractual arrangement. This was done by ensuring limitation on the tenure of the PPP. The Chinese government did put a reasonable limit on the period for the project to be handed over. Zou et al (2008) were able to study the risk factors for three projects; two of which were in Australia and one on mainland China. These projects were the Sydney Cross City Tunnel, the Sydney Airport Railway Link and the Fe-De Highway in Hengshui City in Hubei Province. China has since put up other projects (Wu et al, 2018).

Guasch's (2004) study of Latin American concessions exemplify how with proper contract design, eventual regulatory framework and coupled with the overall structure of governance, provide the necessary conditions for success. His contention is that concessions would succeed if they are better designed. Guasch's (2004) analysis points out one of the major weaknesses seen in Zambian concessions that have led to inefficiency in PPP contract administration.

In Scotland, the Almond Valley and Seafield (AV&S) project involved the construction and operation of a water treatment facility in East of Scotland Water (ESW) (Grimsey and Lewis, 2002). The issued services contract was for 30 years between ESW (representing the public) and Stirling Water. Signed on as a PFI scheme, the aim of the project was to comply with new regulatory standards that were put in force by December 2000. ESW invested 850 million British pounds. The project dealt with posed risks by the use of various methods such as expected cost, Monte Carlo simulation and sensitivity analysis as affecting the procurer, sponsor and lender (Grimsey and Lewis, 2002; Deleze and Korkeamaki, 2018). Abednego and Ogunlana (2006) noted how those countries in the East Asia region have had success in attracting private investment in infrastructure. Risk analysis techniques range from simple ones such as sensitivity analysis to more complex probabilistic methods (Frank and Shen, 2016). Two observations were made regarding the pattern of PPP use across continents by Li and Akintoye (2003). They noted the high use of PPPs in developed economies for the delivery of government public services, goods and facilities. Secondly, they concluded that public or private dominance was dependant on ideological stance of a country (Hueskes et al, 2017).

Abednego and Ogunlana (2006) reported how that Indonesia led East Asia in allowing the private sector invest in toll road projects since the 1990s with its eventual expansion making significant progress. The driving force was the need for infrastructure whereby the private sector invested $20 billion in the transport sector. Seaports also benefited – of the 20 projects undertaken 7 where seaport infrastructure while the rest were toll roads (Abednego and Ogunlana, 2006). In a robust economy such as that of Indonesia, risk

allocation perception is a critical factor to ascertain for the parties involved (Dahiya et al, 2017).

The most common form of PPP is the vertical type that embodies a lifecycle approach that transfers risk to the private sector in the form of design, construction, finance operation and maintenance over the concession period. The Build-Operate-Transfer (BOT) arrangement is normally used for such contracts. BOT involves the transfer to the private sector of a facility for an agreed period of time. In fact, such PPP variants have the single characteristic of risk transfer to the private sector. PPPs can either utilise user-financed and budget-financed models as shown in **Figure 2.1** below. Used financed projects are very rare, particularly, at the on-set of the project. However, they gravitate to this as they utilise raised revenues from the project to be able to finance acquired loans from multi-lateral organisations (Jean-Loup, 2017).

The use of hedge funds comes in handy to be able cushion financial as well as other risks that may affect the project. Cost benefit analyses are therefore performed during the feasibility phase (Vickermore, 2017).

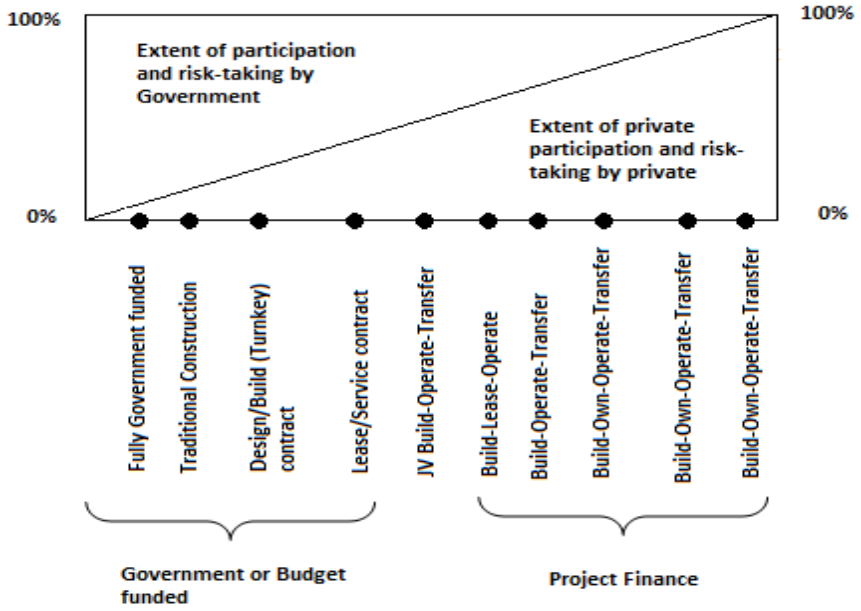


Figure 2.1: PPP procurement mode and extent of participation and risk-taking by the public and private parties
(*After Zou et al, 2008)*

User-financed models allow the private investor to recover his investment through user charges that are linked to the provided infrastructure. With a budget-financed model, the investor is given down payments that are equivalent to the service level provided. It is usually the responsibility of government in deciding which financing model to use depending on type of infrastructure service as well as prevailing political and economic circumstances. Ball (2011) reported that in Australia PPPs are categorised either as 'economic' or 'social'. Economic projects are revenue generators while social projects are budget funded (Cedrick and Long, 2017; Ball, 2011).

2.10 PPPs in Sub-Saharan Africa

PPPs have taken different forms on the African continent though fall far short of what the developed world has accomplished (Davies and Giovannetti, 2018; Li and Akintoye, 2003). The need for infrastructure development in developing countries together with increased pressure on national budgets has encouraged the private sector to become partners (Alshawi, 2009; Chimanse, 2017). Infrastructure developments of roads, bridges and vital services play a vital role in influencing the economic viability and social welfare of a nation (Chan et al, 2011). Broadly, PPPs describe public or private participation in the provision of public infrastructure development. Four types of PPPs (shown in **Figure 2.2**) are commonly used namely:

- management and lease contracts are contracts that enable a private company take the reins of a state-owned entity for a defined period whilst ownership and investment decisions remain the preserve of the state. Operational risk is handled by the state in a management contract while in the lease one; the private operator assumes the same;

- concessions entail that the private entity manages a state-owned business for a period of time taking on board the full investment risk;

- greenfield projects recognises joint venture projects orchestrated by both the public and private or just the private entity to construct and operate the project for an agreed period; and

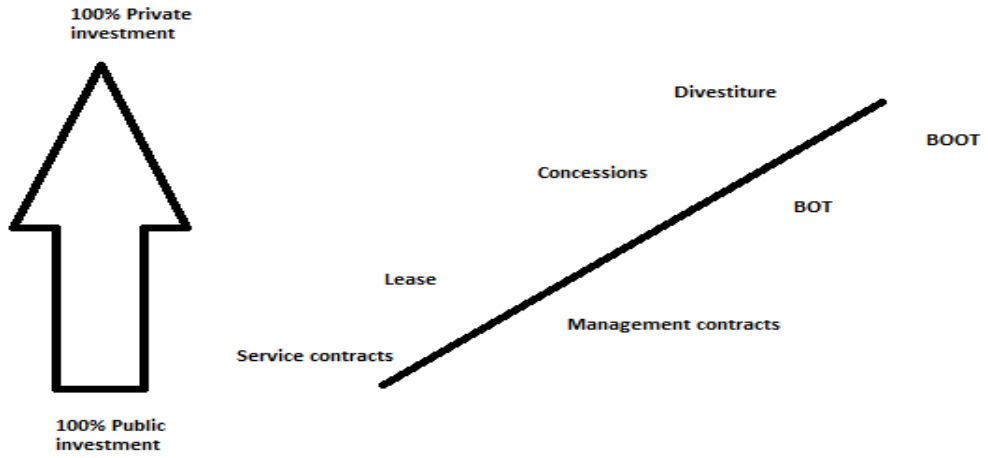


Figure 2.2: PPP variant modes and public and private investment
(After World Bank Tool Kit, 1997)

- divestitures are ventures whereby the government wholly or partially gives over its equity share in a state owned company by way of mass privatisation.

Akintoye (2009) advised that developing countries align their economic activities to those related to transportation, energy and telecommunications. The cost of such infrastructure may be prohibitive compared to other competing national needs but rewarding to the nation (Alfen et al 2009). Capital investment of this magnitude is a problem when relying upon government budgets and foreign aid. In addition, there is need to strengthen institutional development in order to facilitate private capital involvement (Pongsiri, 2002). These reasons are perceived as major barriers in the implementation of PPPs. Barriers identified include (Cui et al, 2018; Farlam, 2005; Akintoye, 2009):

- the absence of efficient, transparent and participatory policies, mechanisms and institutions;
- lack of adequate capacity for private sector development;
- lack of innovative partnerships and business models;
- unavailability of a policy environment to facilitate cooperation and partnerships between public and private actors;

- limited access to finance; and
- inadequate safety net mechanisms and basic services.

The measurement of efficiency gains has been difficult for developing countries owing to unavailability of reliable historic data to enable accurate lifecycle estimations be done on projects (Alfen et al, 2009; Toumi et al, 2018). Alfen et al (2009) and Heider et al (2015) opined further that budgetary assumptions are over-optimistic coupled with difficulties of discount rate selection and choice of risk testing mechanisms.

IBRD (2008) reported that Africa recorded an improvement in infrastructure between the 1990's and 2000 as shown in **Table 2.1** below.

Table 2.1: Improvements in African Infrastructure access

Service	1990's	2000's	% change
Telephones (per 1000)	21	90	328.6
Improved water (% of households)	55	65	18.1
Improved sanitation (% of households)	31	37	19.3
Grid electricity	16	23	43.8

(*After IBRD (2008), Africa Development Indicators)*

It is estimated that Africa needs $22 billion a year for its unmet infrastructure needs plus another $17 billion for operations and maintenance (IBRD, 2008). High indirect costs to firms with lack of adequate energy and transportation are cited as major impediments to investment (IBRD, 2008). Farlam (2005) and Boamah (2017) reported that the power sector ranked second behind telecommunications in terms of investment and was third in number of projects with regard to private activity in utility-related infrastructure in Sub-Saharan Africa between 1990 and 2001.

Mourao (2018) and Zulu and Muleya (2009) pointed out that in Sub-Saharan Africa, those attempting this mode of procurement are faced with challenges of inadequate regulatory frameworks and impoverished public and private sectors which are necessary requisites to the success of PPPs (Cedrick and Long, 2017; Li, 2005; Zhang, 2005).

However, PPP projects on the African continent continue to rise (Akintoye, 2009). By the year 2005, South Africa had done over 50 such partnerships in development and implementation at national and provincial level and 300 projects at municipal level since the inception of PPPs in 1994 (Farlam, 2005).

2.11 PPPs in the SADC region

The Africa Infrastructure Country Diagnostic (AICD) (2010) stated the challenge of dependence on official development assistance (ODA) that has contributed to an erratic pattern of investment in the road sub-sector for the Common Market for East and Southern Africa (COMESA) and the Southern Africa Development Community (SADC) region. Some of these challenges are being addressed through the PPP mode of delivery enabling the region to record both successes and failures (Farlam, 2005). Regional development of trade corridors north and south of the equator has seen unprecedented development in the energy and road sectors. One such successful project was the implementation of the Maputo Development Corridor (MDC).

2.11.1 The N4 toll road

The MDC's projects included N4 toll road from Witbank in South Africa to Maputo in Mozambique; the rehabilitation of Maputo Port; and the Ressano Garcia railway. A 30 year concession was signed by the governments of South Africa and Mozambique with a private consortium, Trans African Concessions (TRAC) to build and operate the N4 toll road from Witbank, South Africa to Maputo, Mozambique at a cost of R3 billion in 1996 (Farlam, 2005).

Finance for the N4 was comprised of 20% equity and 80% debt. Three construction companies who were project sponsors contributed R331 million worth of equity that was provided by the South Africa Infrastructure Fund; Rand Merchant Bank Asset Management together with five other investors (Farlam, 2005). The debt for TRAC obtained from South African based banks, was guaranteed by the governments of South Africa and Mozambique. Initially the project was faced with demand and user payment risks owing to the fact that investment was to be recovered through project finance. Traffic volumes that were projected in view of increased regional trade and economic

growth fell far short while the poor communities in Mozambique were both unwilling and unable to pay toll fees. The solution was cross-subsidation of the Mozambican portion with the South African side high revenues. The success of the MDC project was felt in the improved road network and facilitated regional tourism growth as well as other investments in aluminium and natural gas (Farlam, 2005).

2.11.2 The Maputo and Tanzanian Port

Following the success of the N4 toll road project, the rehabilitation of the Maputo Port was next. A joint venture was formed between the Mozambican national ports and rails authority and a private consortium led by the British Mersey Docks and Harbour Company (Farlam, 2005). The consortium, the Maputo Port Development Company (MPDC) owned 51% while 49% was held by the Mozambican government. A 15 year concession was signed with aim of re-establishing the ports of Maputo and Matola as key economic centres for growth. The concessioning of this port increased its efficiency from handling 4.3 million tonnes in 2002 to 5.54 million tonnes in 2004. In Tanzania, similar results were obtained when the port at Dar-es-Salaam was concessioned with revenue projections being exceeded in the first year by 206% and 218% respectively (Farlam 2005).

2.11.3 Prison infrastructure

Farlam (2005) reported the signing of two contracts by the South African government for the construction of correctional facilities at Bloemfontein and Louis Trichardt. Due to cost, the scope was narrowed both in terms of number of units built as well as specifications (Farlam, 2005). Initially 11 prisons were earmarked to be built but number was revised to two. The payment for the two prisons will take up 5% of the correctional services budget for 25 years.

2.12 PPPs in Zambia

The World Bank reforms of the late 1990s ushered in the advent of privatisation in Zambia. Although a few projects were undertaken under as PPPs, there was no legal framework for it. The PPP law was enacted in 2009. However, with stable economic conditions, Zambia's portfolio of PPPs is steadily growing. In the power sector alone, 13 projects were implemented under the private power investment. One border

infrastructure was built under the PPP auspices. The Road Development Agency advertised PPP toll roads but has had no favourable responses from would-be investors.

2.13 Measures for project viability and success

Project objectives must be systematically analysed using costs and benefits through an economic appraisal. Some common measures that are normally used for PPP projects are as follows (Toumi et al, 2018; Alfen et al, 2009; Yescombe, 2007; Smith et al, 2014):

- return on investment;
- return on equity;
- net present value;
- payback period; and
- debt service coverage ratio.

Mourao (2018), Alfen et al (2009), Bull and McNeill (2007) demonstrated how projects in developing countries were exposed to numerous 'institutional and transactional hurdles' among which include:

- a stable political environment;
- loan guarantees;
- stability and enforceability of institutions;
- instability of the local currency;
- credit support for the loan;
- availability of public information;
- availability of private information; and
- an inadequately developed local financial market.

PPP projects undergo a three phase structure that includes the periods of development, construction and operation. These phases experience different types of risks that the developer assumes. **Table 2.2** below summarises critical risks that projects are exposed to during the different phases.

Table 2.2: Summary of critical risks in different PPP phases

Phase	Risk
1. Development	Land acquisition, delay in financial close
2. Construction	Completion risk, cost overrun risk
3. Operation	Demand risk, traffic revenue risk

(After Yescombe, 2007)

The projects exposure to different risks generates the risk profile (Knutson and Huettel, 2018, Akintoye, 2009; Guasch, 2004). The risk profile influences the source of funding as well as the financial package that funding agencies will apportion in terms of risk/reward for the phase (Balog et al, 2017; Amundurud and Aven, 2015; Alfen et al, 2009; Yescombe 2007). A successful financial package is deemed to be one that provides different investors with financial instruments that equate the risk/reward profile and further utilised for risk management (Smith, 2015, Alfen et al, 2009). Project finance is the preferred mode of financing infrastructure. With project finance, repayment of the loan for the capital costs is generated through the cash flows from the operation of the project. This is the concern for debt finance lenders who will scrutinise the project's capacity to produce revenues that will service such financial obligations. However, there must be a good return on investment that will be the preoccupation of the investor. The greater need is for the identification, assessment and management of risks that will threaten the project's capacity to generate revenues so as to service debt obligations as well as achieve investment return. Ye (2009) and Vickermore (2017) pointed out three categories of funds for financing a project namely:

- equity;
- subordinated debt; and
- senior debt.

The levels of risk due to exposure for each of these categories require different returns for funding providers (Ye, 2009; Cedrick and Long, 2017). Any investment strategy must have proper planning in terms of project finance that must avoid poor construction quality, construction delays and cost overruns (Alfen et al 2009; Smith et al, 2014). The risk evaluation must include the developer's debt profile whose financial ratios would afford them to own the envisaged threats.

2.14 Risk construction in PPPs

While referring to risk, Calder (2011) Cedrick and Long (2017) argued that PPPs represent uncharted and dangerous waters particularly for the uninitiated public or private partner. Gallimore et al (1997) stated that it is far more difficult to define risk and less of a problem in identifying the circumstances when this might occur. Risk is defined as 'any factor, event or influence that threatens the successful completion of a project in terms of time, cost or quality' (EU, 2003). Gallimore et al (1997) and Kusi et al (2017) defined risk as 'reflecting the prospect of failing to achieve expected return'. It is important to examine whether PPPs are not 'institutionalised reputational myths' (Kewell, 2007; Cui et al, 2018). Construction risk, as an act, involves the assembly of ideas, assumptions, feelings, images, impressions and knowledge of dangers, hazards, customs and rules into mental models that help determine the need for and risks associated with rational and also possibly irrational forms of action (Kewell, 2007). Kewell (2007) argued that construction risk formed by the exchange of discourse has the hallmark of trust and reputation. Reputation is what is central to decision-making, particularly with regard to cognition and analysis of risk (Kewell, 2007; Vickermore, 2017). This is what is central to PPP stakeholders in their perception of risk in a project, particularly those of an epistemic nature.

2.14.1 The categorisation of risk

Gallimore et al (1997) and Smith et al (2014) argued that apart from risks that may be referred to as project-specific and systematic, the PPP financial arrangement itself is a risk. Chan et al (2011) acknowledged that decision-making in infrastructure development and management has increasingly become complex and dynamic. Adams et al (2006) and Mourao (2018) argued that China had developed a complex form of

bureaucracy that enabled it to forge ahead with its development agenda through the use of 14 different modes of PPPs. But the industry was constrained with getting access to capital despite having a domestic savings rate of 40 per cent. These funds were, however, not readily available for investment, hence hampering PPP progress (Adams et al, 2006). Another constraint is with regards to private asset ownership that still remains a risk in China. Foreign and local firms are therefore unwilling to be involved in PPP projects (Adams et al, 2006; Wang et al 2000). Adams et al (2006) and Deleze and Korkeamaki (2018) argued that there is general disagreement on the acceptance of risk under PPP by both the public and private sector.

Risks are grouped into two broad classes that PPP projects experience, namely, systematic and specific (Adams et al, 2006). Systematic risks are outside the control of the private investor and include factors such as labour costs, competitive pressure, gross domestic product (GDP) growth or decline, inflation and other macroeconomic variables (Frank and Shen, 2016). Specific risks are those that are attendant to the operation of the PPP project and will depend on the 'nature of the project' (Saad and Samet, 2017). Adams et al (2006) acknowledged that there is little published material on how risks are allocated in PPP projects in China. There has been recognised a gap between policy and implementation of policy in China (Boamah, 2017; Adams et al, 2006). Lahdenpera (2010) and Kartashova (2018) has suggested that the success of a project is dependent on the employers and contractors' able understanding of each other as they gain and pain share.

Rwelamila et al (2003) suggested that risk be considered from the position of the implementing agency or public partner. A number of questions could be asked at this point such as: 'is the implementing agency well managed? Is there commitment by the agency to have the project implemented?' Chan et al (2011) and Shrestha et al (2017) defined risk factor as an event, activity or situation that could lead to the possibility of suffering some loss if happened. Risk sharing is the establishment of the dividing ratio between the employer and the contractor (Kartashova, 2018; Chan et al 2011).

2.14.2 Features of a PPP

The Australian PPP Guidelines (2008) singled out the following factors as principal features of a PPP:

- provision of a service involving the creation of an asset by the private sector designing, constructing, financing, maintaining and delivering of ancillary services for a specific period;

- a contribution by government through land, capital works, risk sharing, revenue diversion, purchase of the agreed services or other supporting mechanisms; and

- the private sector receiving payments from government or users of economic infrastructure once operation of the infrastructure has commenced and contingent on the private sector's performance in supplying the services.

The one key defining feature of PPPs is that of synergy. Querrien and Elander (2002) described synergy as 'the added value obtained when two or more partners act together in order to achieve a common objective'. This is the essence of the partnering that enables the public as well as the private sector achieve what they could together (Ke et al 2011; Pongsiri, 2002; Davies and Giovannetti, 2018). The main aim is to share experiences and hence gain skills that would be utilised in future projects.

This is what differentiates PPPs from traditionally procured projects. The synergies that are provided by PPPs often allow the parties involved in the execution of the contract attain valuable experience. Such experience will traverse ambits of finance acquisition and utilisation during the implementation stage of the project. Weighted average cost of capital (WACC) that developer's uses to spread their equity and debt after the project is completed assist in making decisions as the scheme is executed (Dahiya et al, 2017). PPPs are normally contrasted with traditional procurement in order to show the differences in terms of advantages and disadvantages between the two systems. **Table 2.3** shows the key differences in procurement methodology (Deleze and Korkeamaki, 2018).

Table 2.3: Differences between traditional and PPP procurement

Traditional Procurement	PPPs
Government purchases an infrastructure asset	Government purchases infrastructure services
Short term design and construction contracts (two to four years)	One long term contract integrating design, build, finance and maintenance
Input-based specifications	Output-based specifications
Government retains whole-of-life asset risk	Private sector retains whole-of-life asset risk
Payment profile has a spike at the start to pay for capital costs, with low on-going costs	Payments begin once the asset is commissioned. The payment profile is relatively even, reflecting the level of service provision over the longer term of the contract
Government is usually liable for construction time and cost overruns	Private contractor is responsible for construction time and cost overruns
Government operates the facility	Government may or may not operate the facility
Government manages multiple contracts over life of the facility	Government manages one contract over the life of the facility

(After Australian National PPP Guidelines, 2008))

Calder (2011) advanced the following characteristics as vital elements of the PPPs:

- that all partners contribute complementary resources;
- ensuring that the working arrangement is done either through a joint venture company or by contract;
- there is private but temporary ownership of assets and substantial inter-temporal;

- risks are not merely transferred to the private sector party but allocated between parties on the basis of who is best placed to manage and bear the risk;

- it bundles investment, construction and service provision into a single long term contract, generally of 15 – 30 years;

- allows the responsibility of leveraging financing to the private sector; and

- payment to the private sector is structured in such a way as to ensure the private party is incentivised to deliver the required services or obligations under the arrangement.

The decision as to who pays and how is vital and must be dealt with. PPPs undertaken on a PFI model have a great share of private participation (Boamah, 2017; Petersen, 2011). When the government chooses to pay for projects, in many cases, it would need to borrow public funds. In such an event, the public debt would increases. Calder (2011) noted that governments in such a position would own an economic asset thereby improving their net worth. Such expenditure would be justified on the basis of the fact that the present value of expected surpluses have been equal or have exceeded the value of existing public debt (OECD, 2008; Joslin and Konchitchki, 2018).

2.15 Previous studies on risk allocation decision-making

PPP projects are subject to uncertainties and risks. Risk studies are particularly aimed at controlling project difficulties and tasked with forming frameworks of fault prevention including human responses (Cui et al, 2018; Kewell, 2007). In order to facilitate decision- making, it is imperative that risks are quantified. Often, project development is modelled as a stochastic process that is characterised by certain laws of probability (Zhang and AbouRizk, 2006). Studies by Broome and Perry (2002) and Bradenfelt (2008) explored how the gain-share/pain-share ratio should be determined in the British and Swedish perspectives respectively. Kartashova (2018) argued that public markets driven by the banking sector must be improved in countries that adopt the PPP mode of development.

Rose and Manly (2010) undertook four case studies applying financial incentives in Australia. They concluded that financial incentives could incorporate rewards across all key organisations contributing to team performance. This means the reward amount should be sufficient enough to be valued by potential receipts generated by the project (Jean-Loup, 2017). They further perceived that the benefits derived from financial incentive mechanisms could be maximised with equitable risk allocation, early contractor involvement, value-driven tender selection, relationship workshop and future job opportunities.

Despite an adequate amount of existing literature about the practices of PPPs globally, empirical studies on the risks of Sub-Saharan African contracts are limited. There is a scarcity of published literature focusing on risk allocation decision-making on construction projects, which are claimed to be implemented in countries that are deemed to be high risk (Mourao, 2018).

2.15.1 Risk identification

Chan et al (2011) studied 34 key risk factors inherent with Target Cost Construction Contracts projects in Hong Kong. Li et al (2005) reported on the findings of a survey on perception on risk allocation of 46 risk factors in PPP/PFI projects in the United Kingdom. Chan et al (2011) observed that in both researches, the 'preferred' risk allocation was determined by the level of the majority opinions. The study by Chan et al (2011) concluded that risks to be borne by the client and contractor were in line with previous findings on risk allocation. The preferred risk allocation was as Akintoye (2003) concluded; being that of the best party capable of administering the risk. This means that the party would need to have more than 50 per cent ownership of such a risk. Studies conducted by Li et al (2005), El-Sayegh (2008) and Joslin and Konchitchki (2018); applied this rule.

2.15.2 PPP Concessions

Zhang and AbouRizk (2006) argued that length of the concession periods divide rights and responsibilities between public and private sectors in the life cycle of projects. According to Becker and Patterson (2005), divided rights structure the sharing of risks and rewards between PPPs partners thereby affecting decision-making with regards to

interest rate and debt management (Deleze and Korkeamaki, 2018). The partnership relationship is conditioned by (Becker and Patterson, 2005):

- what the PPP is expected to serve;
- the extent of financial risk that is taken by the individual party;
- how the reward structure will benefit the parties; and
- the degree of involvement in development, operation and ownership by respective parties.

Two necessary parameters must be fulfilled to ensure success of PPPs. The first is the existence of a strong association between rewards and risks mainly aimed at the private partner (Becker and Patterson, 2005; Shrestha et al, 2017). It is postulated that the incentives for higher rewards will be greater with the private partner taking on higher risks. The second is a strong association between risk and the level of involvement by the private partner in the development, operations and ownership (Munier, 2014 and Becker and Patterson, 2005). It is further postulated that better decision-making would be achieved if these two parameters are adhered to on PPP projects (Wu et al, 2018; Becker and Patterson, 2005).

Becker and Patterson (2005) further stated that the relationship between public and private partners' changes as the degree of risk and amount of return jointly increase. Adversarial tendencies have been recorded in cases where the degrees of risk and return have increased (Vickermore, 2017). Governments stand to benefit when the private sector finances a project as the burden for public debt capacity can be reduced (Cui et al, 2018).

2.15.3 PPP successes

The years 1995 to 2010 have also seen the resurgence in PPP projects around the world. Notable projects recorded included capital-intensive road projects such as the Athens ring road (Pantouvakis and Vandoros, 2005), the massive sports infrastructure as showcased in the Beijing Olympic infrastructure of China (Ke et al, 2010), Australia's

Sydney Super Dome (Jefferies, 2006), coal fired electric power stations in China (Kumaraswamy and Zhang, 2003) and the construction of hydro-electric stations in South Africa (Farlam, 2005, and Cui, 2018). Hodge (2004) cited studies that indicated how government departments implemented PPPs registered 10 to 20% in cost savings. In addition, Gosling (2004) noted that according to the UK's National Audit Office, 76% of the PFI projects were constructed on time, while in the case of those completed under conventional procurement, it was only 30%. In South Africa, early indications of projects undertaken under the PPP approach suggested that they were completed on time and expected to yield cost-saving and value for money benefits (Dachs, 2006). The issue of cost and time savings arising from PPPs is still a matter of debate (Li and Akintoye, 2003). Akintoye et al (2005) and Munier (2014) argued that wherever PPP procurement had been used, the way in which associated risks were handled and treated had become an important issue. Widen and Olander (2003) and Belkhir et al (2017) stated that risk and risk allocation are issues that are 'naturally more difficult to manage in the context where PPPs are new'. The need for an appropriate risk transfer strategy is a matter receiving much attention owing to the complexities of PPP projects (Wu et al, 2018; Li and Akintoye, 2003).

Li and Akintoye (2003) and Munier (2014) mentioned that 'as a general rule', risks due to design, construction and operation must be transferred to the private partner. Consonantly, Bracey and Moldovan (2006) stated that risk must be allocated to the party able to handle it. Risk-devolution by the private partner must be safe-guarded against (Monteiro, 2008). Hueskes et al (2017) and Hardcastle and Boothroyd (2003) noted that in the PFI model, this is regarded as a fundamental requirement. However, the allocation of risk is optimally achieved when each party bears the risks it is best able to cope with (Stafylas et al, 2017 and Bracey and Moldovan, 2006). The presence of risks could hinder the attainment of a project's objectives of success (Vickermore, 2017; Hardcastle and Boothroyd, 2003). Shrestha (2017), Monteiro (2008) and Curristine (2007) argued that the efficiency of a PPP contract depends on the effective transfer of some risks to the private partner. Private entities are efficient in the management of a project if they have money at stake and if they can manage the risks (Li and Akintoye, 2003; Monteiro, 2008).

2.15.4 Risk Management

Studies into construction risks have been extensive, which have been covered by Cui et al (2018), Cohen (2007) and Akintoye et al (2003); to varying degrees. The matrices of risk that are adopted evince differing autoptic characteristics such as are displayed in Schaufelberger and Wipadapisut (2003), Grimsey and Lewis (2002) and Li et al (2003). The most common classification of risks divides them as either 'external' or 'internal' (Li et al, 2003; Schaufelberger and Wipadapisut, 2003 and Grimsey and Lewis, 2002). Ke et al (2010), Chan et al, (2010), Xu et al (2010) and Roumboustsos and Anagnostopoulos (2008) utilise an adapted version of the Li et al (2003) list of attractive and negative factors of PPPs as shown in **Table 2.4**. The bifurcation of risk is therefore a matter of preference. However, such taxonomy must be holistic (Zou et al, 2005) and more importantly, it must note the source of the risk (Li and Akintoye, 2003; Zou et al, 2005). Ironically, this is what different studies of risk have shown (Wu et al, 2018, Munier 2014).

Though a risk management process may be in place, not all risks may be 'harmful' to a project (Belkhir, 2017 and Gehner, 2006). The essence of risk management is to ensure that all risks are identified together with their consequences (Manelele, 2008). In short, the concept of uncertainty is at the helm of risk (Munier, 2014; Ward and Chapman, 2003; Gehner, 2006). At times, risk is perceived as a negative event by many project owners. Risk is a combination of the probability, extent to which the event is likely to occur, and its consequence, outcome of an event (Gehner, 2006). Gehner (2006) suggested that ambiguity and subjectivity, which are the hallmark of uncertainty, must be considered in risk analysis estimations for PPP projects to succeed. Cost benefit analyses could verify the successful attainment of desired goals of the project proprietor and developer (Vickermore, 2017).

Risks often occur at different points during the cycle of a project (Munier, 2014; Pantouvakis and Vandoros, 2004; Rwelamila et al, 2003). The risk management process, therefore, ensures that project players maximise opportunities while minimising the adverse consequences of an event. According to the Guide to the Project Management Body of Knowledge (PMBOK, 1998), risk management has three processes.

Table 2.4: List of attractive and negative factors

Attractive factors	Negative factors
1. Solve the problem of public sector budget restraint	1. Reduce the project accountability
2. Provide an integrated solution for public infrastructure services	2. High risk relying on private sector
3. Reduce public money tied up in capital investment	3. Very few schemes have actually reached the contract stage (aborted before contract)
4. Cap the final service costs	4. Lengthy delays because of political debate
5. Facilitate creative and innovative approaches	5. Higher charge to the direct users
6. Reduce the total project cost	6. Less employment positions
7. Save time in delivering the project	7. High participation costs
8. Transfer risk to the private partner	8. High project costs
9. Reduce public sector administration costs	9. A great deal of management time spent in contract transaction
10. Benefit to local economic development	10. Lack of experience and appropriate skills
11. Improve buildability	11. Confusion over government objectives and evaluation criteria
12. Improve maintainability	12. Excessive restrictions on participation
13. Technology transfer to local enterprise	13. Lengthy delays in negotiation
14. No recourse or limited recourse to public funding	
15. Accelerate project development	

(After Gehner, 2006)

These consist of the identification, assessment and response for risk. Risk management is a deliberate action of turning uncertainty by increasing the chances for good outcomes

(Pun-hing, 2003). Hence, the identification of risk is the most important phase of the risk management process (Smith et al, 2014).

For any investment, there is need to ensure that care is taken on how risk is transferred to either the public or private developer (Rwelamila et al, 2003). If a partner is not able to 'absorb' the risk, the partner would exhaust all means to minimise the loss and transfer the risk back to the employer which would result in a lose/lose situation (Xu et al, 2010). Insolvency of a partner may also have similar results (Ahadzi and Bowles, 2004; Munier, 2014). The employer or client may face the dilemma of re-nominating a new partner or contractor to have the project completed with unavoidable loss of resources and time (Davies and Giovannetti, 2018; Bracey and Moldovan, 2006).

It is important that risks are identified, assessed, responded to and controlled (Smith et al, 2014). In other words, a risk management system must be put in place. The principle of control suggests that the party which has the better ability of control be given the risk (Munier, 2014; Bracey and Moldovan, 2006). The principle of capability transfers the risk to the party which is most capable to absorb it (Akintoye, 2005, Xu et al 2010). These two principles are not mutually exclusive (Shrestha, 2017; Xu et al, 2010). Each of these principles will come in play at their own times (Gehner, 2006). For controllable risks such as design changes, work extent, management quality and how disputes will be resolved, the principle of control will be utilised (Balog et al, 2017; Bracey and Moldovan, 2006). But as for uncontrollable risks such as natural disasters, inclement weather, changes in legislation and currency fluctuations, the principle of capability will be applied, which in almost all cases, is taken on by the client (Bracey and Moldovan, 2006). Smith et al (2014) calls such risks as 'epistemic' or 'unknown unknowns'. Ke's et al (2010) research proved that the UK private industry was capable of handling a lot of risks that their counterparts in Greece, Hong Kong and China were not able to (Pantouvakis an Vandross, 2006; Boamah, 2017). Alfen et al (2009) and Cui et al (2018) warned of lack of historical information regarding risk sources restricting the identification process. Because of this, the prediction of potential risks is rendered difficult preventing accurate estimation that aids proper planning.

Appropriate risk management strategies are thus not instituted by stakeholders due to lack of information regarding risks and their consequences (Alfen et al, 2009).

2.16 Risk allocation categories

Research regarding risk in PPP projects has gained ascendancy from 1998 to 2010 with studies undertaken in the United Kingdom, China, Hong Kong and Greece (Ke et al, 2010; Li, 2005; Pantouvakis and Vandoros, 2004) and Cui et al (2018). Results from these researches suggested that risk allocation structures will be very different for any type of contract and country. Because of the vast experience that the UK has had of using PPPs, Ke et al (2010) noted that the private sector was more ready to bear risks than those countries embarking on using the model. Risk has to do with the person advantaged to deal with it. Various contracts have vantage points for which they are to offer advice about risk. These vantage points could place risk in private or corporate hands. Divestiture contracts have total private control as **Figure 2.3** below.

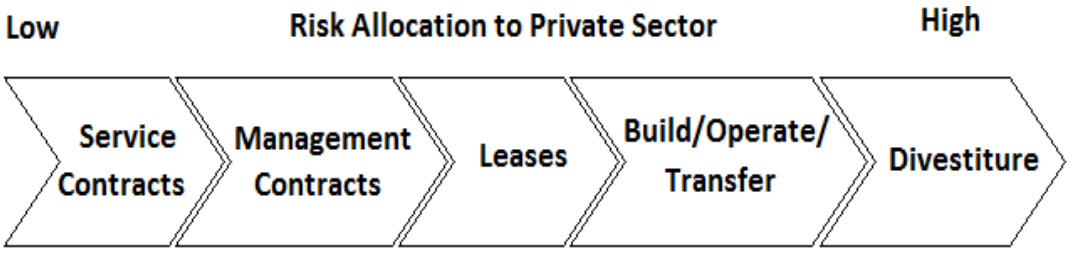


Figure 2.3: Risk transfers continuum of PPP projects

(After Alfen et al, 2005

The literature reviewed regarding risks in PPP projects suggested that developed countries have stronger public and private institutions such that the private sector readily takes on risk on floated projects (Balog et al (2017) ; Li et al, 2005). Nisar (2007) reported on the success of the PFI project, HMP Altcourse (Fazakerley) of the United Kingdom was able to encourage a good number of bidders who had earlier been seen undertake great risk in investing in prison service infrastructure. The risk pattern that emerges in such projects is heavily inclined to the private sector even though

governments take on part of the risks. Studies on risk allocation revealed uneven and unjustified sharing of risk (Pantouvakis and Vandoros, 2006; Jin and Doloi, 2010) and a want of preference of what risk to own in the project (Ke et al, 2010, Li et al 2005).

Risks affect attainment or non-attainment of project objectives as literature reviewed has suggested (Rwelamila et al, 2003). That is why Ndandiko (2006), Zulu and Muleya argued for addressing major issues regarding factors such as the legal regulatory governance framework, risk management and procurement; and finance and economics, in order for PPPs to be successful in the developing world. In the comparative study on risk allocation done by Ke et al (2010), their methodology left out risks such as "lack of tradition of private provision of public services," "change in tax regulation," "land acquisition (site availability)," "late design changes," "level of demand for project," and "inflation rate volatility." Roumboustsos and Anagnostopoulos (2008) left out risks issues such as "archaeological findings," "expropriation or nationalisation of assets," "construction time delay," "insolvency/default of subcontractors/suppliers," and "low operating productivity." For emerging economies such as Zambia's, these are the very factors that receive consideration in conventional the implementation of construction projects. Wang et al (1999) covers these factors under political and force majeure risks and suggested that concession agreement clauses must ably address such inadvertent concerns. According to Li et al (2005), PPPs are also seen to be attractive in terms of the capacity to achieve the transfer of technological knowledge to local enterprises in developing countries. This must be done through joint venture agreements particularly when local expertise is grafted to understudy their foreign counterparts (Chan et al, 2006).

According to studies conducted by Cui et al (2018), Ke et al (2010), Li and Akintoye (2003); Vladkov and Markov (2009); Alibegovic (2009); Gallimore et al (1997); Zhang (2005a), Xu et al (2010) and Jefferies (2006), risk patterns differ according to the set of conditions the project is faced with. Equitable risk allocation is highly related to the social, economic and legal situation of countries (Ke et al, 2010). The critical nature of risks for any project is influenced by a combination of the political, legal, economic and the social environment of the country (Kalidindi and Thomas, 2003; Zhang, 2009). Xu et

al (2010) argued that there is a scarcity of research studies based on holistic reliable quantitative risk allocation models making him propose a fuzzy risk one. This study provides a methodology for the quantitative expression of subjective intuition which utilises Li et al (2005) research and successfully evaluates 23 factors that influence equitable risk allocation (Xu et al 2010). Although their findings do not vary significantly, Xu et al (2010) study proved that risk allocation was a complex and flexible process with definitive results regarding risk sharing. The probability and uncertainty components of risk are quantitatively evaluated and ranked such as identified in studies by Gehner (2006); Xu et al (2010) and Cui et al (2018).

The CSF's study by Chan et al (2010) singled out appropriate risk allocation concluding that there was need to better understand individual factors affecting project success, which is the focus of this research study. Pongsiri (2002) argued that while many governments in developing countries are eager to sign their first demonstration PPP contracts, most have inept legal and regulatory frameworks for monitoring the performance of private contractors and for ensuring contractual compliance. Performance monitoring achieves better and informed decision making which is a need in emerging economies that have adopted the PPP mode of procuring construction projects (Bracey and Moldovan, 2006; Pongsiri, 2002; Zhang, 2005b; Wu et al, 2018).

The Australian National PPP Guidelines (2008) has summarised the main issue involved in the delivery of infrastructure by stating that 'the challenge for the public and private sectors to determine the most effective and efficient means of service delivery in an arrangement that is beneficial to both sectors as well as to users and taxpayers'. Such challenges are left to the interpretation of the inquirer. The guidelines further singled out a complex risk profile as well as opportunity for its transfer, as one of the drivers of value for money (VFM) in PPPs using the Australian National PPP Guidelines, 2008. These guidelines are but a factor among many others studies on risk allocation management that have been identified. Such studies have not focused on Zambia in making their conclusions. This study, therefore, remains unique in achieving the goals of ensuring that such specific factors are identified.

The literature that was reviewed had shown that there has been growing use of PPPs for infrastructure development in developing countries (Cui et al, 2018; Akintoye et al, 2003; Bull and McNeill, 2007). However, there has been very little attention paid to the impact of risks in emerging economies. Wu et al (2018) stipulated such factors in their study of the waste-to-energy and suggested a risk assessment framework based on a 2-dimension linguistic environment. However, their conclusions were the same as those obtained in seminal works of Li and Akintoye (2005).

2.16.1 Risks in PPP projects

Several studies have been conducted over risks in PPP projects. Grimsey and Lewis (2002) singled out nine such risks that any infrastructure project is able to experience. These were enumerated as technical, construction, operating, revenue, financial, force majeure, regulatory/political, environmental and project default risks. Abednego and Ogunlana (2006) noted risks occurring on toll way projects. Seven risks were brought forth that had an impact on project success namely political, construction, operation and maintenance, legal and contractual, income, financial and force majeure risks. As stated before, various categories have been adopted for risks examples are 'global or elemental' (Grimsey and Lewis, 2002); moderate and disasters (Grimsey and Lewis, 2002)

Abednego and Ogunlana (2006) maintained the position that a full-orbed consideration of risk allocation takes into account four key areas:

- as to what risks are allocated;
- the one who has the ability to bear the risks;
- how sustainably the risks would be managed? and
- what right time to do so.

Figure 2.4 below shows how this concept of risk allocation logically operates. Grimsey and Lewis (2002) argued that allocated risk required their analysis particularly as they are grafted in the design of contractual arrangements before the tender stage. Ultimately,

PPP projects are judged by their capacity to service operating costs, debt finance as well as ensuring returns to risk capital through projected revenue streams (Grimsey and Lewis, 2002).

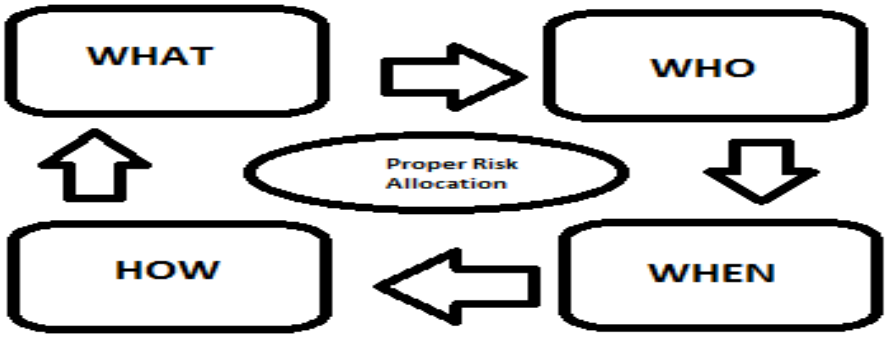


Figure 2.4: Concept of proper risk allocation

(After Abednego and Ogunlana, 2006)

2.16.2 Content analysis of reviewed literature

There are several inputs to the research work stemming from the literature reviewed. The literature reviewed showed the importance of understanding the concept of PPP's. Various factors were pointed out in the discursive of the literature. Content analysis seeks to show the major aim of the papers reviewed. Ironically, these are the factors that the analysis of chapter 4 will focus on. Chapter three enables the researcher to use the necessary methods available to not only justify the subject, but to seek answers for the main objective. Meanwhile, the main papers reviewed must be summarised. The summaries address the sub-themes set in the sub-objectives. **Table 2.5**, therefore, gives a summary of the content analysis of the papers reviewed.

Table 2.5: Summary of literature reviewed on risk decision-making in PPP construction projects

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Alshawi, M (2009)	Concept and background to public private partnership (PPP)/Private Finance Initiative (PFI), UK experience, University of Salford	Contrasts Private Finance Initiative (PFI) and traditional procurement	Literature review	Insightful paper that shows the difference between PFI and traditional procurement. The paper goes further to explore various PFI characteristics among which are transferring of risk, value for money (VFM) and advantages and disadvantages of PFI projects. The paper is fairly basic in nature mainly based on literature reviewed.	In the context of decision-making, the paper elaborated the need to understand connected virtues for PPPs. VFM for one, is right at the centre of risk management and is the first virtue that receives attention in development projects.
Ahadzi, M and Bowles, G (2004)	Public-Private Partnerships and Contract Negotiations: An Empirical Study, Construction Management and Economics	To investigate the extent of delays together with their effect on the pre-contract/bidding costs; identify characteristic attributes that influence negotiation of PPP contracts and exploring the basic differences in perception of these key attributes in influencing the outcome of negotiations.	Literature review, use of semi-structured interviews by questionnaire survey	Bidding and advisory costs were found to be high which made PPPs expensive compared to other modes of infrastructure procurement. Factors to ease the process of negotiation were studied and found to consist of the degree of mutual dependence and sharing of power between the parties. It was observed that the group of attributes that related to the nature and strength of the consortium ranked the highest. This research uncovered the fact that instead of innovation and design solutions being encouraged, they were ranked the lowest. Using multi- criteria decision making, there must be recognition that internal and external environment attributes are interlinked.	This paper showed the necessity of knowing factors that ease the process of negotiation. In view of the fact that risk is accepted by the developer, several factors must be evaluated to ensure the success of a project. The recognition of internal and external factors to the project has a bearing on what decisions are made for the project.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Akintoye, A (2009)	PPPs for Physical Infrastructure in Developing Countries	Gave an overview of the private sector participation in PPP in the developing world	Literature review and case studies	Akintoye (2009) reviewed PPP activity in developing countries. Much activity has been noted in the energy and telecommunications industries. Notable in the analysis is the fact that Sub-Saharan Africa is at the bottom of the PPP development list. Akintoye postulates that the private sector remains to be attracted to local investment.	In as much as this sector fails to marshal resources to implement projects, their advice is a necessary component of those that seek to invest in projects.
Li, B, Akintoye, A., Edwards, P. J. and Hardcastle, C (2005)	Perception of Positive and Negative Factors influencing the Attractiveness of PFI/PPP Procurement for Construction Projects in the UK	To report the findings of research into perceptions of what makes Private Finance Initiative (PFI) attractive or unattractive as a procurement system for UK projects.	Used postal survey questionnaire technique together with literature review. Response data subjected to descriptive statistical analysis	Paper gives a lot of insight on negative and positive perceptions on the use of the PPP procurement method in the UK. The study concluded with nine positive factors which make PPP/PFI attractive of which transfer of risk to the private sector was the first. Negative factors, however, show that PPPs are not the only answer to development problems.	This study was useful in showing that PPPs will be attractive with better project technology and economy, public sector avoidance of regulatory and financial constraints and public saving in transaction costs.
Bracey, N and Moldovan, S (2006)	Public-Private Partnership: Risks to the Public and Private Sector	To show what equitable risk allocation must consider between the private and public sector particularly during the renegotiation period	Literature review and case studies	The paper lays the fundamentals of risk allocation which are vested in the fact that: risk allocation should be consistent with market conditions and expectations (also based on outcomes of previous projects) in order to minimise tender and closure costs; risk allocation should be mindful of the potential risks to both sides arising in the project's life	The paper also delineates which risks would be shouldered by the public and private sectors. During renegotiation, the roles of each party should be clearly defined during the initial negotiations.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Chan, J.H, Chan, D.W, Lam, P.T and Chan, A.P (2011)	Preferred Risk Allocation in Target Cost Contracts in Construction	To identify the party most preferred to risks associated with target cost contracts and guaranteed maximum price contracts	Empirical questionnaire survey	The study indicated that risks on tender documentation and design are better borne by clients, while construction related risks are perceived to be taken by contractors.	The paper developed a preferred risk allocation scheme that can be used as a guide for decision makers to determine optimal risk allocation at the planning stage. One of the main conclusions derived from this research stated that inadequate consideration of risk allocation may result to abject failure in achieving project objectives upon completion.
Chan P. C. A, Yeung, J. F. Y, Yu, C. C.P, Wang, S. Q and Ke, Y (2011)	Empirical Study of Risk Assessment and Allocation of Public-Private Partnership Projects in China	Aim was to identify and assess the principle risks for the delivery PPP projects in China and to address their proper risk allocation between the private and public sectors	Empirical questionnaire survey	The paper concluded that the most important risk factors were (1) government intervention; (2) government corruption; and (3) poor decision making processes. Ultimately, these factors are impediments to the success of PPP projects in China. 34 risk factors between the private and public sectors were studied and differences in perception were noted among practitioners and academics particularly on the matter of corruption.	The study showed what risks the public and private sectors prefer undertaking. Systematic risks such as political legal and social were taken by the public while those specific to the project were undertaken by the private partner amongst which were construction, operation and relationship risks.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Chan, P.C, Lam, P.T.I, Chan, D.W.M, Cheung, E and Ke, Y (2010)	Critical Success Factors in PPP in Infrastructure Developments: Chinese Perspective	To identify the critical success factors (CSFs) in China	Empirical questionnaire survey with factor analysis	Questionnaire survey utilised in this research was designed by Li (2003) which had been used in a similar Hong Kong study. Factor analysis came up with 18 CSFs which were later grouped into five factors: (1) stable macroeconomic environment (2) shared responsibility between private and public sectors (3) transparent and efficient procurement process (4) stable political and social environment; and (5) judicious government control.	This paper also makes a comparison on China and UK CSF's which were broken down into the 5 mentioned categories. The study established a better understanding of the important individual factors affecting success or otherwise of PPP projects. Studying CSF's enhances decision making particularly in the choice of suitable projects.
Curristine, T (2007)	PPPS: Potential Risks and Benefits, Public-Private Partnerships, Budgeting and Public Expenditure Division	To show the risks and benefits of PPPs amidst tight budgetary constraint in public expenditure	Workshop presentation	In spite of risks threatening undertaking works on PPP structure, there has been greater encouragement of this due to envisaged potential benefits.	This presentation gave the potential risks and benefits that go with implementing PPPs. It pondered on budgetary constraints that go with the execution of PPP projects.
Farlam, P (2005)	Working Together: Assessing Public-Private Partnerships in Africa,	To show the differences in procurement systems. Three systems are contrasted – public procurement, PPPs and full privatisation.	Case studies	Eight case studies are examined of PPPs implemented in South Africa. Four sectors are studied which include transport, telecommunications, water and sanitation, power and eco-tourism. Key lesson was the matter of complexities to do with the concessions given.	The aim was to show how that PPPs can be applied to various projects. In all cases, it was expedient to gain information before decisions could be made on issues ranging from policy, definition of investment obligations and in general, the concession.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Gallimore, P, Williams, W and Woodward, D (1997)	Perceptions of Risk in Private Finance Initiative, Journal of Property Finance	To explore the extent to which different risk perceptions of PFI arrangements existed	Questionnaire survey	The study concluded that certain risks are perceived differently by PFI participants generally. The study focused on 12 risks and established a generic approach to the study of risks in PFI projects. The study discovered that they studied risks not previously encountered by the private sector. One of these perceptions was to the effect that the private sector can be a viable vehicle for development.	This study was critical to examining risk allocation in those general perceptions of professions and the public must be assessed to ensure project success.
Herzberg, B and Wright, A (2005)	Competitive Partnerships, Building and Maintaining Public-Private dialogue to improve the Investment Climate	To provide principles that must govern public private partnerships	Guidebook, case studies	Generally lays the shift from government to governance through policy reforms, implementation and institutionalising. Shows the various roles that the public and private sector are to play.	The principles are often forgotten for the gain that are hoped to be derived out of PPPs. Policy reform must be a constant aspect of the PPP contract.
Ministry of Finance and National Planning (2011)	Public-Private Partnership Policy and Act 2009	To encourage development through PPP procurement method	Desk study	The Zambian PPP law is along the PFI lines of the UK and hence favours the private sector.	The Zambian PPP law follows after the PFI British model with aspects taken from practices across the world. One significant factor brought about by its introduction, is the confidence investors have attached to the law.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Jefferies, M (2006)	Critical Success Factors of Public-Private Partnerships; A Case Study of the Sydney SuperDome	To examine perceptions of Build-Own-Operate-Transfer (BOOT) schemes in order to develop a framework of critical success factors (CSF)	Case study	A list of 23 critical success factors is the result of Jefferies work. This project boasts of being a panacea for other similar projects in Australia. The CSFs that were identified for the SuperDome ensured the success of bidding process as well as the projects' all-round business ventures in the competition with rival major venues.	The CSFs identified have the potential of being replicated around the world regarding the managing of bidding risk and ensuring that PPP projects have all-round business etiquette about them to be successful.
Zou, P.X.W, Zhang, G, and Wang, J (2007)	Identifying Key Risks in Construction Projects: Life Cycle and Stakeholder Perspectives	To articulate and manage key risks associated with construction projects from perspectives of stakeholder and project life cycle	Literature review and postal questionnaire survey	Survey results are grouped in five risk categories representing risks related to costs, time, quality, the environment and safety.	The study concluded that risk management would be effective if managed from the perspective of a project life cycle. This is due to the fact that many risks arise in more than one phase of a construction project. The study was able to show through the fish bone diagram that a total of 37 risks affected the feasibility, design, construction and operation project life cycles.
Jin, X.H and Ling, F.Y.Y (2006)	Key relationship-based determinants of project performance in China	To investigate relationship-based factors that affect performance of general building projects in China	Literature review	This study was an extension of previous studies done to predict project performance. The study established that four relationship-based factors were uncovered to affect four performance metrics.	Allocated risk inevitably follows these aspects to be ensuring good working relations particularly in the SPV.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Ke, Y, Wang, S.Q and Chan, P.A. (2010)	Risk Allocation in Public-Private Partnership Infrastructure Projects: Comparative study	To develop a risk allocation scheme for PPP projects in both China and Hong Kong.	Empirical questionnaire survey	Results in China and Hong Kong show that the public preferred to retain most legal, social and political risk together with micro level risks such as force majeure. On the other hand, the majority of meso-level risks are allocated to the private sector. The paper summarised the necessity of knowing what needs be shared at the various levels of the project.	The development of the risk allocation scheme showed the needed focus on the different levels of managing a PPP in delineating risk. Mutual agreement is necessary to ensuring the success of the PPP project.
Kumaraswamy, M.M and Zhang, X.Q (2003)	Risk Assessment and Management in BOT-type Public-Private Partnership Projects in China – with speed reference to Hong Kong	To examine how some 'science' may be profitably injected to complement 'state of the art' approaches to risk management in BOT-type PPP projects	Descriptive, case study	The paper enumerates various projects that have utilised the BOT-type of PPP. These include notable projects such as the Shajiao B, Laibin B and the Shandong Zhoughua. Various risks that the projects faced are also given. Also given are the mitigatory measures that were adopted on the risks that were experienced.	The conclusion to the study stated that because of the complexities and broad risks such PPP projects experience, 'relational' joint risk management approaches would be commendable for such situations.
Manuj, I and Mentzer, J.T (2008)	Global Supply Chain Risk Management Strategies, International Journal of Physical Distribution and Logistics Management	To explore the phenomenon of risk management and risk management strategies in global supply chains	Literature review, interviews augmented with focus group discussion	The paper is seminal in listing six risk management strategies stipulated as postponement, speculation, hedging, control/share/transfer, security and avoidance. Modalities of how risk can be managed are modelled.	The concern of the paper is that adoption of any strategy must be preceded by knowledge of that strategy. To this end, inter-organisational learning would help develop a knowledge base for an organisation.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Merna, T and Lamb, D (2009)	Application of Risk Analysis in Privately Financed Projects: The Value for Money Assessment through the Public Sector Comparator and Private Finance Alternative	To outline a quantitative approach to risk analysis and discuss how the approach can be applied to the formation of the public sector comparator (PSC and the private finance alternative (PFA) for VFM assessment.	Descriptive, case study	PSC is but one method that can be used to test the validity of privately financed projects. Merna and Lamb (2009) concluded by insisting that further analysis be employed for the assessment of projects. The PSC must be supported by bankability and affordability analysis so as to establish private sector interest and public sector ability to service the liabilities that are granted by the concession.	Merna and Lamb (2009) model uses net present cost (NPC), net present value (NPV) and internal rate of return (IRR) to construct the PSC and PFA to form the VFM assessment. Suggestion is that these can be utilised for measuring and monitoring performance when public and private management systems are standardised.
Ndandiko, C (2006)	Public Private Partnerships Modes of Procuring Public Infrastructure and Service Delivery in Developing Countries: Lessons from Uganda	To contribute to the strengthening of PPP institutional and capacity constraints for countries adopting procurement mode	Literature review, Case study	Ndandiko (2006) takes a very radical stance by arguing that PPPs cannot work on the African continent due to 'weak public and private infrastructure'. Lack of capacity is another reason cited for non-performance of PPPs. While citing the Uganda case studies, Ndandiko (2006) noted the apparent misunderstanding in the interpretation of privatisation and the PPP concept.	Ndandiko (2006) lamented that though the private sector had been allowed participation, the legal and regulatory framework is missing leading to an unsystematic implementation.
Nisar, T.M (2007)	Risk Management in Public-Private Partnership Contracts	To explore specific PFI options in order to establish value for money for projects	Descriptive, case studies	Financial incentives of service payment deductions generally resulted in problems.	Lack of monitoring manpower is also another problem that leads to non-performance of PFI projects.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Pantouvakis, J and Vandoros, N (2006)	Risk Allocation in Large PPP Projects in Greece	Investigation of risks in Greek PPP projects with a view of determining discrepancies in their allocation	Case study	Three case studies are presented after a succinct literature review of risk studies. Conclusion after the study was Pantouvakis and Vandoros (2006) found that the majority of the risks were borne by the public, totally contradicting previously held views that private sector assumed them.	The case study showed how that the private sector was unwilling to take risks directly related to the public decision-making process.
Petersen, O. H. (2011)	Public-Private Partnerships: Policy and Regulation	To show what key framework conditions are necessary in terms of policy and regulation for PPP development	Literature review, Case study	Petersen (2011) lists seven types of PPP models popularly used. The model approaches are known as policy sector, governance, classification, local regeneration, third-world development, financial infrastructure and historical approach. Petersen (2011) examines both the horizontal (public-private) and vertical dimensions of decision making processes in PPP using the Actor Centered Institutionalism (ACI).	The conclusion that the paper arrived at is a matter that shows that there is close interdependence in decision-making in the factors that were examined for PPP policy to succeed.
Pongsiri, N (2002)	Regulation and Public-Private Partnerships	To ensure that regulation is designed and administered to protect collective welfare, ensuring open competition.	Descriptive	Pongsiri (2002) noted the need for a regulatory framework. He stated that 'most developing countries still need to have the regulatory and surveillance machinery in place to ensure effectiveness, fairness and openness of their PPP schemes'.	This paper showed the importance for developing countries to have regulatory frameworks that are workable. The ultimate goal of such frameworks is to bring about greater levels of accountability.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Rwelamila, P, Chege, L and Manchidi, T.E(2003)	Public-Private Partnership in South African Local Authorities: Risks and Opportunities	To examine the negative perceptions for effective and efficient PPPs.	Literature review, descriptive	Due to negative perceptions, PPP project delivery systems are difficult to implement, often requiring careful risk management.	This paper showed that risk sharing between the public and the private sectors could improve the efficiency and effectiveness of the PPP.
Shaoul, J (2009)	Using the Private Sector to Finance Capital Expenditure: The Financial Realities	To develop a contractual model where the private sector finances and shares risks and rewards with the public sector over a 30 year period according to terms set out in a contract	Descriptive	Shaoul (2009) analysed what controlling of a PFI project should entail. Two factors are important: value for money and affordability. In view of the fact that such contracts are over an extended period of time, evaluation must be done. The need to build to time and budget, ensuring application of the necessary specification and penalties to incentivise operational performance of the private sector.	This paper argued that there is insistency for what PFI has claimed compared to the outcomes. Shaoul (2009) concludes by stating that 'PFI ensures a resolution of the distributional conflict in favour of the corporations and more particularly the financial sector, who are its chief promoters, under the guise of additionality, risk transfer, efficiency, incentives etc.'
Solino, A. S and Vassallo, J M (2009)	Using Public-Private Partnerships to Expand Highways: Madrid-Barajas International Airport Case Study	To highlight the implementation of a non-integrated PPP approach based on separating infrastructure construction and management	Case study	Three reasons are advanced as to why this is so vis-à-vis the need to comply with tough qualification requirements, the perception bidders have for integrated projects are that they are laden with large risks and such projects bring about loss of important economies of scale. But it was admitted, non-integrated PPP projects have the advantage of boosting competition.	The paper concluded that for incomplete contracts, it is advisable to 'unbundle' infrastructure construction. Service provision is required when construction quality can be specified and easy to monitor. Quality of service on the other hand was difficult to specify or monitor.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Shrestha, R.B and Ogunlana, S (2009)	Financial effects of Power Purchase Agreement clauses in Revenue Stream of Independent Power Producers in Nepal	To analyse financial effects on PPA	Descriptive, case study	The 5 projects that were reviewed by this study showed the direct bearing of the Power Purchase Agreement (PPA) on the financial viability of the project.	Financial implications must be analysed for a project and will be the basis of the PPA negotiation. This is because financial viability gives a futuristic perspective of the project. Success could be guaranteed if financial risks are dealt with at the inception of the project.
Wang, S.Q (2007)	Infrastructure Development PPP in China and Lessons Learnt	To demonstrate lessons learnt from China's experience of PPPs	Workshop presentation	China's rise as an economic giant has had a lot of challenges particularly in infrastructure development. China's expected road development between 2005 and 2030 will rise to 2000 billion RMB. There has been a lot of housekeeping to be done. There have been latest PPP-relevant policies and regulations. In addition to this, China has made the effort of following international custom and practices.	This study ensured that China's PPP implementation followed risk sharing schemes applied internationally. Accordingly, laws to deal with foreign exchange were changed. However, Chinese PPPs introduced project support and other incentives for projects.
Wang, S.Q, Tiong, R.L.K, Ting, S.K and Ashley, D (1999)	Political Risks: Analysis of Key Contract Clauses in China's BOT Project	(1)To identify the unique or critical risks (2)To evaluate mitigating measures (3) To provide a risk management framework	Descriptive, case study	Concession clauses to cover the above risks were examined. In general, it was agreed that the contract language was effective and the clauses adequately address the sponsors' and lenders' concerns toward political and force majeure risks in China.	This study showed the importance of ensuring that the clauses of the PPP contract were adequate, covering all the necessary areas of concern of the project. Clauses needed to be specific and avenues of how risk would be mitigated.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Wang, S.Q, Tiong, R. L, Ting, S.K, and Ashley, D (2000)	Foreign exchange and Revenue Risks: Analysis of Key Contract Clauses in China's BOT Project	To identify unique or critical risks associated with China's BOT projects	Descriptive, case study	Although contract clauses are drafted according to international customs and practices, they are still not suitable in the Chinese context. The contract language is effective, in line with international practices.	This study showed the necessity of instilling investor confidence. How major risks regarding tariff adjustment risk, exchange rate and convertibility risk were the focus of attention.
Xu, Y., Chan, A.P.C, and Yeung, J.Y.F (2010)	Developing a Fuzzy Risk Allocation Model for PPP Projects in China	To develop a fuzzy synthetic evaluation model for determining equitable risk allocation	Descriptive	The qualitative and experiential knowledge that decision making processes are imbued with expressed in linguistic terms, require qualitative and experiential knowledge of construction experts. Such knowledge is subjective, partial and implicit in the way it is applied. The paper gives a list of 23 principles that influence risk allocation on PPP projects. The aim of the fuzzy risk allocation model is to transform imprecise linguistic principles into a more usable quantitative-based analysis using fuzzy set theory approach.	Although the methodology adopted for the research used the fuzzy risk allocation model, it nonetheless provided an explicit, comprehensive and systematic framework on risk allocation practice for the project.
Zhang, X.Q and AbouRizk, S M (2006)	Determining a reasonable concession period for private sector provision of public works and services	Proposal of determining of an appropriate length through simulation techniques	Descriptive, Monte Carlo simulation	This paper proposes that the concession integrates construction and operation periods. Critical to the formulation of the concession is analytical information on risks and uncertainties.	The Monte Carlo simulation is used as a tool to measure uncertainties and reason with construction and economic risks.

Author	Title	Objectives	Methodology	Conclusions/Comments	Critique
Zhang, X (2005a)	Critical Success Factors for PPP in Infrastructure Development	Development of a workable procurement for improved practice in PPP projects	Descriptive	The listing of studies undertaken on CSF's shows that most had dealt with specific contract types and not in a holistic manner. The Five main categories that were formed the basis of obtaining a successful contractual arrangement.	This study showed the necessity of developing a workable procurement contractual arrangement.
Zhang, X (2005b)	Criteria for Selecting the Private-Sector Partner in Public-Private Partnership	Develop a selection criteria based on based value of the right private partner	Descriptive, questionnaire survey	Zhang (2005) has a systematic approach that develops the selection criteria. Zhang (2005) singles out four evaluation areas. Each of these areas is significantly different in the way the criterion is evolved. The selection of a private partner is important.	Meeting best value requirement standards as risk is allocated, enables better handling of contractual difficulties after the award of the contract.
Zhang, X (2009)	Concession Period Determination for PPP Infrastructure Projects in Hong Kong	To determine the appropriate length of the concession period for a particular PPP project	Descriptive	Zhang (2009) shows the types of concessions available. The concession is important in that it should integrate construction and operation so as to encourage innovations, efficiency, cost savings and early project completion. Critical to this process is information regarding risks and uncertainties so that the concession period can be determined.	This paper utilised the Monte Carlo Simulation to measure issues of uncertainty on the project and is helpful to facilitate the determination of a feasible concession period.
Zulu, S and Muleya, F (2009)	Delivering Infrastructure Development using PPP	To examine the challenges faced in infrastructure making by PPP	Descriptive, case study	Broadening of the revenue base for the country will move the country forward through advantages PPPs.	This paper's concludes that legal regulatory governance, and risk management are important.

2.17 Identification of research gaps in literature reviewed

The literature review identified research gaps in line with the objectives of the study. In order to do so, the gaps were used to generate research questions so that solutions could be found. Five questions were produced that are summarised in **Table 2.6** and listed below:

1. to what degree were critical success factors (CSFs) affecting decisions made on a PPP project?

2. what important factors portended effective risk allocation mechanisms used for decision making on PPP projects?

Table 2.6: **Research gaps in literature reviewed**

Research question	Enquiry emphasis	Action	Enquiry question
1. Do PPP critical success factors assist decision making in the allocation of risk for concession periods?	Critical success factors are fundamental to decision making process that govern award of a contract.	There is need to investigate to what degree these critical success factors affect decisions made regarding risks on PPP projects.	• To what degree do critical success factors (CSFs) affect decisions made on a PPP project concession regarding risk allocation?
2. Is risk allocation practice effectively used for decisions making for the PPP concession period?	The debate that those implementing the PPP mode of construction have systems that cannot effectively make decisions for risk allocation. By way of policy, Ho (2009) advised that instead of stiff contract conditions, appropriate risk allocation mechanisms must be the focus.	There is need to find out what an effective risk allocation mechanism must achieve to enhance decision making.	• What must be modelled in an effective risk allocation mechanism to enable PPP successful decision making?

3. Do ascertained risks affect decisions regarding project objectives that are targeted to be attained during the concession period?	Project objectives are affected differently from inception to completion. Objectives set must be achieved even in the midst of risks that range from political to economic ones.	There is need to measure the effects of major risks affecting project's different phases.	• What is the effect of major risks affecting the achievement/non-achievement of project objectives during the different phases?
4. Are there financial decision tools that are used by private entities in negotiating the PPP concession period?	There are several tools that are used to assess project viability. Usually single range net present value (NPV) values are utilised to come to decisions on projects. For analysing cash flow problems, the Monte Carlo simulation is appropriate.	There is need to investigate NPV distribution over the project noting what beneficial effects would be obtained. Differing NPV values necessitate consistent decision-making in selecting the best negotiated PPP concession period.	• What investment objectives must be achieved on implemented PPP projects? • What decision making tools would be used for differing investment financial market?
5. Are there instruments that are used to avert various risks on PPP projects during concession periods?	Risk mitigating measures are numerous. As the concession period is very long, sustainability of such instruments in fledgling financial climate must be ascertained.	There is need to investigate appropriate methods that could be applied to projects that would affect PPPs that could be viewed as successful.	• What methods must be used to protect projects from major risks?

3. what was the effect of major risks affecting the achievement/non-achievement of project objectives during the different phases?

4. what decision-making tools were used for mitigating risk?

5. What is the effect of major risks affecting the achievement/non-achievement of objectives during the different phases of the project?

2.18 Conceptual framework

In view of the literature that was reviewed as well as knowledge gaps identified, the conceptual frame adopted is shown in **Figure 2.5** below:

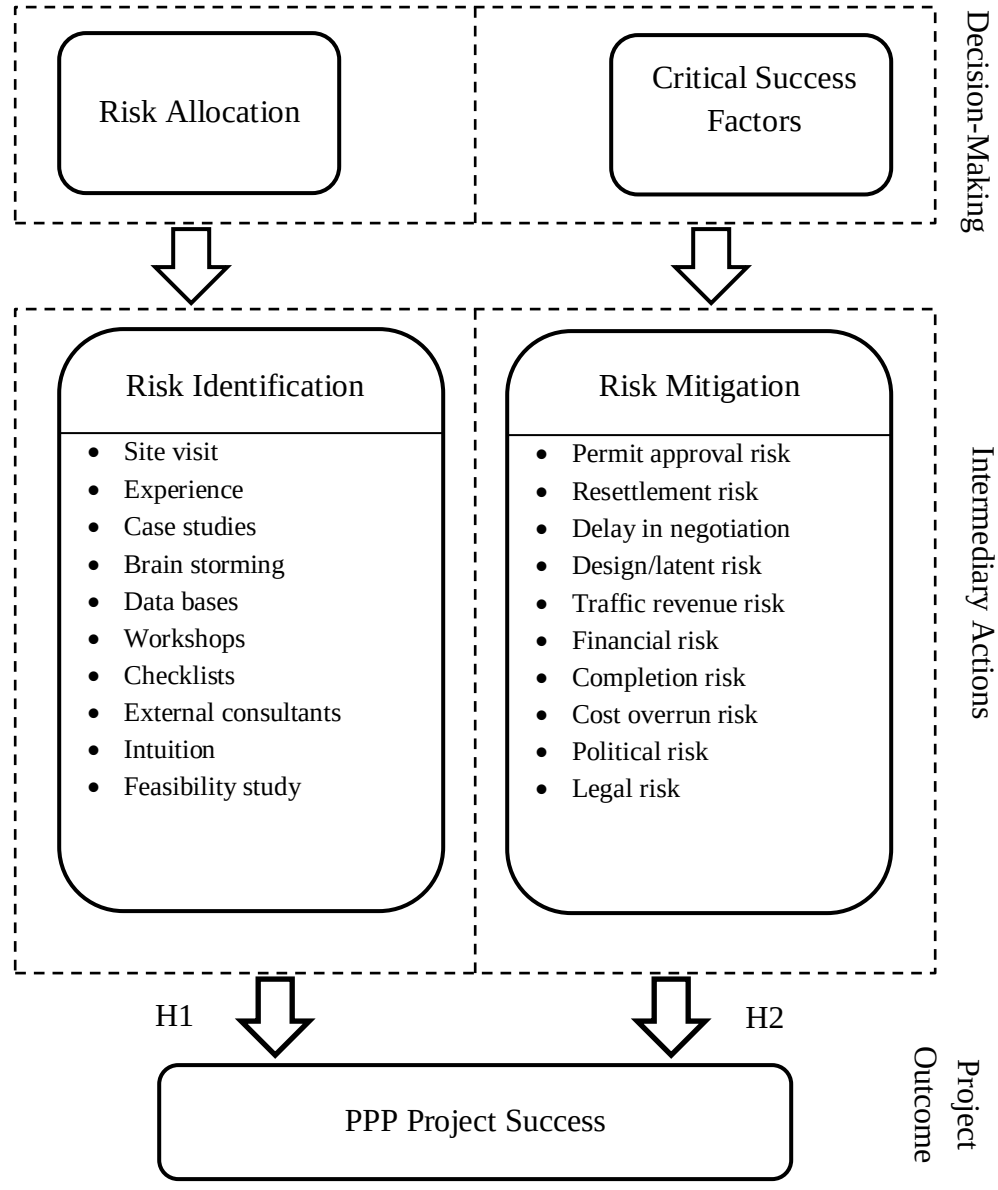


Figure 2.5: Conceptual Framework

2.19 Research Hypotheses

The research tested three hypotheses (**Ho**, **H1** and **H2**) in order to see if:

Ho – decision-making was not dependent on risk allocation, risk identification, critical success factors and risk mitigation for a PPP project to be successful;

H1 – decision-making was dependent on risk allocation and risk identification for a PPP project to be successful; or

H2 – decision-making was dependent on critical success factors and risk mitigation for a PPP project to be successful.

2.20 Summary

This chapter gave the theoretical background upon which the research was based. Several factors were discussed that necessitate the successful implementation of PPPs. Key areas of discussion involved theories which form the basis of risk identification, allocation and their mitigation in order to ensure PPP project success. Various studies around the world were examined enabling the identification of critical success factors for application in Zambia's context. With various countries in Africa adopting the PPP mode of project delivery, its application remains a 'greenfield' in view of the continent's under-development. Critical success factors for PPPs are a consequence of the country's economic development status. Inevitably, although the tally of such projects is increasing in terms of their implementation and operation, improvement in PPP regulatory frameworks in regard to risk allocation and their consequent mitigation leading to project success, remain a challenge.

CHAPTER 3 : RESEARCH METHODOLOGY

3.1 Introduction

The previous chapter presented reviewed literature that gave the theory underlying the application of public private partnerships (PPPs). Theory provides the reason for research to be conducted. The methods of data collection as well as those for empirical data analysis are discussed in this chapter. Accordingly, ontological and epistemological methodological factors were observed during the research discourse. The adopted ontological philosophical approach was based on the content of primary data collected through interviews. Epistemologically, themes were established enabling the researcher to use constructivist-pragmatism paradigm in interpreting the emerging patterns. The determination of the population and sampling frame for this study is also provided in this chapter.

3.2 Aim of research design

Construction management is a discipline that is aligned to the quantitative research methodology (Dainty, 2007). Qualitative studies are descriptive in character and gather data using variables measured on nominal or ordinal scales (Kumar, 2005). Quantitative studies are exploratory in nature and are fashioned to ascertain variation in a phenomenon (Kumar, 2005). Bryman (2015) contended that while quantitative and qualitative research may represent different approaches, a ‘wedge’ must not be driven between them. Mixed research methods, which use more than one method, have therefore become popular (Brannen, 2005).

Quantitative and qualitative approaches enable the researcher ask different questions concerning phenomenon (Silverman, 2010; Kumar, 2005). Bryman (2015) showed how quantitative approaches are ‘naturalistically’ inclined. As such quantitative analyses take the form of experimental designs whose aim is to ‘manipulate’ variables (Bryman, 2008). In manipulating variables, quantitative analyses try to control, predict and explain phenomenon. On the other hand, qualitative analyses are designed for understanding and describing phenomenon (Silverman, 2010).

The aim of a research design is to make available a framework that will enhance the collection and analysis of data in light of the problem being probed (Bryman, 2015). Efficient organisation of the process is at the centre of such design (Dainty, 2007), which aim is achieved through the selection of a research method from the several that are available (Kumar, 2005). The principles and procedures that are applied for any scientific investigation are what are known as research methodology. These consist of research methods and strategies that are discussed differently by many authors. For instance, Yin (2009) discussed five research strategies namely experiment; survey; archival analysis; history and case study. Kumar (2005) catalogued methods such as questionnaires, interviews and experiments. Bryman (2008) argued in detail that research methods are commonly distinguished as quantitative and qualitative. Data characteristics for quantitative and qualitative methods are different as **Table 3.1** shows.

Table 3.1: Data characteristics

Qualitative data	Quantitative data
• Researcher gathers information for the first time. • Concerns word meanings and involvement with an event. • Considered penetrative in revealing concealed motivations and values.	• Collected from existing researches. • Have a lot of quantitative data and numerical aspects. • Use of variables is common in unravelling phenomenon. • Utilises statistical analysis.

(After Bryman, 2015)

3.3 Case study design

Case studies are detailed, in-depth analyses of typical life situations (Yin, 2009). The focus of the study is the comprehensive analysis of events or conditions together with the processes that take place and their interrelationships (Kothari, 2011). According to Yin (2009), these seek to empirically to investigate a real-life project so as to make clear the context of such a phenomenon. The case study design has an advantage compared with large number of studies in respect to the depth of the analysis, where depth can be understood as empirical completeness and natural wholeness or as conceptual richness

and theoretical consistency (Silverman, 2010). The case study approach provides the opportunity for intensive analysis of the many specific details often overlooked by other methods (Kothari, 2010). Nisar (2006) noted the use of the case study as an interpretative method. Moreover, the case study approach allows for the use of multiple sources of empirical data through the method of data triangulation (Yin, 2009; Bryman, 2015). This increases the reliability of the results and conclusions because 'any finding or conclusion in a case study is likely to be much more convincing and accurate if it is based on several different sources of information' (Yin, 2009).

Successfully used, case studies enable the researcher to carry out in-depth interviews, review reports of individuals and administer questionnaires (Kothari, 2011). False generalisations particularly in view of the fact that case studies have no set rules are their greatest limitation. Case studies are used for descriptive and exploratory problems. Descriptive problems concern issues lacking knowledge of a particular phenomenon. Exploratory problems, though descriptive, are orientated at phenomenon which is new in character, with little or no information existing (Nkhata, 1997). Furthermore, in terms of choosing cases for comparison, the case study is fundamentally different from the statistical method by relying on fewer cases which have been strategically chosen, based on expected information content (Silverman, 2010).

3.3.1 Advantages of case study method

The case study method offers the following advantages (Kumar, 2005):

- it facilitates study of social phenomenon in a manner generally not possible with use of the observation method;
- information obtained reinforces the researcher's task of constructing the questionnaire;
- units of the study data are easily determined and organised;
- improvement is realised as the unit's historical data is understood;
- the researcher's analytical abilities and skills are sharpened;

- case studies offer the systematic capture of social change information hence considered a gateway and destination to ‘abstract knowledge’;
- such studies are useful for diagnosis, therapy and other practical case problems that needed to be resolved;
- study of multiple cases yield compelling evidence; and
- such studies operate on a robust rationale.

3.3.2 Disadvantages of case study method

The following disadvantages are common to case studies (Kumar, 2005):

- there is difficulty of comparability that the methods faced as the units used had to be read into it;
- the danger of false generalisation is a reality as there are no set rules for collecting information;
- case studies require a lot of time and are expensive;
- they are of limited use as they face challenges with sampling when extended to the larger community; and
- multiple-case studies require extensive resources.

This research was designed as an embedded multiple-case study. An embedded design requires the investigations be done for each site. The site could be evaluated for various issues including performance. The results of individual surveys are not replicated among other cases. However, the underlying premise for multiple-case selection is “replication”. According to Yin (2009), such case studies are selected based upon the predictability of similar or contrasting results. In cases of comparison, this method relies on fewer cases that would be selected with purposeful intent. The end result of all these procedures was the development of a rich theoretical framework. It was this framework that became the instrument for generalisations for the two cases that were studied. The

study offered a comparison between different sectors that were using the PPP mode of procurement.

3.4 Data collection sources

The methodology of this study is shown in **Figure 3.1** and involved the following:

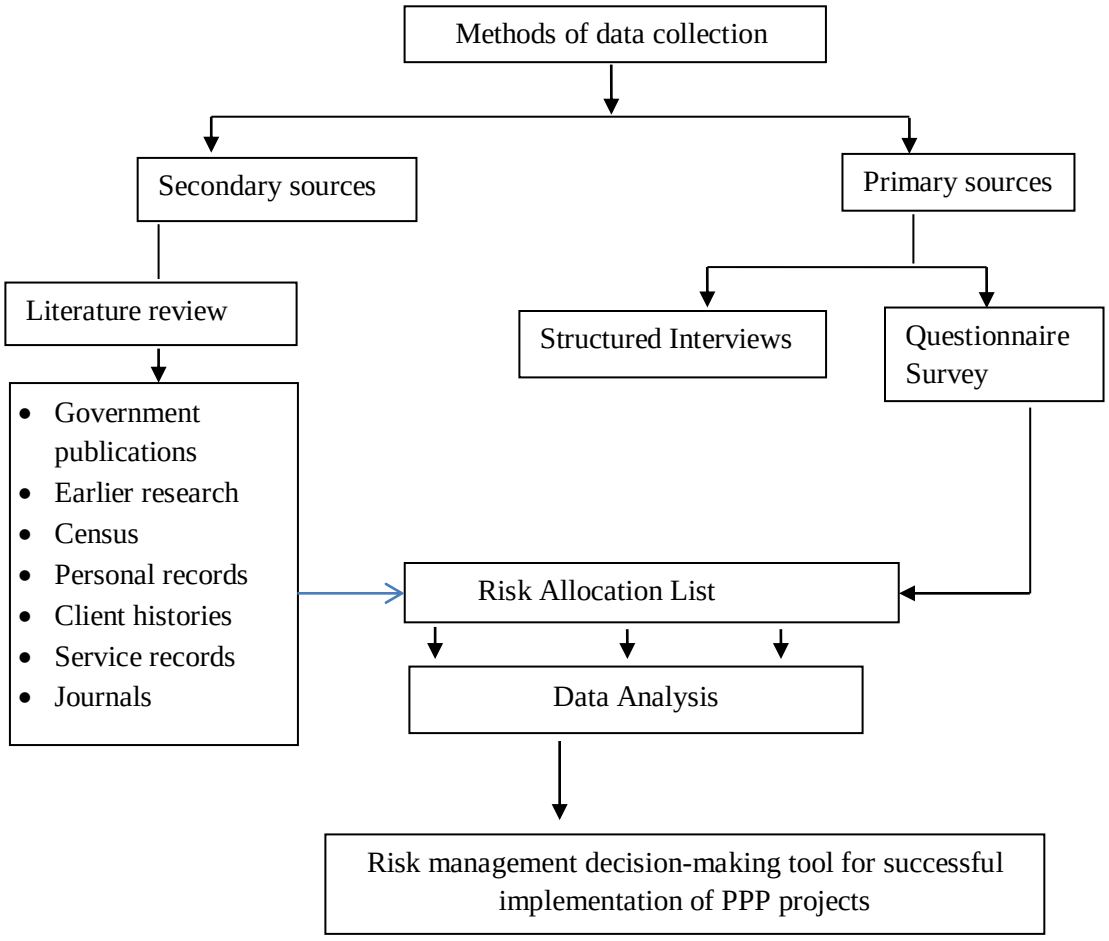


Figure 3.1: Primary and secondary data collection sources

(After Kumar, 2005 and Bryman, 2008)

The methodology utilises obtaining primary and secondary data in order to derive factors for critical success for the PPP project success.

3.4.1 Quantitative research

Bryman (2008, p.22) defined quantitative research 'as a research strategy that emphasises quantification in the collection and analysis of data'. With the problem identified, a theory is normally tested, measured with figures and eventually analysed using statistics. This is what embodies the deductive approach. The aim of quantitative research is to make predictable generalisations on the theory being examined (Bryman, 2008). The method is therefore viewed as objective since it is tested by using structured instruments. This enables the research to be repeated on varied sample sizes.

Quantitative research uses experiments, quasi-experiments and surveys.

- experiments: In view of replicating experiments, scientists endeavour to be explicit about the procedures they use;
- quasi-experiments: these are studies that have certain characteristics of experimental design but that do not fulfil all of the internal validity requirements (Bryman, 2015). Normally, such experiments undergo some form of manipulation when conducted; and
- surveys: surveys are called cross-sectional designs that use questionnaires and structured interviews to collect quantitative data in connection with one or more variables over determined samples. Statistical analysis is used to analyse the data.

3.4.1.1 Advantages and disadvantages of quantitative research

Quantitative research uses standardised instruments for collecting data. The standardised instruments are considered objective. Accuracy and verification are the two advantages of such instruments. Repeated measurements enable accuracy and reliability to be achieved. Research verification is attained through the use of the sample and its design. Larger sample sizes provide the opportunity to generalise findings to a much wider population (Kothari, 2011). However, quantitative researches have disadvantages. Quantitative research is able to obtain patterns of data easily but has difficulty in providing explanations for them. There is also a failure of identifying variables that need investigation when they are bound up in complex problems.

3.4.2 Qualitative research

A qualitative research, though using samples, need not be representative of the phenomenon being studied (Kothari, 2011). Hence, this type of research is subjective in nature as it focuses on describing observed behaviour.

Bryman (2008) suggested the following collection methods for qualitative research:

- interviews;
- focus groups; and
- observation.

3.5 Mixed research methods

Bryman (2008) argued that mixed research are a combination of quantitative and qualitative methods. He further stated that such a combination of methods is mutually illuminating. The three approaches used in mixed methods are: triangulation, facilitation and complementarity. Qualitative or quantitative researches are used to corroborate each other's findings in triangulation. Facilitation is the use of a defined strategy to aid research while complementarity occurs when two strategies are employed so that different aspects of an investigation are dovetailed (Bryman, 2015). One of the mixed methods this research study has used is that of content analysis of journal articles. Content analysis has the advantage of examining the rationales of tested quantitative and qualitative research combinations.

3.5.1 Interviews

Interviews involve contact with individuals and so as to elicit verbal responses to sets of predetermined questions (Kumar, 2005; Kothari, 2011). Analytical clarity is the aim of the interview process in order to fill 'conceptual gaps' (Charmaz, 2006). Further, they provide a platform of accessing people's perceptions, meaning, definitions of situations and construction of reality (Easterby-Smith et al., 2002). The interview's flexibility and adaptability enables them to suit different research situations. Bryman (2015) noted that the self-completion questionnaire and the structured interview are similar methods.

Easterby-Smith et al (2002) stated that response rates for interviews were higher than those of questionnaires or telephonic surveys. Two aims are essential when framing the questions namely to give thorough exploration of the topic as well as endeavour that the participant's experience is thoroughly covered (Charmaz, 2006). Interview questions covered issues of behaviour, opinions, knowledge and other background demographics. Several versions of interview types exist ranging from the informal to the more formal. In all of these, face to face contact is the major form of engaging the interviewees. Phone interviews were organised based on the convenience of those being interviewed. This offered flexibility in setting up the interviews particularly for chief executives of companies. Hence, depending on the stage of research reached and data required, interviews can either be structured, semi-structured or unstructured.

3.5.2 Structured interviews

The structured interview is described as a prominent data collection strategy done in the context of a survey (Bryman, 2015). This type of interview is preferred as it promotes 'standardisation' in the two major areas of questions asked and answers obtained. Pre-established questions having predetermined response class are used for the structured interviews. Open-ended questions are also used as these give minimal discrepancy in responses (Charmaz, 2006). The interviewer is further restricted by the structure of the interview guide in following its order and wording (Kumar, 2005; Kothari, 2011). The advantage of such a 'structured' order enables statistical comparisons to be conducted on responses given.

3.5.3 Semi-structured interviews

These are interviews that can be part of a structured or an unstructured interview. Though direction for the interview may be provided using the guide, much freedom is given to the interviewer as he focuses on major issues of concern. Open-ended questions form the core of the questions in these interviews (Kumar, 2005; Charmaz, 2006). Though this is the opposite of the structured interview that is based on closed type of questions, interviewees readily give valid responses. Therefore, questions asked were dependent on the situation which was different from the structured method that strictly

adhered to the order. Kumar (2005) gave the aim of such interviews as gaining understanding from an informant well versed with the field of study.

3.5.4 Unstructured interviews

Unstructured interviews are informal and largely exploratory. An atmosphere of trust and confidence enables the interviewee to participate freely (Charmaz, 2006). Questions are asked as the interview progresses without any pre-set answers. The interview relies on the rich quality of the interaction so as to derive responses that are 'as natural as possible'.

3.5.5 Advantages of interviews

Kothari (2011) and Kumar (2005) posit that interviews advantages consist of the following:

- that they are most appropriate for complex situations. The method offers the interviewer preparatory time before sensitive questions are asked to respondents;
- in-depth information is obtained through probing follow-through questions proving the interview method appropriate;
- information could be supplemented. The interviewer is able to supplement information obtained from responses with that gained from non-verbal reactions;
- questions can be explained. The interviewer is able to repeat the question and put it in a form that is understood by the respondent; and
- interviewing has a wider application. The interview is able to cater for those educated and uneducated. The research used this method because interviewees were able to elaborate

3.5.6 Disadvantages of interviews

Kumar (2005) identified disadvantages of interviews as follows:

- the interview process is time consuming and expensive. This challenge is posed when gathering data from respondents scattered over a wide geographical area;

- data collected depends on the quality of the interaction. Generated data is dependent on experience, skills and the commitment that is exhibited by the interviewer; and
- interviewer bias is identified from several sources i.e. from the researcher, possible use of multiple researchers to gather data including the way data would be subsequently treated.

In seeking to go beneath the surface of ordinary conversation, the interviewer ensures that (Charmaz, 2006):

- experiences are not merely described;
- there are pauses to explore statements or topics;
- more detail or explanation is requested;
- the participants are asked about their thoughts, feelings and actions;
- the participant is kept on the subject;
- earlier points that need clarification are revisited;
- the interviewee's point is restated to check for accuracy;
- the questioning tempo is either slowed down or quickened;
- there is no shift in the immediate topic;
- there was use of observational and social skills to further the discussion; and
- the participant is respected and appreciation is expressed for participating.

3.5.7 Questionnaire survey

The questionnaire consists of a set of written questions that respondents are requested to answer. These surveys are of two kinds; the questionnaire as well as the schedule (Kothari, 2010). The difference lies in the matter of administration. Questionnaires are given to respondents, while that of a schedule is conducted face to face during the

research which is simply an interview (Kothari, 2010). In either case, great care is taken that questions posed are clear and easily understood (Nkhata, 1997). This necessitates having the layout of the questionnaire adopting a pleasant format and a question sequence that is convenient to follow (Kumar, 2005). The questionnaire is developed in an interactive style that is normally preceded by a covering letter to the respondent. Prior information is also given regarding the form of questions to be asked (Kothari, 2010). Open and closed-ended questions are utilised in the questionnaire (Kumar, 2005). Open-ended questions are designed to solicit free expression from respondents (Kothari, 2010). They also provide the opportunity to probe deeply for clarity as such questions are difficult to answer than closed-ended ones (Nkhata, 1997 and Kumar, 2005). Closed-ended questions are structured with choices for respondent's selection (Kothari, 2010). Multiple choice types of questions have the advantage of easy handling and therefore most amenable to statistical analysis. The questionnaire and schedule method had numerous advantages and disadvantages (Kothari, 2010).

3.5.7.1 Advantages of questionnaires

According to Kothari (2011) and Kumar (2005), questionnaires have the following merits:

- that they are less costly when they are mailed to far flung areas;
- mailed questionnaires are free from interviewer bias as respondents answer in their own words;
- there is greater anonymity offered to respondents for mailed questionnaires;
- respondents have adequate time to give well thought out answers;
- unfriendly respondents are reached through questionnaires; and
- the method offers use over a large sample making results more dependable and reliable.

3.5.7.2 Disadvantages of questionnaires

Questionnaires have the following disadvantages (Nkhata, 1997; Kumar, 2005; Kothari, 2010):

- low rate of response drastically reduced the sample size;
- questionnaires can only be administered to those that are literate and would co-operate;
- there are difficulties in knowing whether the targeted person had completed the questionnaire;
- mailed questionnaires offer no opportunity of clarifying given answers;
- method did not allow for spontaneous responses as there is enough time for reflecting on the answer;
- raised difficulties in dealing with ambiguous replies or omissions; and
- the method proved to be slow in getting results.

3.5.8 Focus group interviews

Bryman (2008, p.473) defined focus group interviews as 'a method of interviewing that involves several people on a specific topic or issue'. Focus groups involve the exploration of perceptions, understandings and experiences of a group of people who share a common event (Kumar, 2005). The meetings enable the group generate a broad frame for discussion of the topic. This is a cost effective way of ensuring that field work to be carried out was focused to enable building of theory. As opinions are expressed, these are carefully recorded. As such discussions are spontaneous; the use of recording devices is of necessity to keep record of events. A focus group can also undertake pilot studies in pre-testing survey questions of self-completion questionnaires (Bryman, 2015). This is advantageous to the researcher as he is assured that administration of the instrument will not be met with apathy from would-be respondents.

3.5.8.1 Advantages and disadvantages of focus groups

Focus groups are able to discuss a theme in depth compared to group interviews (Bryman, 2008). Discussions that are moderated are kept 'in focus' thereby saving on time. The fact that the researcher has less control over the focus group proceedings is one of the main disadvantages of this method. This method generates a lot of data that becomes difficult to analyse. Other difficulties of organisation, time-consuming transcribing and the potential of causing discomfort among participants are some of the other notable disadvantages of the method (Bryman, 2015).

This method was used as it offered the advantage of discussing the implementation of PPPs in Zambia by the use of two separate groups that examined literature reviewed questions so as to generate a questionnaire for data collection. The second group pre-tested the questionnaire that the first group answered.

3.5.9 Direct observation

The observation method is defined as "a technique in which the researcher employs explicitly formulated rules for the observation and recording of behaviour" (Bryman, 2008:257). Observational methods refer to data gathering methods that focus on experience by providing real-world impressions in authentic surroundings (Goulding, 2007). The observation method becomes a research tool when there is purposeful recording of information that becomes subjected to investigative checks and controls for validity and reliability (Kothari, 2011). Observational data uses comparative methodologies (Charmaz, 2006). The investigator collects data by being involved directly or indirectly. This is also known as participant or non-participant observation. Direct observation is susceptible to the 'Hawthorne Effect' which is a distortion that is associated with change in behaviour of those being observed due to a participant observer who has become part of the group (Kumar, 2005). On the other hand, the non-participant observer detaches themselves from those observed. Subjective bias is eliminated by accurate observation and reporting (Kumar, 2005; Kothari, 2011). The willingness of respondents is not insisted upon. Since this research utilised case studies,

observational data was used as an investigative tool to augment results from the quantitative analysis.

The character of these observations can therefore be structured or unstructured. Structured observations are formal and recorded in a standardised way. For descriptive studies, the structured observation method is recommended (Kumar, 2005). Exploratory studies utilise the unstructured observation method. Observations can also be controlled and uncontrolled. Uncontrolled observations are those that take place in their natural environments. Often the aim of such an observation is to capture the moment or instance hence spontaneity governs this methodology (Charmaz, 2006; Kothari, 2011). Exploratory studies therefore benefit from such observations. Controlled observations take place under guided or laboratory conditions (Kothari, 2010; Bryman, 2015). One problem with observational understanding is its inability to open up the meaning of an individual's lived experience for the observing individual (Goulding, 2007).

3.5.9.1 Advantages of observation method

The following advantages were noted for the observation method (Kothari, 2011):

- it eliminates subjective bias if observations are done accurately;
- the information being obtained under this method relates to what is currently happening; it is not being complicated by either the past behaviour or future intentions or attitudes; and
- this method is independent of the respondent's willingness to respond and as such, is relatively less demanding of active cooperation on the part of respondents as happens to be the case in the interview or questionnaire method. The observation method was used in assisting analysis from qualitative and quantitative data.

3.5.9.2 Disadvantages of the observation method

Several limitations are notable regarding this method. This method can be expensive particularly when information is provided in a limited way. The likelihood of unforeseen factors marring the observational task is another limitation that this method possesses

(Kothari, 2011). Measures to reduce the Hawthorne Effect on the results further limit the use of this methodology.

3.5.10 Observation measurement

The observation methodology is recorded using the following means:

- narratives;
- use of scales;
- categorical recording; and
- the use of mechanical devices such as MP3's.

3.5.10.1 Narratives

Narratives are reputed as a channel for collecting sensitive information (Kumar, 2005). The contents of the narrative are predetermined as the persons telling their story about the incident. Throughout the process, the researcher is passive and actively listens while using low inference descriptors to encourage the discussion (Silverman, 2010).

3.5.10.2 Use of scales

Scales are used to find out the attitude of respondents regarding an issue using either open-ended or closed-ended questions. Open-ended questions invite respondents to describe independent opinions concerning a matter. Closed-ended questioning utilises framed descriptive categories to elicit attitudes on various aspects of the issue under study. Kumar (2005) stated that attitudinal scales measure the intensity of respondent's attitudes towards different aspects of an issue and provide techniques to combine the attitudes towards different aspects into one overall indicator. The major scale that was used in the study was the Likert scale.

3.5.10.3 Categorical recording

Recording of various categories is a way of organising data in research. This is because data has various properties which have be dealt with according to its characteristics (Selvam, 2017; Till, 1974). The difference in data properties allows the researcher to be able to use different types of statistical tests.

3.5.10.4 Mechanical device use

Use of mechanical devices such as MP3 recorders, is a helpful tool for research. It assists the researcher to be able to replay interviews for further analysis. This allows the researcher to concentrate on getting as much information as possible from those being interviewed (Kumar, 2005).

3.6 Research context

The advocacy for Public Private Partnerships (PPPs) has witnessed a steady increase of construction projects on the African continent (Akintoye, 2009; Zulu and Muleya, 2009). Africa's infrastructure agenda includes an aggressive private participation as the springboard in matters of economic development (Ayee, 2005). Development of infrastructure is nestled in the context of competing demands for growing economies like Zambia (Zulu and Muleya, 2009). Under-development has characterised sectors such as water reticulation, housing, roads and railway infrastructure (Banda, 2004; Manelele, 2008). Therefore, the introduction of the PPP mode of contract was designed not just to lessen the nation's budgetary burden (Khanda, 2011; Pongsiri, 2002) but to foster wider infrastructure development. The slow implementation of PPPs in Zambia has raised concern on the risks that threaten such projects hence prompting this study.

However, wholesome adoption of PPPs in developing economies has highlighted the need for strengthened legal frameworks (Ndandiko, 2006). Legal frameworks protect infrastructure investments from various risks (Guasch, 2004) pursuant to their successful implementation. A broad range of risks affect projects earmarked for investment that threaten attainment of critical success factors (Dikmen et al, 2009). Studies conducted by Akintoye (2005), Wang et al (2000), Grimsey and Lewis (2004) and Zou et al (2008) suggested that risks affect all stages of projects from implementation to completion. This study therefore investigated effects of decision made with regards to allocated risks on PPP projects during their development.

The research sought to investigate how effective the introduced PPP law was in the implemented projects. Furthermore the research intended to establish risks which were considered at the beginning of the projects. It was critical to also analyse the processes

in use with regard to the way they aided PPP critical success factors that ensured the successful implementation of the projects.

Hence, the constructionist paradigm was used to explain social reality with generated meaning arising from the reviewed projects enabling them to 'connect' with their environment (Kothari, 2011; Bryman, 2008; Easterby-Smith et al, 2015). The applied research strategy was therefore pervasively qualitative augmented with quantitative aspects.

Yin (2009) noted the importance of differentiating the various research designs that could be used to collect data. Essentially, case studies give a broader perspective depending on the questions that can be asked (Bryman, 2015). Questions examining 'what' were exploratory justifying the use of an exploratory study by using hypotheses and propositions. Exploratory studies would therefore utilise a survey, experiment or case study (Kothari, 2011; Rovai et al, 2013). It was noted though that the case study would provide an insight into the difficulties of implementing PPPs in a developing economy. But this was not the case for the second type of 'what' and 'how many' type of questions whose mode of enquiry naturally favours the survey method. Hence the rationale for the survey method befits outcomes that would be descriptive or predictive such as a survey of attitudes. 'How' and 'why' questions are explanatory in nature. Research methods best suited for this are case studies, histories and experiments that give a 'longitudinal' overview of time. The researcher's involvement in the research is shown in the second column having much control with experiments and would be the determinant of the focus of the method. Yin (2009) proposed five main research strategies and determined the conditions for their use (**Table 3.2** below).

Table 3.2: Relevant methods for different research situations

Method	Form of research question	Requires control of behavioural event?	Focuses on contemporary
Experiment	What? How? Why?	Yes	Yes
Survey	Who? What? Where? How many? How much?	No	Yes
Archival analysis	What? Who? Where? How many? How much?	No	Yes/No
History	What? How? Why?	No	No
Case study	What? How? Why?	No	Yes

(After Yin, 2009)

In view of **Table 3.2** above, research strategies and methods were developed for each of the questions as shown in **Table 3.3**. The rationale for each of the strategy and method used was also explained.

Table 3.3: **Strategies for research questions**

Research question 1	To what degree do critical success factors (CSFs) affect decisions made on a PPP project concession regarding risk allocation?
Research strategy	Qualitative and quantitative research
Research method	Literature review, interview survey, questionnaire survey
Rationale	As a 'what' question, this favours an exploratory survey. Critical success factors influencing decision making are carefully listed from literature reviewed empirical studies conducted around the world e.g. Cui et al (2018); Bing et al (2005); Chan et al (2011); Chan et al (2006); Chan et al (2011); Chan et al (2010); Jefferies (2006) and Zhang (2005a). The survey would utilise a 5 step Likert scale to establish the criticality of CSFs. The 'degree' to which CSF's affect decision making on PPP project concession regarding risk allocation will use a parametric test statistic used in the context of hypothesis testing. Charles Spearman's coefficient of correlation will be used to determine the extent to which variables are ranked in order of popularity. Karl Pearson's coefficient of correlation will also be used to measure the degree of relationship between the variables. There will also be need to find out the degree of intensity between these attributes that define what a PPP is for a developing country. The significance of such association will be found by using the Chi-square test.

Research question 2	What must be modelled in an effective risk allocation mechanism to be used for decision making?
Research strategy	Quantitative and qualitative research
Research method	Literature review, focus group interview survey, questionnaire survey
Rationale	Being a 'what' question, this will explore elements that must be modelled for effective risk allocation. The questionnaire was used to collect data from those involved in PPP projects and information extracted providing the researcher to evaluate tools used in the allocation of risk. Many of such tools are aimed at deciphering the financial standing of the developer. Statistical inferences were evaluated using SPSS.
Research question 3	How are major risks affecting the achievement/non-achievement of project objectives during the different phases?
Research strategy	Qualitative and quantitative research
Research method	Literature review, archival analysis, questionnaire survey, case study
Rationale	The effect of major risks affecting the project is the reason for this investigation. A questionnaire survey will be used to see what risks different phases face from inception to completion. Multiple regression analysis will be used.
Research question 4	How must investment objectives be achieved on implemented PPP projects?
Research strategy	Qualitative and Quantitative research
Research method	Literature review, focus group interview, questionnaire survey, case study
Rationale	This is a 'how' question, clearly suggesting the survey and case study methods. The case studies used showed how the developers pursued the objectives of the project.
Research question 5	What decision making tools would be used for differing investment options of the financial market?
Research strategy	Qualitative and quantitative research
Research method	Literature review, case study, focus group, questionnaire.
Rationale	This is a 'what' question and therefore is exploratory in nature. This investigated which methods were better suited for projects in Zambia and would be compared to projects in other countries. Statistical evaluation will be the basis of the analysis. From the on-set, it was determined that basic methods were mostly used in the evaluation of the projects.
Research question 6	What methods must be used to protect projects from major risks?
Research strategy	Qualitative research, focus group, questionnaire survey
Research method	Literature review
Rationale	This is another exploratory question that was used assess the methods to protect projects from risks. Comparisons were made with projects done across the world catalogued in published journals. For Australia, in the brief for the construction of the SuperDome project, utilised the need to shore against excessive dereliction of the structures. The project circumvented this by ensuring that business went on all year round.

Research question 7	What measures can be implemented in the banking system to encourage PPPs?
Research strategy	Qualitative survey
Research method	Literature review, focus group, questionnaire survey
Rationale	This question is targeted at exploring what measures the banking system have implemented or are envisaging to implement to encourage the implementation of PPPs in Zambia.

3.7 Research sources

Crotty (2008) and Easterby-Smith et al (2015) identified research methods as processes and instruments used for gathering information. There are two major approaches in gathering information about a situation, person, problem or phenomenon. These two major approaches are categorised as primary and secondary data.

Primary sources provide first-hand information while secondary sources provide second hand data. This study employed both methods of primary and secondary data to be able to investigate the issues in decision-making. The secondary sources of information used in this research included: textbooks, databases, articles, journals and conference papers, government documents and on-line documents. This information obtained ensured an in-depth understanding of the topic, and served as a tool in the designing of the questionnaire, whilst the primary data were collected through a structured survey. A focus group approach fitted this purpose that included different professionals that had participated in PPP projects.

There are several methods that can be utilised in collecting primary data. The choice of method depends upon the purpose and aims of the study, the resources available and the skills of the researcher (Kumar, 2005). Kumar explained that there are many types of research methods that can be used to collect primary data such as: experiments, surveys, observations and existing data. There are two types of surveys namely interviews and questionnaires. Kumar (2005) further discussed that survey is a structured list. Kumar (2005) explained that surveys have been characterised by the collection of data from samples of people to describe and explain the characteristics or opinions of a population through a representative.

3.8 Instrument design

Two types of instruments were used to collect data for this research. These were a structured questionnaire as well as a detailed one that was administered to construction industry practitioners conversant with PPPs. A select focus group was given the structured questionnaire in order to gather essential data on risk allocation. These same questions (though in a modified form) were used in the two case studies that are presented in the analysis. The detailed questionnaires were preferred as they saved time and were comparatively convenient and inexpensive. Generally, questionnaires also offer great anonymity as there is a no face to face interaction between the respondents and the interviewer, except when arranged with respondent. In situations where sensitive questions were asked, the questionnaire helped increase the likelihood of obtaining accurate information (Bryman, 2015). Bryman (2015) stated that well designed questionnaires are highly structured to allow the same type of information to be collected from a large number of people in the same way and for data to be analysed quantitatively and systematically. The questions for this research were carefully structured to directly address the goals of the research. Only questions that directly addressed the goals of the research were asked. PPPs are nascent in Zambia and hence the data gathered was sourced from those that had initial experience of their implementation. Such data was then interpreted using inductive techniques. It was important that theoretical propositions underlying examination of the problem formed the basis for explaining the outcomes. The research design was therefore descriptive as in such a design subjects are only measured once (Kothari, 2011).

Bryman (2015) indicated that the length of the questionnaire be taken into consideration so as to obtain accurate relevant information in so far as looking at what is being asked, how it is being asked and the order of how it was asked. The length of the questionnaire in this research was appropriate. The questions were kept as simple as possible to ensure that all those answering the questionnaire would clearly understand the questions being asked.

The questionnaire was designed to address the research question of the problem. Closed ended type of questions were used, the reasoning behind the use of closed-ended questions was because they provide ease of answering and are simpler to analyse as they provide a "ready-made" list of responses (Kumar, 2005). Care was also taken to avoid bias by providing alternative responses by related and proceeding questions.

3.9 Measurement Scales

The survey was based on the Likert scale, in which the respondents were asked to respond to questions or statements (Kumar, 2005). The Likert scale was chosen because the scale can be used in both respondent-centred (how responses differ between people) and stimulus-centred studies, and is judged to be the most appropriate to glean data in support of the research problem in question.

Bryman (2015) posited that the advantages of using the Likert scale were:

- easy and quick to construct;
- each item met an empirical test for discriminating ability;
- the Likert scale is probably more reliable than the Thurston scale, and it provides a greater volume of data than the Thurston differential scale; and
- the Likert scale is also treated as an interval scale.

According to Kumar (2005), interval scales facilitate meaningful statistics when calculating means, standard deviation and Pearson correlation coefficient. The scale is based on the assumption that each statement or item on the scale has equal importance or weight in terms of reflecting towards the issue in the question (Kothari, 2011).

Likert scales have the advantage of not expecting a simple yes/no answer from the respondent, but rather allow for degrees of opinion, and even no opinion at all. Therefore, quantitative data is obtained which means that data can be analysed with relative ease. Due to the advantage the Likert scale were used in the questionnaire instrument.

The questionnaires were divided into three sections, each relating to the research problem. Information sifted from the literature review assisted with the questionnaire design. As PPPs are novel in Zambia, more questions were included to capture the underlying trends of decision-making on projects.

The questionnaire was distributed with a cover letter. The cover letter included (Kothari, 2011):

- an explanation of the relevance of the study;
- a brief description of the objectives of the study;
- instructions on how to administer the questionnaire; and
- assurance of confidentiality.

3.10 Study area

The case study method was used to study the Kasumbalesa Border Post and the University of Zambia East Park Mall for this research. These projects were executed using the public private partnership legislation, Act No. 14 of 2009.

3.11 Data Collection

Data collection was done at three levels. Firstly, structured interviews were conducted at various venues in the City of Lusaka. A selected focus group of ten participants were carefully selected based on their experience with the initial phase of the PPP introduction in Lusaka Zambia. These were asked five specific questions that dealt with the breadth of the research. Their interviews were recorded and reviewed. Secondly, detailed questionnaires were then administered to one hundred and fifty practitioners from various organisations in order to collect data for the research. The researcher ensured that all questionnaires were personally delivered to the relevant participants over a period of 21 days in the city of Lusaka. Of the 53 questionnaires that were returned, only 47 were used for generating findings and analysis for the discussion as seen in the next two chapters. Finally, two case studies were used to observe how research objectives were achieved during their implementation.

A collective administration method was adopted for this research, as this method is regarded as one of the best ways of administering a questionnaire to capture audience such as students in a class room. This administration method ensures very high response rate as fewer people will refuse to participate in your study. Another advantage of this administration method is that the researcher will have personal contact with the study population, hence the researcher will be able to explain the purpose, relevance and importance of the study as well as clarify any questions respondents may have (Kumar, 2005).

3.12 Sample size

According to Kothari (2011), if the population is very homogenous, and the study not very detailed then a small sample will give a fairly representative view of the whole population. The greater the accuracy required in the true representation of the population, then the larger the sample must be. The size of the sample should be in direct relationship to the number of questions asked. This provided a safety measure for this research.

A two stage unstructured focus group study provided the initial non-probability sampling for the research. This was first done with the specialised team dealing with PPPs in the Ministry of Finance and then with a stratified group of selected consultants, contractors, banking institutions and constituent end-users who have had working experience with implemented as well as proposed projects.

In the primary technique, data is collected for the first time and hence considered, original in character (Kothari, 2011). Methods such as the interview and questionnaire management are recognised under this technique. A special inclusion in this technique is the pilot survey. This often takes the form of focus or panel groups (Kumar, 2005). To achieve the aims of the study, the questionnaire was administered to a stratified sample extracted from five groups consisting of the following:

- contractors;
- construction consultants;
- financial institutions; and

- client entities consisting of public and private organisations.

The sample was drawn from relevant institutions that represented groups such as:

- the National Council for Construction,
- the Zambia Institute of Architects;
- the Surveyors Institute of Zambia;
- the Zambia Institute of Bankers;
- client entities undertaking PPP projects (represented by Zambia Development Agency); and
- constituent groups in places where projects were being undertaken.

For the projects chosen that had case studies, a procedure were devised to be followed for deriving the needed information. Documentary (or archival) evidence of the projects were also used as secondary data. Eventually, data triangulation was the end process used for comparative analysis.

3.13 Sampling and sampling techniques

Sampling is the process of selecting a few elements from the targeted population to become the basis for estimating or predicting a fact, situation or outcome regarding the intended populace (Kothari, 2011). Bryman (2015) defined population as a collective term used to describe the total quantity of cases of the type which are subject to a study, while a sample is defined as a selected number of cases in a population.

Kothari (2011) identified two types of sampling namely probability and non-probability. The concept of 'random selection' underlies probability sampling as **Figure 3.2** shows. With random selection, each element of the sample stands an equal chance of being included. That is why it is also known as 'chance sampling'. Non-probability is also known by many other names such as 'deliberate sampling', 'purposive sampling' and

'judgment sampling' (Kumar 2005; Bryman, 2015). Kothari (2011) defined non-probability sampling as 'the sampling procedure which does not afford any basis for estimating the probability that each item in the population has been included in the sample'. Items for the sample are therefore deliberately selected with some exploratory purpose in mind (Kothari, 2011). Simple random sampling is used when the population is uniform or has similar characteristics in all cases. These techniques should aim to guarantee that each element has an equal chance of being selected (Kothari, 2011). This study employed simple random sampling as a sampling technique due to the fact that this technique gives each population member a chance of being selected. **Figure 3.2** below shows these two sampling designs.

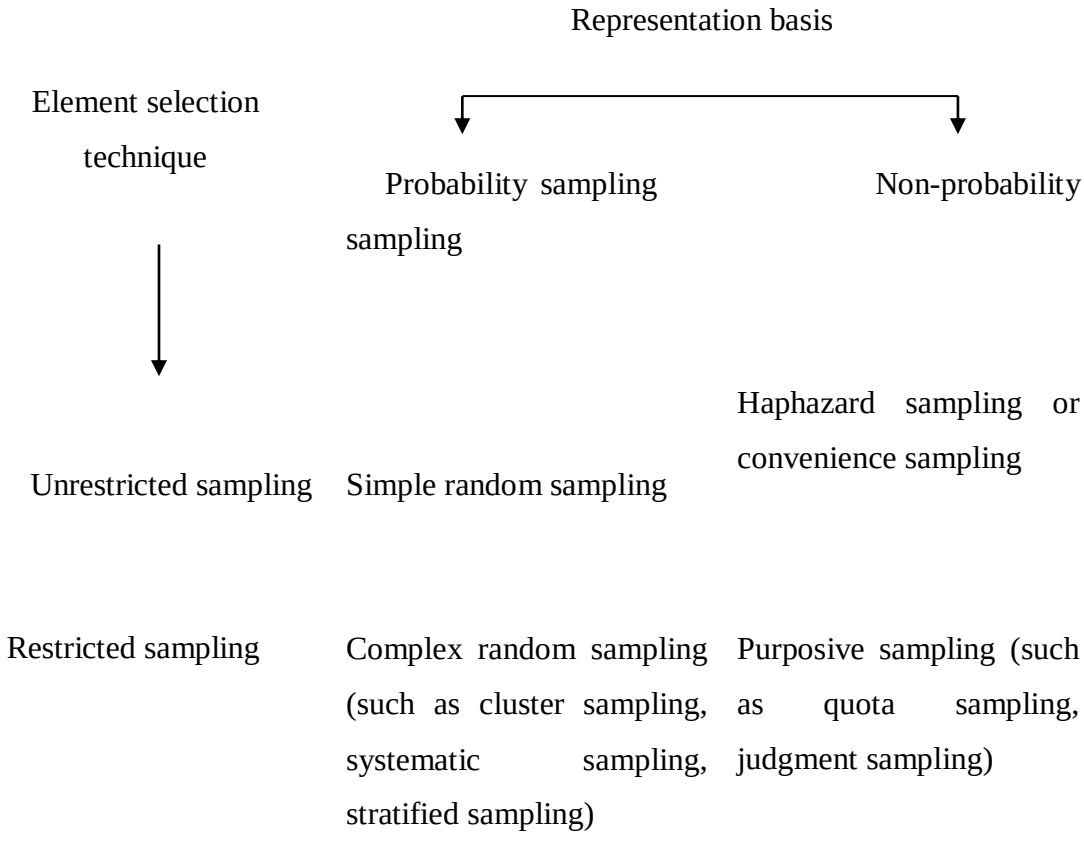


Figure 3.2: Sampling designs

(After Kothari, 2011)

3.14 Instrument design

As the questionnaire was easy to answer, respondents given were able to answer it in approximately twenty minutes. To aid this, prior appointments were made. The research instrument had 18 questions. Preliminary details of the respondent were requested in the first section while the next questions dealt with the five areas of concern by way of Likert scale tables and a question.

3.15 Data analysis

Kothari (2011) stated that quantitative analysis uses mathematical syntax operations to investigate the properties of the data. Statistics can be divided into parametric and non-parametric statistics. Parametric statistics can further be subdivided into descriptive and inferential statistics. Descriptive statistics are used to present quantitative descriptions in a manageable form. In a research study, there may be lots of measures or large numbers of people would need to be measured. Descriptive statistics help us to simplify large amounts of data in a sensible way, whereas inferential statistics go beyond describing the characteristics of data as well as the examination of correlations between the variables (Bryman, 2015).

This research will make use of descriptive statistics in analysing the data collected as this method helps us to simplify large amounts of data with ease. Different research methods ensured that data was collected in various ways. Research methods bear assumptions with regard to what may be considered knowledge and how it may be obtained (Kumar, 2005). Choice of a particular method is contingent upon the circumstances (Crotty, 1998). It is therefore common to use both primary and secondary methods whether a study is of a positivist or constructionist perspective (Kothari, 2011). It has further been argued that discrimination of the methods would lie not just in the types of questions asked of the data but also the conclusions drawn (Lin, 1998). Hence, it remains the primary duty of the researcher to eliminate those methods deemed less appropriate to the research process (Kumar, 2005; Silverman, 2010). The blending of methods with their attendant advantages and disadvantages is what makes a research successful or not (Bryman, 2015).

3.15.1 Simulation modelling – Monte Carlo technique

Simulation allows for a rich, detailed project outcome presentation. A simulation model depends on two essential elements:

- its ability to project outcomes and outcome values; and
- it can repeatedly generate scenarios driven by randomly sampled input probability distributions.

The Monte Carlo simulation model is reputed to incorporate these features for project analysis. Ultimately, the Monte Carlo simulation is a statistical tool that works on the average of probability distributions. These statistical tools could be used to test different risk scenarios particularly in comparing implemented projects. However, the Monte Carlo simulation was not conducted on the two case studies studied. This was due to the set objectives for the study that did not seek investigating aspects pertaining to the impact of risk allocation decisions. Allocated risk on the parties participating in the project was ascertained using SPSS results as well as interpretation of NPV calculations of the case study financial data.

3.16 Research reliability and validity

Validity and reliability are very critical to the research process. The degree to which the researcher measures what has been set out to quantify is known as the validity (Kumar, 2005). How accurately the research instrument measures what is intended, defines the validity. Social sciences use two approaches for establishing the validity of a research instrument: logic and statistical evidence. Establishing logical linkages between questions is established through 'justification of each question in relation with the objectives of the study' which is also known as 'face and content validity' (Kumar, 2005, p.154).

3.15.1 Construct validity

This is a complex technique that establishes the validity of an instrument using statistical procedures (Kumar, 2005). By this method, validity is ascertained by the total contribution of constructs to the variance. The instrument is rated valid when the variance attributable to the constructs is greater. Many factors affect the reliability of a

research instrument. For example, the instrument may be tested for the wording of the questions, the physical setting or the nature of interaction (Kumar, 2005). Therefore, a research instrument is usually tested for its external and internal consistency procedures.

3.16 Generic research methodology

The adopted research methodology had four stages (see **Figure 3.3**) that consisted of the following tasks:

Stage 1: This stage of the investigation involved the review of literature and collection of data from various sources to get an in-depth understanding of the subject matter of the research. The process involved consulting documents used in the implementation of PPPs. Peer reviewed journals were also read;

Stage 2: This stage generated the research instruments required in order to gather the data. Two focus group discussions were conducted with questions formulated from the literature review. These questions were discussed by the two groups and then tested through a pilot study;

Stage 3: An embedded case study approach was adopted for two implemented projects. Essentially, the case studies acted as a verification process of the research questions posited for investigation. The focus group interviews and questionnaire methods were used to obtain data from those that had participated in various PPP projects as well those that were acquainting themselves to the mode of procurement. Additionally, archival information was accessed so as evaluate the total project; and

Stage 4: This stage consisted of constructing a risk allocation decision-making model for use on Zambian project. It was validated by the focus group interviews that had been initially done.

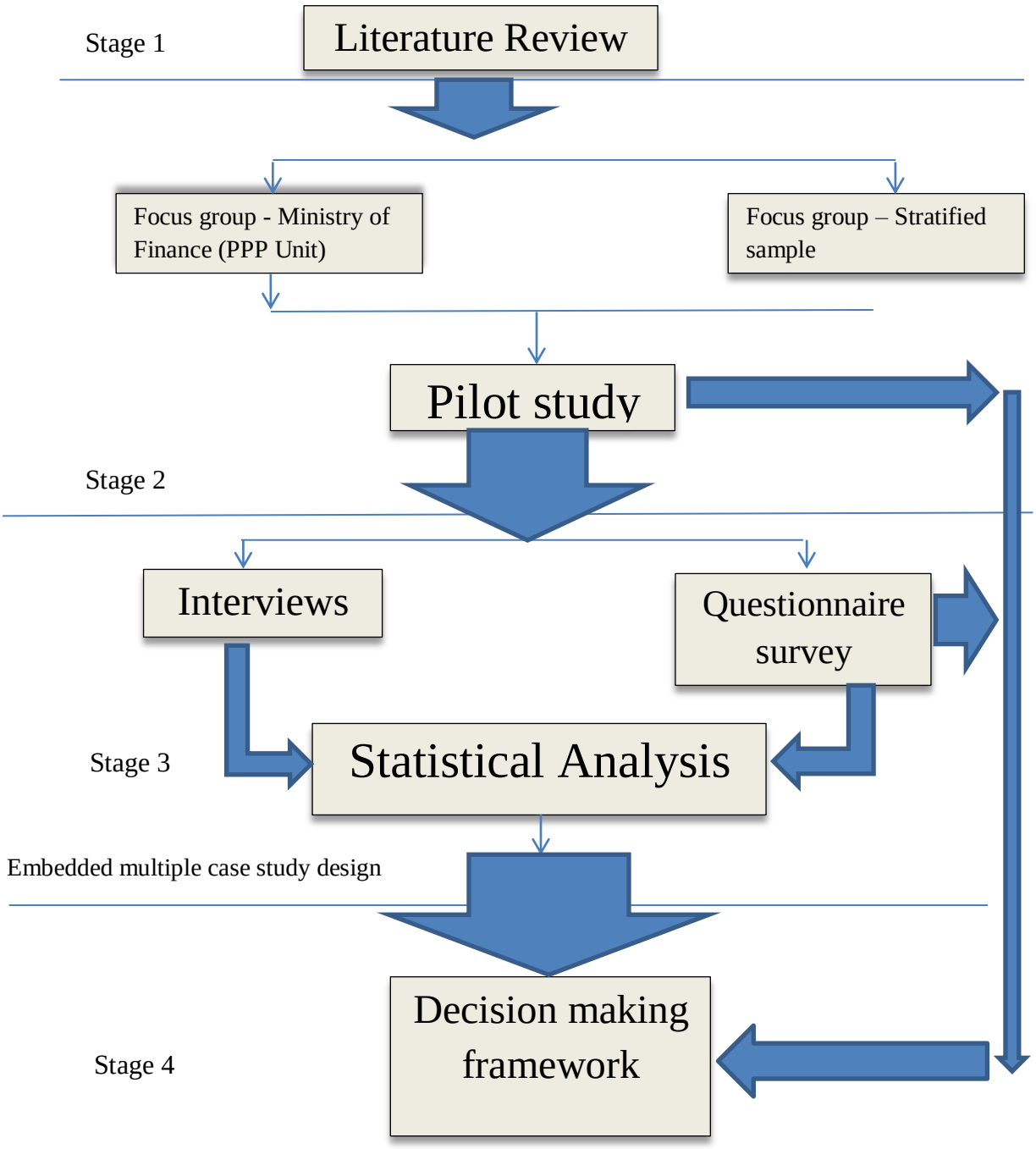


Figure 3.3: Generic research methodology

3.17 Ethical considerations

Ethics in social research covers four main areas which ensure (Silverman, 2010; Bryman, 2015):

- that participants are not in any way harmed by the research process;

- informed consent to be obtained from those participating in the research;
- there is no invasion of privacy; and
- that there must be no deception involved as data is gathered.

The matter of confidentiality was uppermost in the researcher's mind as various documents and individuals were consulted. Letters, phone calls and emails were sent to respondents so as to conform to scientific research etiquette. See attached letter and list of respondents that was used in **Appendices' B, C and D**. The researcher assured the respondents that the information given would be treated with utmost confidentiality.

Face to face interviews were conducted using a structured format (see **Appendix B**). Respondent profiles are shown in chapter 4. The basic aim of the interviews was to collect data using different ways so as to enrich the research output. Interview questions were focused at obtaining perceptions of risk in PPP projects. Interviewees were asked about their experiences and knowledge in the handling of risk from project inception to commissioning. It was important to specifically understand why respondents adopted certain strategies for risk. Further, it was anticipated that answering very sensitive questions would be met with some resistance or hesitation. Asking the questions indirectly enabled the researcher to obtain such critical information.

Notes that were written around certain questions that had been asked were later used for reflecting on issues that rose and enriched the research. The researcher constantly interacted with the data keeping a diary of matters that had been done and those that were to be attended to. All respondents as well as their organisations were recorded. Positions held by respondents were recorded during the research process. Owing to the sensitivity of some of the projects being undertaken in the energy sector, there was need to get clearance from relevant authorities particularly for financial data.

3.18 Structure of interview and questionnaire used in data collection

3.18.1 Structured interviews

A two paged set of questions was administered to a selected group of eleven professionals (see **Appendix B**). The questions were outlined very clearly and asked for details of the interviewee. Recommendations for those who participated were forwarded to the researcher through institutions that consisted of government departments (i.e. MOFNP – PPP unit), professional bodies as well as existing national associations dealing with programmes in private sector development. As PPPs are novel in Zambia, choice of those to be part of the focus group was based on:

i) their PPP proven track record;
ii) being a stakeholder holding a responsible office;
iii) their in-depth knowledge of commerce and industry; and
iv) their involvement over time in related PPP issues.

Six main aspects of PPPs were singled out together with subset questions, which were gaps identified in the literature review. The questions were aimed at having in-depth discussions with those who constituted the selected panel. Appointments were made prior to the stated date and time. It was necessary to get as much information as possible from those that were key players in the implementation of the PPPs. The questions had spaces provided for the interviewees to give their answers before the appointed discussion date sent to them through email. Interviewees were told that their responses were to be recorded in case any needed to get prior permission from their organisations. A lapse of time was therefore allowed so that interviewees could recollect incidents as well as ask the researcher questions in case of queries. All questions that were asked were of an exploratory nature. Information obtained was represented in histograms.

3.18.2. The questionnaire

The questionnaire used for the survey is as shown in **Appendix F**. Ensuring anonymity of the respondents was paramount in the mind of the researcher so as to reduce biasness. For this reason, only cell phone and email details were requested to be filled in. The type

of data collected was both categorical and ordinal. These two types of data vary particularly in the matter of ordering. Categorical data may at times be called nominal. When strictly applied, categorical data delineates data into different categories while an ordinal variable places items in defined order. **Table 3.4** below shows the format adopted for the questionnaire. For the technical questions that were asked, Likert scales were created to enable the respondent to answer in the shortest possible time.

Table 3.4: Structure of the questionnaire

Questions covered	Information required
General – provided definitions of risk, allocation, decision-making and PPPs	• Contact number • Email
(1-12) Part 1 – General	• General information about the respondent and projects done
(13) Risk identification	• Marking of factors on Likert scale
(14) Critical success factors	• Marking of factors on Likert scale
(15) Risk allocation	• Marking of factors on Likert scale
(16) Risk mitigation	• Marking of factors on Likert scale
(17) PPP project success	• Marking of factors on Likert scale
(18) Risk in construction phases	• Marking of factors on Likert scale

3.19 Summary

This chapter identified the philosophical orientation of the research with a view of selecting the most appropriate methodological approach to be employed. The chapter has also sought to describe the theoretical approach the research study had adopted. The entire research therefore had a qualitative approach coupled with quantitative analysis that would use SPSS. The Delphi method was proposed as the first step of the research design in seeking to generate a theory of risk for PPPs being implemented in developing countries. This consisted of interviews done with practitioners that had experience with PPPs. The next chapter will report on the results collected and data presented.

CHAPTER 4 : RESEARCH RESULTS

4.1 Introduction

The previous chapter gave a description of the basic research methodologies. Results obtained were interpreted using positivist and phenomelogical approaches to research. Further descriptions were given of the research design and strategies that were used to achieve the main aim and objectives of the research. Data was collected using structured interviews, questionnaires as well as two case studies. The structured interviews conducted ensured that questions were qualitatively of an 'open type'. The interviews were designed to re-tell professional experience and interviewees were selected from top management of different key stakeholders. Each interview lasted between 30 to 40 minutes. Extensive notes were taken during the interviews. The spacing of the interviews enhanced establishment of good contact and firm arrangement of dates and venues. Moreover, the spacing of the interviews also helped in the compilation of the information and progressive analysis of the data. All interviewees were given the list of questions and asked to insert their answers in the spaces provided before the recorded interviews were conducted. The philosophical ontological approach sought to establish epistemological understanding of the PPP phenomenon. A detailed questionnaire was administered to professionals that had participated in typical PPP contract preparations. The questionnaire had a total of eighteen questions aimed at getting their views concerning the four main research questions. Inevitably, this described process was both deductive and inductive. Lastly, two case studies were conducted whose aim was to verify the delineated bounds of the research concerning project success and decision-making.

4.2 Descriptive and inferential statistics

The aim of descriptive statistics is to describe the characteristics of the data on which the research study has been undertaken. Descriptive statistics are an adjunct to making numerical summaries of the sample studied. On the other hand, inferential statistics make interpretations concerning the collected data that is applied to more general conditions. By way of inferential statistics, the researcher arrives at conclusions beyond the collected data in making comparatives with existing phenomenon. Inferential

statistics emanate from a broader family known as general linear model that include the t-test, Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA, principal component analysis, partial and multiple regression analysis and other methods such as factor analysis, multi-dimensional scaling, trend-surface analysis, cluster analysis, time series analysis and discriminant function analysis (Till, 1974; Fernandes, 2009).

4.2.1 Parametric and non-parametric statistics

Research data arises from observations and experimentation that is converted to measurement scales. Measurement scales for data will differ significantly and are characterised as nominal, ordinal, interval as well as ratio. Parametric data describes the conditions from the population it is taken from. Statistics brought taken out of parametric data are considered to be the most reliable and are applied to ratio and interval type of variables. This will show the various levels of variability in the data through the use of the mean and median. However, various assumptions are made about the distribution's measurements that are considered to be substantially vast. Random sampling may be utilised for such data. The following other assumptions must be true when parametric tests are done:

i) they are a generally distributed data with normality considered as a value close to or away from zero hence determining characteristics of skewness and kurtosis. Essentially, they show how the data is spread with the Kolmogorov-smirnov test falling in this category of tests;

ii) homogeneity is a necessary hallmark;

iii) it has interval level of measurement for the data; and

iv) there is independence from data taken from different participants.

Non-parametric statistics are normally applied to nominal as well as ordinal data with random sampling used in their assessment. The use of either parametric or non-parametric, however, remains a researcher's matter of judgement. Interviews conducted with the selected focus panel were able to yield data of an ordinal and nominal nature. Visual representation of the data was given by the use of frequency tables, bar and pie

charts that were constructed from results obtained from that interviews and questionnaire survey.

4.2.2 Inferential statistics

The research questionnaire used collected both nominal and ordinal data that are described as non-parametric (Till, 1974). As the questionnaire was used for the survey, only ordinal and nominal data were collected. There are other sophisticated parametric and non-parametric tests that can be used to analyse the data that is collected. For instance, simple linear or multiple regressions could be used in predicting a value of a variable from the one or two variables, respectively. ANOVA that belongs to the parametric category is able to perform multiple t-tests and were used in the questionnaire analysis (Healey, 2013).

4.2.3 Regression analysis

Regression analysis is used as a predictor of variables from others as well as for measuring the relationship that would exist between variables (Healey, 2013). It is used for purposes of coming up with a model that enables the prediction of dependent variables from those that are independent. Hence, regression helps in quantification between a pair of variables (Till, 1994). To perform regression on variables, invariably such values would be correlated and are denoted by "*r"*, a dimensionless varying measure between +1 and -1. The resultant positive value signifies 'perfectness of relationship' while the negative is its antipathy. The central value of '0' denotes that there is 'no relationship' between the bivariate values. This research therefore used regression analysis to be able to detect what factors of allocated and mitigated risk in decision-making, contribute to PPP project success in Zambia.

4.2.3.1 Principal component analysis and factor analysis

The aim of this research cannot be finalised by merely describing the complex relationships that compose decision-making influenced by risk identification and critical success factors. It is necessary through mathematical procedures that principal parameters underlying the PPP decision-making are narrowed down to a small number of variables. As these 'new' variables are related to the originally measured variables

'by rotation in space' (Fernandes, 2009), they will unravel the variance (or underlying reason) in those initially considered. Such analysis, when plotted shows the disparity between the two sets of variables giving us principal component analysis which is the very basis for the difference. Therefore, principal component analysis is an adjunct to factor analysis that goes beyond the examination of relationships originally existing between variables. This research utilised these two analytical tools to examine decision-making done on PPP projects in Zambia.

4.2.3.2 Tests for dependent and independent variables

The Statistical Package for the Social Sciences (SPSS) programme contains a Ward chi-square statistic. The independent values whose *p*-values are smaller than 0.05 were considered significant as viewed from the output tables labelled as 'variables in the equation'.

4.1.3.3 Goodness-of-fit test statistics

Parametric and non-parametric tests use the chi-square distribution. They are employed to test the goodness-of-fit of a set of data to a theoretical distribution. The acceptable *p* value uses the usual 5 per cent confidence interval. In this wise, the goodness-of-fit achieves an insignificant chi-square value of $p > 0.05$ that indicates how well the data fits (Till, 1974).

4.2.3.4 Precision and accuracy

These two properties are vital components to a research and are associated with the data's mean value. Precision examines the reproducibility of the research method employed. It is reckoned that the precision of the better method will be closely aligned to the mean value. Other than the mean, the coefficient of variation could be expressed as a percentage of the mean value (Healey, 2013). Research must exclude systematic errors in the used method which is considered by the distance it is from the true value of the determined mean value. A t-test could be used for this purpose.

4.2.4 Factors used in the regression component and factor analysis

They were five identified variables/factors that were run in the regression analysis SPSS version 21 programme. These were appropriately labelled as dependent and independent factors. Data collected was of an ordinal and nominal nature. Variables are listed under point **4.2.4** and shown in the conceptual framework (**Figure 2.5**). The five variables used in the analysis were listed under risk identification, critical success factors, risk allocation, risk mitigation and lastly, project success. These are shown below:

i) Variable 1 - Risk Identification

a) site visit;
b) experience;
c) Case studies;
d) brain storming;
e) data bases;
f) workshops;
g) checklists;
h) external consultants;
i) intuition;
j) allied organisation input;
k) risk rating matrix; and
l) feasibility study.

ii) Variable 2 – Critical Success Factors

a) favourable legal framework;
b) sound economic policy;
c) stable macro condition;
d) strong and private consortium;
e) shared authority for public and private sectors;
f) social support;
g) thorough and realistic assessment of costs and benefits;

h) technology transfer to local enterprise;
i) save time in delivering the project;
j) benefit to local economic development;
k) transparent procurement process; and
l) good governance.

iii) Variable 3 – Risk Allocation

a) pre-investment risk is managed by private companies;
b) political risk is shared;
c) permit approval risk is handled by the public;
d) technology is shared;
e) completion risk is managed by the public and the private;
f) cost overrun is managed by the private;
g) operation risk is managed by the private;
h) regulatory risk is managed by the public;
i) political risk is managed by the public;
j) financial risk is managed by sharing;
k) debt servicing risk is shared; and
l) partnering risk is shared.

iv) Variable 4 – Risk Mitigation

a) permit approval risk is mitigated by treatment;
b) resettlement and rehabilitation risk is mitigated by transfer;
c) delay in financial closure risk is mitigated by transfer;
d) design and latent defect risk is mitigated by termination;
e) traffic revenue risk is mitigated by transfer;
f) financial risk is mitigated by transfer;
g) completion risk is mitigated by transfer;
h) cost overrun risk is mitigated by treatment;
i) political risk is mitigated by termination;
j) legal risk is mitigated by treatment;

k) debt servicing risk is mitigated by transfer; and

l) operation risk is mitigated by treatment.

v) Variable 5 - PPP project success

a) PPP projects are completed within budget;

b) PPP projects are completed within the scheduled time;

c) PPP projects are produced according to the specifications – high quality;

d) PPP project stakeholders are satisfied;

e) PPP projects generates profits in the operation phase;

f) Risk management decisions in PPP projects leads to cost savings;

g) PPP projects provide integrated solutions for public infrastructure services;

h) PPP projects contribute to local economic development;

i) PPP projects bring about technology transfer to local people;

j) PPP project risk management decisions leads to realising value for money

k) PPP project risk management decisions leads to employment creation; and

l) PPP projects lead to exchange of expertise.

4.3 Presentation of interview results

Owing to the fact that PPPs were novel in Zambia at the time of the study, a purposive sample of 11 stakeholder interviewees were selected based on their experience of the initial PPP procurement phase undertaken by the Zambian government. Five main areas were the focus of the interviews included critical success factors for PPPs, the risk identification, mitigation and allocation as well as project success. Descriptive analysis was used on the qualitative data collected (Silverman, 2010). The risk perception view of this focus group was compared to those obtained from the questionnaire survey. This ensured that what was asked in the questionnaire was further narrowed for adequate analysis to be performed on the factors using SPSS Rotated Component Matrix. The conceptual framework raised two hypotheses to be tested. There was also need to compare risk allocation perceptions for project success. In order to compare the two groups' perceptions on decision-making tools used for allocated risk to ensure project

success, Spearman's rho was used. Statistically, Spearman's rho may be used to compare the strength of association regarding opinions of two entities or more (Healey, 2011).

4.3.1 Background information on respondents

Respondents interviewed held high or middle level positions in the organisations they were employed. Five out of the eleven were senior managers while five were middle managers. One was a chair person of a private sector organisation. All the respondents were in management positions and well advanced in their careers. The average age obtained for the 11 participants was 45 years. In terms of education, all stated to have a minimum of a basic degree from reputable institutions with the exception of two manager partners who had gone for post graduate masters studies. The results in **Table 4.1** below show that the interviewees were in positions where they could accurately articulate issues related to PPPs.

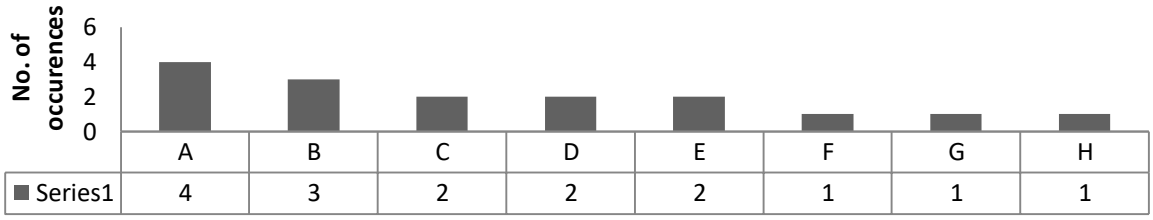
Table 4.1: Composition of focus panel interviewees

Organisation	**Positions held**	**Number interviewed**
Private Sector consultants	Managing Partners	5
Public institution	Senior middle managers	5
Private sector	Chief Executive Officer	1

4.4.1 Critical Success Factors

Interviewees were asked if the introduced PPP law had helped in the implementation of the projects in Zambia. Out of the eleven interviewed, five (50%) of the respondents agreed that critical success factors were used in PPP implementation. They were also of the view that without the PPP law, there would have been little progress in implementing this mode of instigating development. Although many PPP projects were at 'drawing board level', their increase was a sign of developer's confidence in the Zambia's PPP law. One interviewee was not sure if the introduction of the law has 'had any tangible effect'. Interviewees were asked as to what would make PPPs to succeed in Zambia. Respondents showed that 'a good working structure' was first with a response of 30%. This was followed by 'delegate work to the private sector' (21%), 'clarity of policy'

(12%), 'publicity or sensitisation of PPPs' (12%), 'developing capacities' (12%), 'thorough PPP knowledge (3%), 'stable macro-economic environment' (3%) and the last was 'government guarantees' (3%) (shown in **Figure 4.1** below).



A – Good working structure

B –Delegate work to the private sector

C –Clarity of policy

D – Publicity or sensitisation of PPPs

E –Developing capacities

F – Thorough PPP knowledge

G – Stable macroeconomic environment

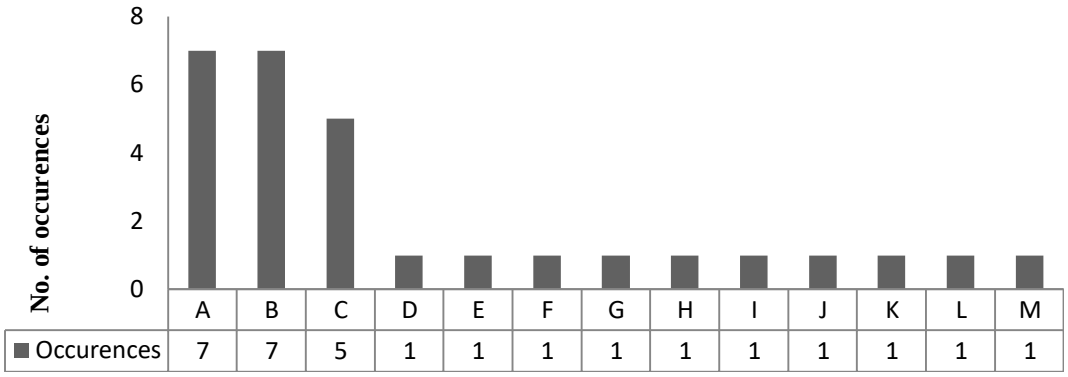
H – Government guarantees

Figure 4.1: Critical Success Factors

4.4.3 Risk allocated to parties on projects for project success

Interviewees were asked as to which risks would make the implementation of PPPs a difficult undertaking for the parties to the contract. Thirteen (13) risks were singled out as influencing the Zambian construction industry as shown in **Figure 4.2**. Of these thirteen factors, political and high interest risk received seven occurrences (which was 70% of the respondents), respectively. These were followed by 'lack of consistent policies' which had five (50%) occurrences. Ten risks had a single (10%) occurrence as shown in **Figure 4.2** denoted by D to M. On the allocation of risk, interviewees were asked as to how risks should be allocated. Interviewees gave five (50%) different responses. 'Government only' bearing the risk as well as 'the best party to handle risk' each had 3 (30%) occurrences, respectively. This was followed by the private sector bearing the risk which had 2 (20%) occurrences. Sharing risk equally and having risk

dealt with in other ways such as engaging a bank, each got a single (10%) occurrence from the interviewees.



A – Political risk
B – High interest rate risk
C – Lack of consistent economic policies
D – Foreign exchange risk
E – Global market influences difficulties
F – Land acquisition
G – Lack of design coordination risk
H – Construction
I – Force majeure
J – Social risk
K – Investment risk
L – Poor governance risk
M – Financial risk

Figure 4.2: Project Risks in Zambia

4.4.3 Investment objectives for PPP project success

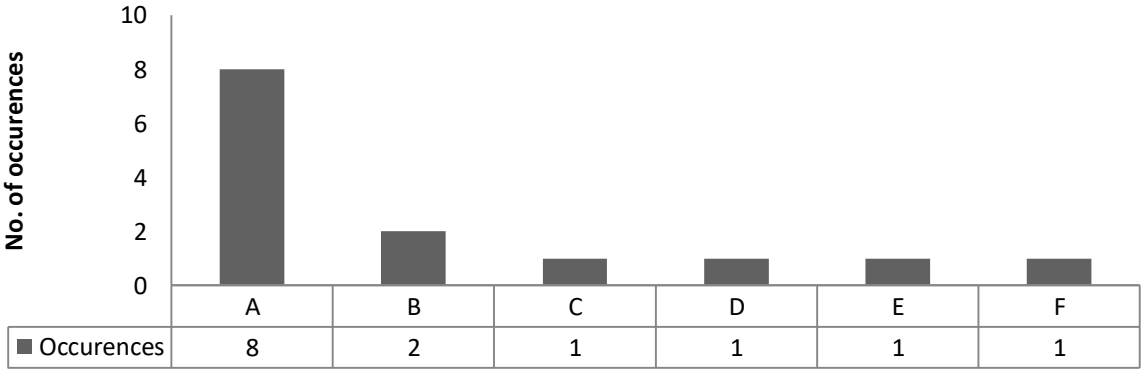
Investment objectives are themes that PPP projects often follow. Interviewees were asked to state what project success objectives the implemented PPPs had followed. The pursuit of 'social infrastructure development' had three occurrences, giving 30% response from respondents. This was followed by the private sector that has a 'profit benefit' receiving five responses from the interviewees, giving 50% response. 'Economic infrastructure' was third with four occurrences that gave 40% from the respondents. 'Improvement of social and economic infrastructure' each had two

occurrences (which was 20% from the respondents) while 'business diversification' had one occurrence (which was 10% from the respondents) indicated by the interviewees.

4.4.4 Financial decision-making tools critical for the success of PPP projects

Interviewees were asked to indicate which financial decision-making tools had been used on implemented PPP projects. A total number of 6 tools were identified as shown in **Figure 4.3** below. These were:

- financial appraisals
- cash flow analysis;
- profit and loss analysis;
- development concept;
- cost benefit analysis; and
- life cycle costing.



A – Financial appraisals B – Cash flow analysis

C – Profit and loss analysis D – Development concept

E – Cost benefit analysis F – Life cycle costing

Figure 4.3: Financial decision-making tools

Financial appraisals were the preferred decision-making tool by financial institutions as noted by eight respondents (giving a response of 80%). This was followed by cash flow analysis that had two (20%) occurrences from respondents.

4.4.4.1 Spearman's rho analysis of financial decision-making tools

Spearman's rho calculations in **Table 4:2** below were used to determine the accuracy of use for project evaluation of five of the financial decision-making tools recommended by the focus group. The five financial decision-making tools were the:

- payback period of the project;
- internal rate of return;
- life cycle costing;
- discounted cash flow; and
- net present value.

Typically, these are the tools used for evaluating the financial management of projects. Spearman's rho gives the relative strength of a relationship. The resultant assessment between 0 + 1 indicates no direct construal. However, when the rho value is squared, a proportional reduction in error (PRE) in the tools is conceivable. The given equation for obtaining the desired values was (Healey, 2009):

$$r_s = 1 - \frac{6\sum D^2}{N(N^2-1)}$$

Table 4.2: Spearman's rho calculation for financial decision-making tools

Financial decision-making tools	Mean	Field mean ranking	Focus group rating	Focus group ranking	D	D^2
Payback period of project	4.30	1	5	1.5	-0.5	0.25
Internal rate of return	3.98	2.5	4	3	-0.5	0.25
Life cycle costing	3.98	2.5	3	4.5	-2	4
Discounted cash flow	3.74	4	3	4.5	-0.5	0.25
Net present value	3.62	5	5	1.5	3.5	12.25
					$\sum D^2 = 0$	$\sum D^2 = 17$

Spearman's rho value=0.15

Using the means and accompanying field mean ranking of the focus group, a Spearman's rho value of 0.15 was obtained. By squaring 0.15, the value of 0.0225 was obtained meaning the use of the financial decision-making tools with risk assessment imbedded in them, would have a predictable reduction in error of 2.25%. This means the evaluation process would attain the accuracy of 97.75%. Discussion of the advantage of attaining such accuracy is in **Chapter 5**.

4.5 Presentation of questionnaire survey results

The questionnaire survey was compiled using various sources to catalogue the factors for critical success, risk allocation, mitigation as well as project objectives (Wang et al, 2000; Li (2003); Khanda (2011); Jefferies (2006); Chan et al (2011) and Yescombe (2007). The under-girding decision-making factors for risk identification, financial evaluation, PPP sensitisation, funding actions, lending modalities and project phases possessing greater risk were obtained from Grimsey and Lewis (2004), Akintoye and Beck (2009) as well as Akintoye et al (2003). The need to ensure that the questionnaire was user-friendly was very critical. Respondents were drawn from a broad range of eligible participants that included banks, contractors as well as consultants. This is because the subject of PPPs involves many institutions. A number of the respondents had very busy work schedules creating an intricate balance in the quest to gather data. The questionnaire was therefore mainly designed with Likert scales with values of 0 – 5 ("0" being "not applicable", "1" being "not significant", "2" being "fairly significant", "3" being "significant", "4" being "very significant" and "5" being "extremely significant"). In order to present the questionnaire in a systematic way, it was divided into 4 sections. Section 1 consisted of questions which were concerned with the respondent's experience e.g. profession, work experience particularly falling under the umbrella of PPPs. This section was designed in order to indicate the degree of reliability of the data provided by the respondents. Section 2 concentrated on the critical success factors while the third part mainly dealt with the allocation of risk and its identification. Section 4 had questions that sought to elaborate on the ramifications of risk from a financial point of view in the four main phases of a PPP development.

4.5.1 Survey response demographics

A total of 120 questionnaires were prepared and distributed to individuals that understood and had experience on the subject of PPPs. The number of returned questionnaires was 53. Of these, 5 were not properly answered leaving 47 valid ones. Respondents of the 5 rejected questionnaires showed a lack of understanding of the essence of the questions asked. The other reason may have been time constraint as Likert scales were indiscriminately marked but inconsistencies were spotted by in-built checks. The overall research response rate was calculated by the formula given by Neuman (2000):

Response rate = (total number of responses)/ (total number in sample – ineligible)

Using this formula, the response rate was:

Response rate = 53/ (120 – 5) = 0.46 x 100 = 46%

However, this research survey gave a response rate of 46%. The accepted industry norm is stated by Easterby et al (2006) to be between 25 and 30%. With a response of 46% for this research, this was an acceptable response. Other researches of a similar nature done on the international platform are shown in **Table 4.3** hence this research compares favourably with studies done elsewhere.

Table 4.3: Similar research statistics

No.	**Research topic**	**Year done**	**Author**	**Response rate**
1	A Concessionaire Decision Model Development and Application for the PPP project procurement	2011	Steve Guanwei Jang	53%
2	The Allocation of Risk in PPP/PFI Construction Projects in the United Kingdom	2005	Li Bing,	12%
3	Framework for Managing Risk in Privately Financed Market Projects in Nigeria	2012	Oluwaseyi A. Awodele	32%

There were 26 private institutions comprising of banks and various consulting firms. Consultants were drawn from members of the Zambia Institute of Architects, Surveyors Institute of Zambia, the Engineering Institution of Zambia and the Zambia Institute of Planners. These represented 55.3%. Such institutions play a key role in the decision-making processes pursuant to the implementation of PPP projects (in Zambia). There were 19 public institutions that were represented in the data that was gathered constituting 40.4% while other entities such as suppliers that participated in PPPs were only two, registering a paltry 4.3% (see **Table 4.4** below).

Table 4.4: Description of organisation

Organisation description

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Private institution	26	55.3	55.3	55.3
	Public Institution	19	40.4	40.4	95.7
	Other institutions	2	4.3	4.3	100.0
	Total	47	100.0	100.0	

28 of these organisations employed less than 100 people while 17 engaged over 500 and 2 had over 1,000 (see **Table 4.5**). These statistics are consistent with the fact that most of the PPPs that have been advertised, stem from the public sector. Although, they have been a number of floated public projects, not many of these have seen the light of day. All this data was entered in the Statistical Packages for Social Sciences (version 20) for analysis.

Table 4.5: Employees in organisations

Employees in organisations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 100	28	59.6	59.6	59.6
	Over 500	17	36.2	36.2	95.7
	Over 1,000	2	4.3	4.3	100.0
	Total	47	100.0	100.0	

Projects participated in by the organisations were housing developments, roads, commercial developments, power and energy, telecommunication and water sanitation (**Table 4.6 below**). Housing and commercial developments constituted 47 and 28%, respectively.

Housing developments relatively bear little risk. Kalemba (2011) noted how that the Luburma and Lusaka central business district markets were the first to be targeted for PPP investment. He encountered a number of difficulties in gathering his primary data. One of the reasons for this was that, the investors did not want to divulge much of what they knew (Kalemba, 2011).

Table 4.6: Projects organisations have participated in

Projects the Organisation has participated in

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Housing Development	22	46.8	46.8	46.8
	Roads	7	14.9	14.9	61.7
	Commercial Development	13	27.7	27.7	89.4
	Power and Energy	1	2.1	2.1	91.5
	Telecommunication	3	6.4	6.4	97.9
	Water Sanitation	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

4.5.3 Level of PPP experience

Respondents were asked to indicate their industrial experience as well as the period they have dealt with PPPs. There was a huge disparity in terms of the year's worked, industrial experience and PPP proficiency. Noted among the respondents was the low PPP experience. Although 64% (representing 30 respondents) indicated that their organisations had done PPPs, actual working experience on these types of contracts remained very low as **Figure 4.4** below shows. The respondent with the highest years of working experience had 14 years while the lowest had a year only. 49% of the respondents had never participated in any PPP activities while only 4.2% had bear experience in PPPs required for a country that is almost a decade since the introduction of the law.

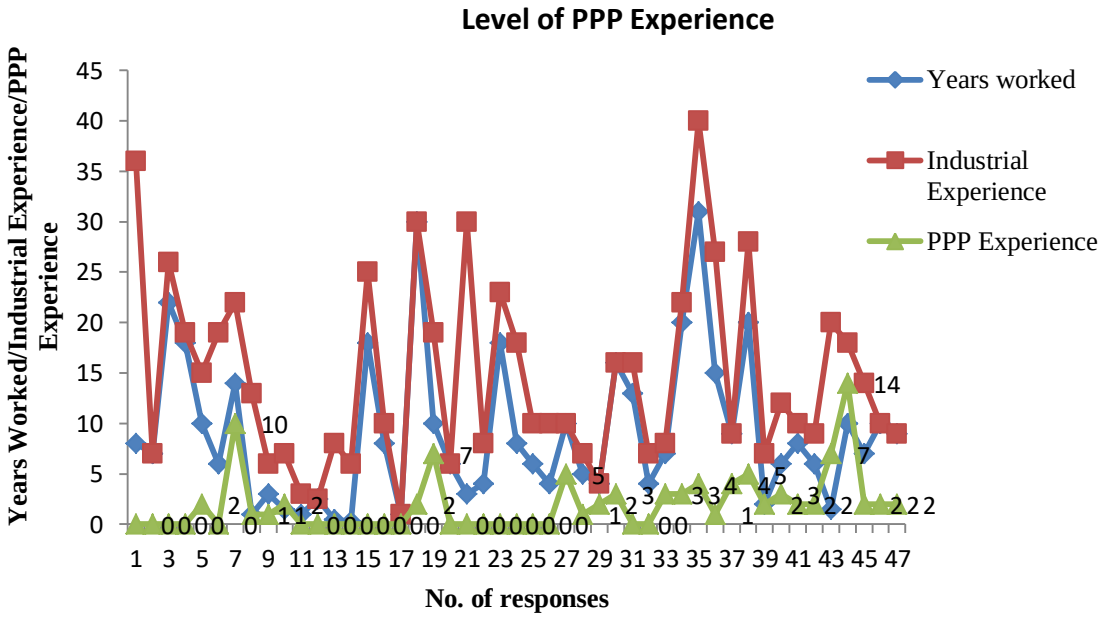


Figure 4.4: Level of PPP experience with professionals

4.5.4 Involvement in PPP projects

Respondents were asked to indicate whether they were involved in PPP projects. Only 17.02% (8 respondents) revealed they were involved in the implementation of PPP schemes while 63.83% (30 respondents) stated that they had not. Organisations that were planning to participate in this mode of ventures were 19.15% (9 respondents). From the above descriptive statistics, a paltry 17.02% were willing to engage in PPP assignments while the majority were unwilling. These results are shown in **Figure 4.5** below.

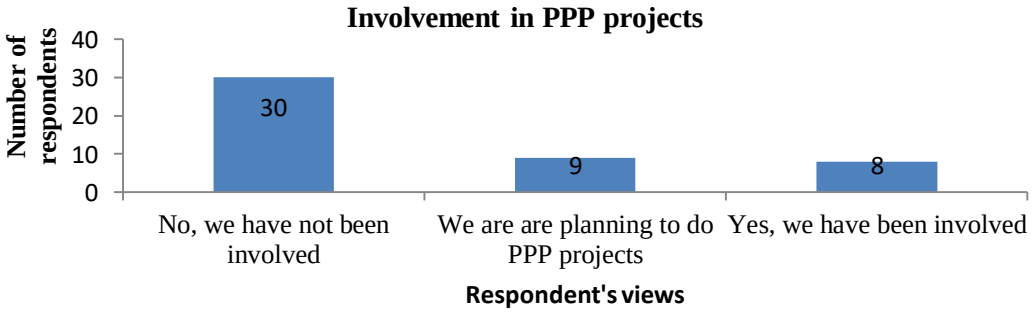


Figure 4.5: Involvement in PPP projects

4.5.5 Type of implemented PPP contracts

Respondents were asked to indicate what type of contracts implemented PPP's were executed under. 68.09% of the respondents denoted that the majority of PPP contracts were accomplished under the Build, Operate and Transfer (BOT) which had 32 responses. The other types of contracts had the following responses:

a) Design, Finance, Build, Operate and Maintain (DFBOM) had 5, giving 10.43%;
b) Build, Own, Operate and Transfer (BOOT), Rehabilitate, Operate and Transfer (ROT) and Design, Finance, Build and Maintain (DFBM) had 3 each, respectively, rendering 6.59%; and
c) Lease, Develop and Operate (LDO) had 1, registering 1.91%.

Therefore, the two most used contracts for PPPs were the BOT and DFBOM types. These are shown in **Figure 4.6** below.

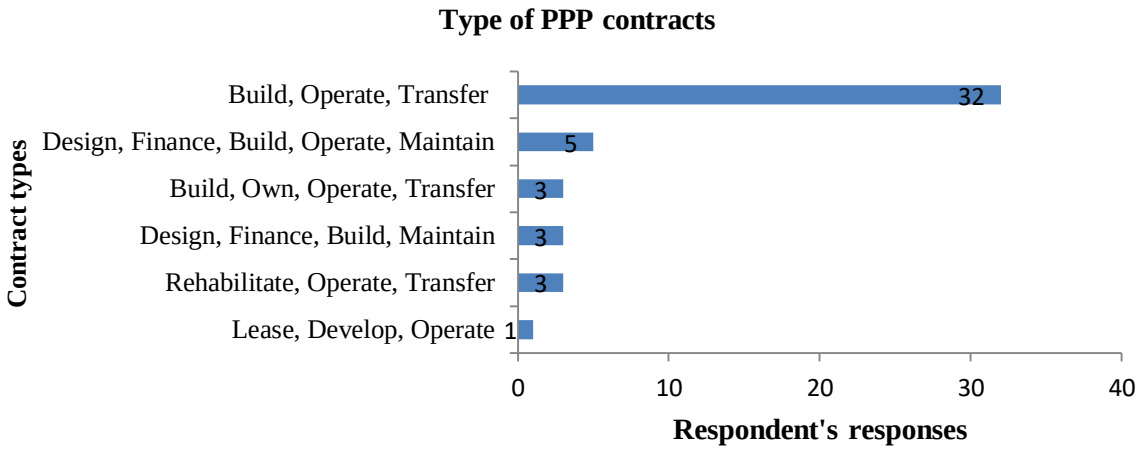


Figure 4.6: Type of PPP contracts

4.5.6 PPP Planning and construction periods

Concern was expressed over the PPP planning period. Nineteen (19) of the respondents representing 40.42% stated that planning was 'within 1 year'. Twelve (or 25.53%) respondents stated that planning took place within "1 to 3 years" while 16 (34.04%) stated that it took "more than 3 years". These results are reflected in **Figure 4.7** below. There is a perceived reduction in terms of the planning duration for PPPs.

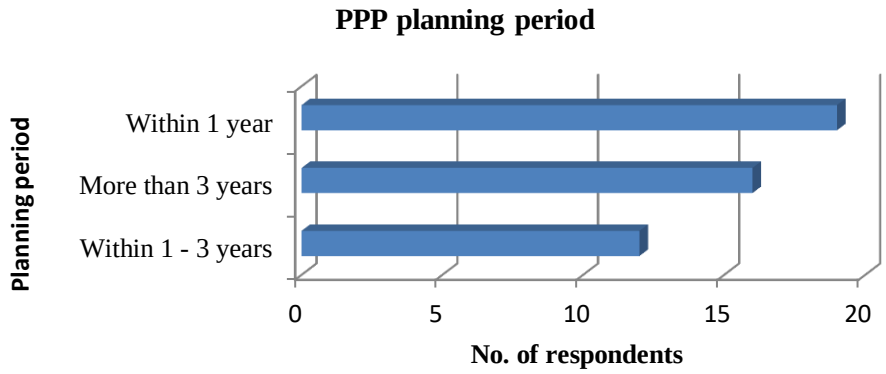


Figure 4.7: PPP Planning period

4.5.7 PPP construction period for project success

With regards to the construction period, results from the questionnaire showed that 20 representing 42.55% of the respondents stated that it was "more than three years" while 19 (denoting 40.43%) said that it was between "1 to 3 years" (see **Figure 4.8** below).

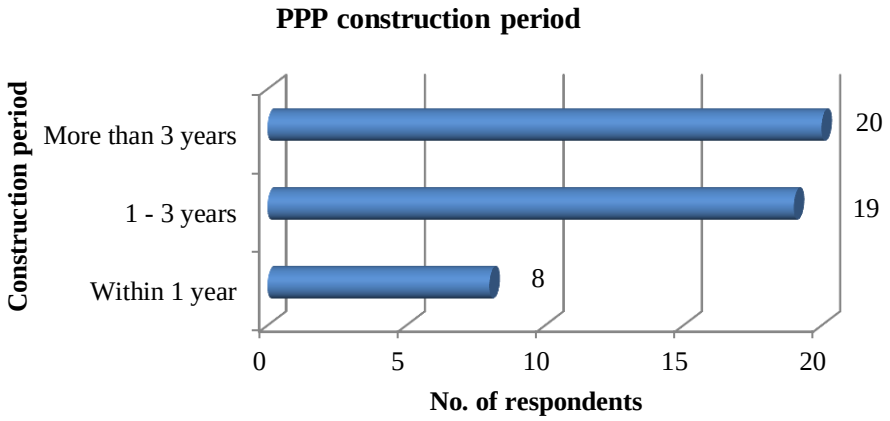


Figure 4.8: PPP construction period

8 respondents (representing 17.02%) stated that it was "within 1 year". It was noted that projects that were implemented shortly after the PPP law came into effect, were completed within 3 years. However, it was also noted that certain recent PPP projects were constructed within a year, which was commendable indeed.

4.5.8 Financial evaluation on PPP projects

Interviewees were asked to state the institutions responsible for carrying out the financial risk evaluation on projects. In-house consultancy and external consultants were the two financial risk evaluating institutions used by a total of 93.62% of the respondents, each received 46.81% respectively as shown in **Table 4.7**.

Table 4.7: Financial evaluators for PPP project

Risk evaluator	Response	Response %
In-house consultancy group	22	46.81
External consultants	22	46.81
Banks	2	4.25
PPP Unit from Ministry of Finance	1	2.13
TOTALS	47	100

Banks and the PPP Unit from the Ministry of Finance got 4.25% and 2.13%, respectively.

4.5.9 Descriptive statistics for risk identification for project success

Table 4.8 below show results for respondent's reaction for risk identification methods used. These were generated using a Likert scale which had five options. Scale options had numbers from 1 to 5 that represented 'strongly disagree', 'disagree', 'neutral', 'agree' and 'strongly agree'. The topmost four preferred methods indicated by respondents were:

(a) 'experience' with a response of 11%;
(b) 'site visit' with a response of 10.77%;
(c) 'brain storming' gave a response of 10.68%; and
(d) 'workshops' with 10.45%.

Table 4.8: Descriptive Statistics for Risk Identification

	N	Minimum	Maximum	Mean	Std. Deviation	% Response
Site visit	47	2.00	5.00	4.2766	.90174	10.77
Experience	47	2.00	5.00	4.3830	.73878	11.00
Case studies	47	1.00	5.00	3.1915	1.40864	8.46
Brain storming	47	2.00	5.00	4.2340	.88986	10.68
Data bases	47	1.00	5.00	3.2979	1.12124	8.69
Workshops	47	1.00	5.00	4.1277	1.01332	10.45
Check lists	47	1.00	5.00	3.6170	1.18969	9.37
External consultants	47	1.00	5.00	3.1064	1.37104	8.28
Intuition	47	1.00	3.00	1.6596	.75977	5.20
Allied organisation input	47	1.00	4.00	2.3830	1.07447	6.74
Risk rating matrix	47	1.00	4.00	1.6809	.72551	5.25
Feasibility study	47	1.00	4.00	1.6170	.79545	5.11
Valid N (listwise) TOTAL	47					100

4.6 Critical success factors (CSFs) influencing decisions on PPP success

The data collected on critical success factors followed a normal distribution though the data was negatively skewed with a value of -0.188 (see **Figure 4.9** below). As the subject of PPPs is novel in Zambia, respondents to the questionnaire viewed factors enumerated on the 5 point Likert scale either as ‘significant’ or ‘highly significant’. The necessity for separating the two was too minimal in the respondents’ conception. This was not surprising as the lack of development in Zambia lends itself to this inevitable conclusion. Respondents, therefore, viewed it essential that these factors be perceived as ‘extremely critical’. Vickermore (2017) utilised the cost-benefit analysis for a comprehensive evaluation of investment in transport. Asenova and Beck (2003) gave three reasons that can encourage the implementation of PPPs in Zambia. The reasons are:

- having the community benefitted through the availability of jobs;
- in fostering the commercialisation of services hence bringing a level of efficiency that the sector lacks; and

- that such ‘efficiency gains’ would have ‘a ripple effect’ of making the government build its financial resources.

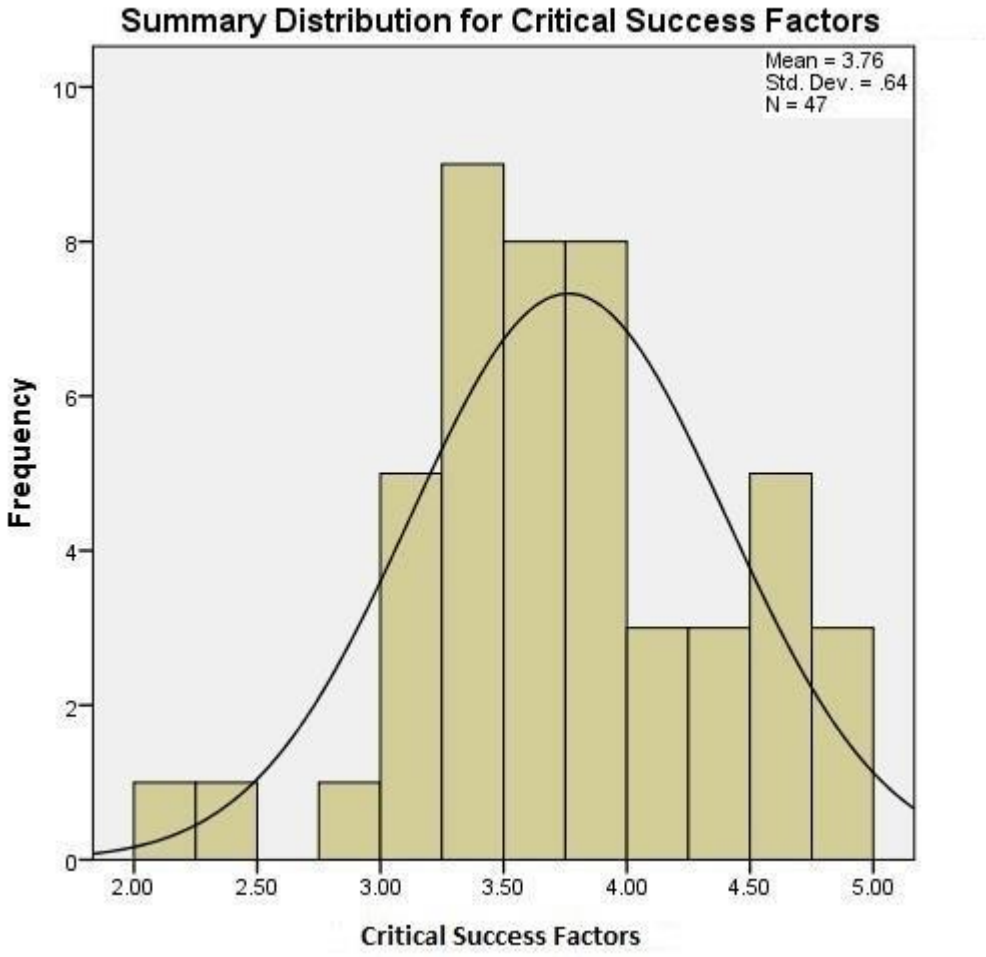


Figure 4.9: Distribution of critical success factors

On the Q-Q plot (**Figure 4.10**), the data above shows that most points were near the straight line with a few outliers. This suggested that the responses in the data had little variance in the perceptions of the respondents. Khanda (2011) noted how that PPPs are a ‘greenfield’ (or new) subject in Zambia. Being a ‘greenfield’, much has not been put in place by way of legislation and experience. Although legislation was enacted in 2009, it has been a learning process with regard to implementation of PPPs in Zambia. This explains why there has been little response with regards to the floated projects across the country by the PPP Unit in the Ministry of Finance and National Planning. With lack of response, projects remain in abeyance waiting for prospectors.

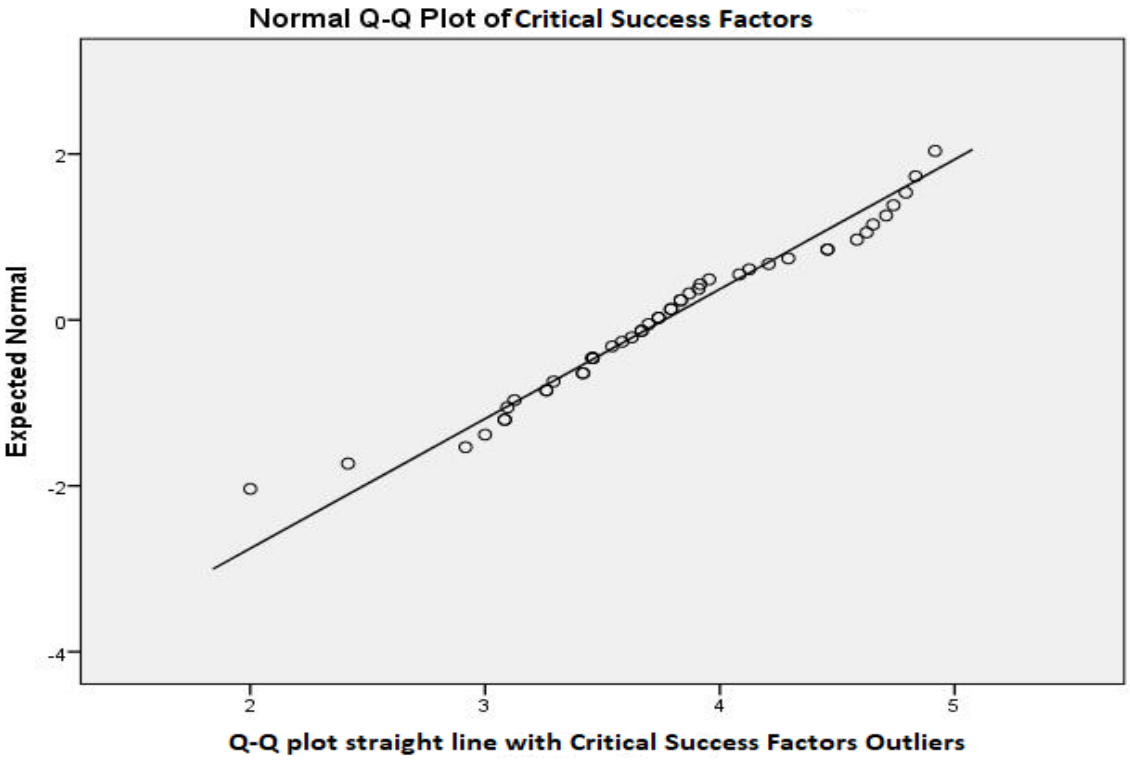


Figure 4.10: Q-Q Plot diagram for critical success factors (CSFs)

However in the case of this research, respondents felt that the implementation of PPPs needed an examination of these CSF factors for projects using the PPP mode of development in Zambia. The standard deviation in the data was recorded as 0.639 suggesting that the data had a normal distribution. The test for normality (using the Kolmogorov- Smirnov) in the SPSS revealed that it attained a significance of 0.20 and 0.258, respectively (see **Table 4.9** below). Kolmogorov- Smirnov test is given to explain the variance in opinions of a cumulative frequency distribution in a given sample (Till, 1974). In this sample, the difference in sentiments was not significant at all (which was 0.258).

Table 4.9: Tests of normality for critical success factors from SPSS

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Avg critical success factor	.086	47	.200*	.970	47	.258

*. This is a lower bound of the true significance.

Respondents were asked to specify which critical success factors could ensure success for implemented PPP projects. The four topmost CSF indicated were 'save time in delivering the project', followed by 'benefit to local economic development', 'thorough and realistic assessment of costs and benefits', and 'shared authority for public and private sectors' which got responses of 9.82%, 9.78%, 9.73% and 9.60%, respectively.

The rest of the results were:

(a) Social support (with a response of 9.55%);

(b) Stable macro condition (with a response of 9.33%)

(c) Sound economic policy (with a response of 8.96%);

(d) Favourable legal framework (with a response of 8.87%);

(e) Strong and good private consortium (with a response of 6.52%);

(f) Transparent procurement process (with a response of 6.21%);

(g) Technology transfer to local enterprise (with a response of 6.20%); and

(h) Good governance (with a response of 5.43%).

Table 4.10 below indicates respondent responses for critical success factors that could ensure success for implemented PPP projects. These are discussed in Chapter 5.

Table 4.10: Statistical descriptives for critical success factors

	N	Minimum	Maximum	Mean	Std. Deviation	% Response
Favourable legal framework	47	1.00	5.00	4.2128	1.04124	8.87
Sound economic policy	47	3.00	5.00	4.2553	.64160	8.96
Stable macro condition	47	3.00	5.00	4.4255	.74439	9.33
Strong and good private consortium	47	1.00	5.00	3.1064	1.04744	6.52
Shared authority for public and private sectors	47	3.00	5.00	4.5532	.61885	9.6
Social support	47	3.00	5.00	4.5319	.65445	9.55
Thorough and realistic assessment of costs and benefits	47	2.00	5.00	4.6170	.67737	9.73
Technology transfer to local enterprise	47	1.00	5.00	2.9574	.99907	6.2
Save time in delivering the project	47	4.00	5.00	4.6596	.47898	9.82
Benefit to local economic development	47	3.00	5.00	4.6383	.60525	9.78
Transparent procurement process	47	1.00	5.00	2.9574	1.04744	6.21
Good governance	47	1.00	5.00	2.5957	1.27960	5.43
Valid N (listwise)	47					100

4.7 Risk allocation descriptive statistics

Respondents were asked to indicate critical success factors pursued on implemented projects. 10.20% respondents stated that ‘debt servicing on projects must be shared’. This was followed by 8.34% of the respondents that felt that ‘political risk must be shared’. The third component of risk allocation concerned the ‘permit approval’ and ‘cost overrun risks’ of the PPP which got 8.30%, respectively. Respondents felt that ‘permit approval risk’ should be handled by the public while ‘cost overrun risk’ must be the responsibility of the private sector. Respondents stated that ‘pre-investment risk’ be managed by private sector companies which had a result of 8.25%. Next was ‘financial risk’ on projects which respondents stated that it should be shared between the private investor and public which got a result of 8.21%. The other responses were ‘completion

risk' being shared between the private investor and public which had a result of 8.16%; 'technology risk' should be shared which got a result of 8.12%; 'partnering is shared' got a result of 7.94%; and 'political risk is managed by the public' got a result of 7.85%.

Table 4.11 below gives the results for risk allocated on PPP projects derived from the SPSS programme. Discussion of the three influential results is in **Chapter 5**.

Table 4.11: Risk allocation descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation	% Response
Pre-investment risk is managed by private companies	47	3.00	5.00	4.5532	.68552	8.25
Political risks are shared	47	3.00	5.00	4.5957	.64806	8.34
Permit approval risk is handled by the public	47	3.00	5.00	4.5745	.65091	8.3
Technology risk is shared	47	3.00	5.00	4.4894	.77662	8.12
Completion risk is managed by the public and the private	47	3.00	5.00	4.5106	.68754	8.16
Cost overrun risk is managed by the private	47	3.00	5.00	4.5745	.65091	8.3
Operation risk is managed by the private	47	1.00	5.00	4.4468	1.01742	8.03
Regulatory risk is managed by the public	47	1.00	5.00	4.5745	.80067	8.3
Political risk is managed by the public	47	1.00	5.00	4.3617	1.07188	7.85
Financial risk is managed shared	47	3.00	5.00	4.5319	.77603	8.21
Debt servicing risk is shared	47	2.00	55.00	5.4681	7.43040	10.2
Partnering risk is shared	47	3.00	5.00	4.4043	.77065	7.94
Valid N (listwise)	47					
TOTAL						100

4.8 Risk mitigation for PPP project success

The questionnaire requested respondents to indicate which risk mitigation methods were used on PPP projects. Results from respondents indicated the following:

(a) 'permit approval risk' received the highest response of 8.727%, be treated;
(b) delay in financial closure (8.63%);
(c) completion and resettlement risk (8.45%);
(d) political risk is mitigated by termination (8.40%);
(e) legal risk (8.36%);
(f) design and latent defect risk mitigated by treatment/cost overrun risk is mitigated by treatment (8.31%);
(g) traffic revenue risk is mitigated by treatment (8.27%);
(h) debt servicing is mitigated by treatment (8.22%); and
(i) operation risk is mitigated by treatment (7.98%).

The results above show an even spread of responses. It was noted that mitigation methods respondents chose were meant to eliminate risks in the early stages of the project. These results are shown in **Table 4.12**. **Chapter 5** discusses the three influential results shown above vis-a-vis:

(a) 'permit approval risk' received the highest response of 8.727%, be treated;
(b) delay in financial closure (8.63%); and
(c) completion and resettlement risk (8.45%).

Table 4.12: Descriptive statistics for risk mitigation

	N	Minimum	Maximum	Mean	Std. Deviation	% Response
Permit approval risk is mitigated by treatment	47	2.00	5.00	4.3191	.91143	8.72
Resettlement and rehabilitation risk is mitigated by transfer	47	1.00	5.00	4.1915	1.11586	8.45
Delay in financial closure risk is mitigated by treatment	47	1.00	5.00	4.2766	1.11710	8.63
Design and latent defect risk is mitigated by treatment	47	1.00	5.00	4.1277	1.13477	8.31
Traffic revenue risk is mitigated by treatment	47	1.00	5.00	4.1064	1.12741	8.27
Financial risk is mitigated by transfer	47	1.00	5.00	3.9362	1.18696	7.90
Completion risk is mitigated by treatment	47	1.00	5.00	4.1915	1.03500	8.45
Cost overrun risk is mitigated by treatment	47	1.00	5.00	4.1277	1.11545	8.31
Political risk is mitigated by termination	47	1.00	5.00	4.1702	1.00691	8.40
Legal risk is mitigated by transfer	47	1.00	5.00	4.1489	1.19744	8.36
Debt servicing risk is mitigated by treatment	47	1.00	5.00	4.0851	1.17639	8.22
Operation risk is mitigated by treatment	47	1.00	5.00	3.9787	1.07318	7.98
Valid N (listwise) TOTAL	47					100

4.9 PPP project success descriptive statistics

The questionnaire requested respondents to indicate what elements constitute project success on PPP projects. Results from respondents were as follows:

(a) PPP management decisions leads: to employment creation, which got a result of 8.58%;
(b) PPPs guarantees high quality construction goods and exchange of expertise getting 8.53% response, respectively;
(c) PPPs brings about transfer of technology to local people, getting a result of 8.49%;
(d) to projects being done in time, which gave a response of 8.44%;
(e) PPP Project Risk management decisions leads to realising value for money which gave a response of 8.40%;
(f) PPP Projects provide integrated solutions for public infrastructure services which gave a response of 8.31%; PPP Projects generates profits in the operation phase which gave a response of 8.26%;
(g) PPP Projects stakeholders are satisfied which gave response of 8.22%;
(h) PPP Projects contribute to local economic development which gave a response of 8.17%; and
(i) PPP Projects are completed within the scheduled time which gave a response of 8.13%.

These results are shown in **Table 4.13** below. **Chapter 5** discusses the three influential results shown above vis-a-vis:

(a) PPP management decisions leads: to employment creation, which got a result of 8.58%;
(b) PPPs guarantees high quality construction goods and exchange of expertise getting 8.53% response, respectively; and
(c) PPP brings about transfer of technology to local people, getting a result of 8.49%.

Table 4.13: Descriptive statistics for PPP projects success

	N	Minimum	Maximum	Mean	Std. Deviation	% Response
PPP Projects are completed within Budget	47	2.00	5.00	4.1702	1.02828	8.44
PPP Projects are completed within the scheduled time	47	1.00	5.00	4.0213	1.22456	8.13
PPP Projects are produced according to the specifications – High quality	47	1.00	5.00	4.2128	.88308	8.53
PPP Projects stakeholders are satisfied	47	1.00	5.00	4.0638	.94188	8.22
PPP Projects generates profits in the operation phase	47	1.00	5.00	4.0851	1.05973	8.26
Risk management decisions in PPP Projects leads to Cost savings	47	1.00	5.00	3.9362	1.13068	7.94
PPP Projects provide integrated solutions for public infrastructure services	47	1.00	5.00	4.1064	1.00508	8.31
PPP Projects contribute to local economic development	47	1.00	5.00	4.0426	.97707	8.17
PPP Projects bring about technology transfer to local people	47	1.00	5.00	4.1915	.92403	8.49
PPP Project Risk management decisions leads to realising value for money	47	1.00	5.00	4.1489	.97755	8.40
PPP Project Risk management decisions leads to employment creation	47	1.00	5.00	4.2340	.91397	8.58
PPP Project leads to exchange of expertise	47	1.00	5.00	4.2128	1.04124	8.53
Valid N (listwise) TOTAL	47					100

4.10 Development phase with most risk

Respondents were requested to indicate which development phase had the most risk. Average scores showed that the construction stage was the phase with the most risk followed by the negotiation, commissioning and hand-over segments (shown in **Figure 4.11 below**).

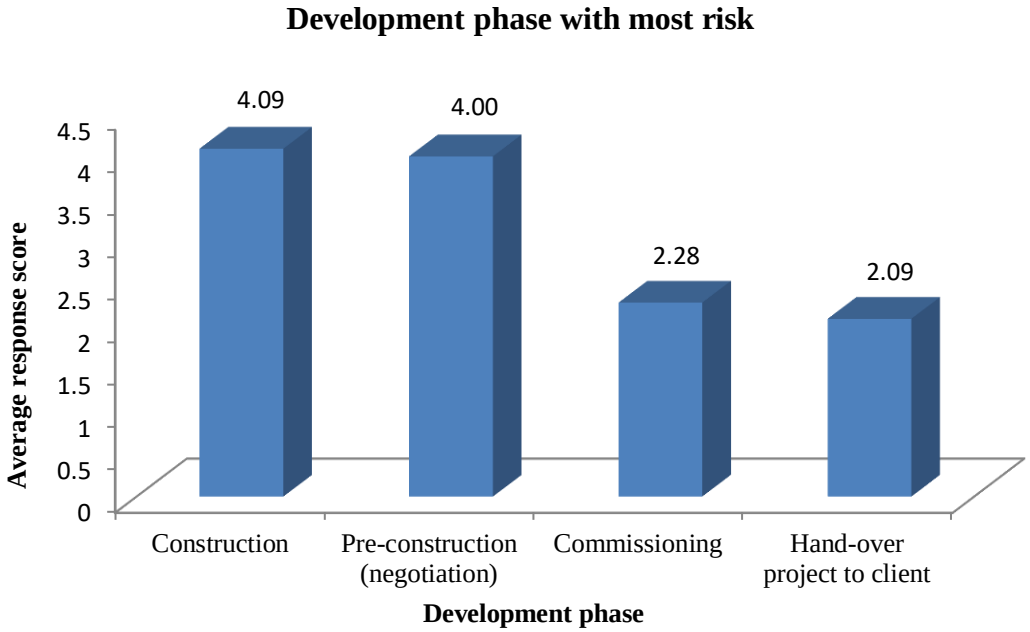


Figure 4.11: Development phase with most risk

Using average response scores, respondents indicated the following:

(a) construction phase (4.09);

(b) pre-construction (negotiation) (4.00);

(c) commissioning (2.28); and

(d) hand-over (2.09).

The above responses are discussed in **Chapter 5**.

4.11 Analysis of case studies

4.11.1 Case studies construction

Case studies fall in the ambit of qualitative study of social research. One of the major factors is to assert the case study's reliability thereby helping the researcher to focus on the main tasks and goals. During the process of developing the study, there was need to answer the problems that confront the researcher (Yin, 2009). According to Yin (2009), the construction of a case study included the following components:

- the conceptualisation of credible research objectives, methodology description and presentation of the topic under study;
- the need to enumerate what field procedures, credentials for accessing the data and exactly how the sources were located;
- what case study questions the researcher had in mind during the data collection; and
- a provision of a guide to the outline and format of the report on the case study.

It was not necessary to justify the need to enumerate the requirements of the case study as the organisation involved (i.e. the University of Zambia and the Kasumbalesa Border Post), was privy to the specifics of the project reported on. During the process of implementation on the project reported, there was greater facilitation by the people involved and the organisation, in general, in the process of the research process. The overview of the research informed the people involved and the organisation about the research main purpose and its objectives. Data collection in the field, however, involved paying attention to the collection procedures in a bid to get sufficient data from the proper informants.

Both the research studies as well as the case study questions were used to remind the researcher of the data that had been collected during the case study and other suitable resources. Other suitable resources involved looking at that tendering documentation and newspaper clips collected during the process of tendering, prior to the implementation of the project.

4.11.2 Case study Qualitative design

The design of the case study must be addressed before being carried out. There are five aspects that must be considered:

- the research questions;
- what the project proposes to do;
- the agreed units of analysis;
- linkage of the data to the project's criteria and proposition; and
- the agreed criteria on how the findings will be interpreted.

4.11.3 Ensuring quality in the case study's methodology

In order to ensure quality, the methodology must follow procedures to overcome its weaknesses so as to strengthen the analysis. Information that is obtained from various sources use triangulation to achieve the quality required. Two methods of triangulation were used in this research (Silverman, 2010):

(a) data triangulation that made use of different sources from which data was collected (i.e. by review of literature, documents, conference papers and interviews). The use of several sources of data, gave the researcher the opportunity to understand what decision-making processes had taken place in the case study thereby providing greater accuracy of the conclusions drawn; and

(b) theory triangulation that was used to enable the researcher to interpret his findings. The representation of results using different forms allows the researcher to compare his results with other similar projects done. This depends on the kind of instruments that have been designed to be able to analyse the information taken from informants. For this research, informants consisted of those that had participated in the project by way of interviewing them and their ability to give key information regarding the implemented schemes.

4.12 Overview of the two case studies

As mentioned previously in chapter 3, two executed PPP successful case studies were studied in order to obtain an in-depth understanding of the decisions made with the

allocated risks. Furthermore, the case studies aimed at answering the research objectives as well as gaps identified in the literature review. The projects were the Kasumbalesa Border Post building construction and the East Park Mall at the University of Zambia. Semi-structured interviews were used during data gathering for the case studies. This qualitative method involved the use informal discussions with government officials and business entities using implemented projects. The consultants as well as the contractor who worked on the projects were the key source of the information used by the researcher. Such discussions, though informal helped give information in a triangulated approach adopted for the research. The results of the case studies can be copied by other developing countries that have adopted the PPP mode of development. Ten (10) key individuals were interviewed in the two projects among who were the lead consultants, the contractor as well as the users of the projects. Anonymity in as far as the identity of the individuals interviewed, remains the preserve of the researcher. Semi-structured interviews were conducted as well as a tour of the facilities to get first-hand information to aid the analysis of the research.

The research main objectives included the following:

(vii) determining critical success factors (CSF's) utilised in decision-making in PPP projects;

(viii) establishing risk allocation practices considered in risk management for PPP projects;

(ix) evaluating how risk allocation impacted decision-making on the projects;

(x) establishing the relationship between risk mitigation decisions and PPP project success; and

(xi) establishing the relationship between risk allocation and PPP project success.

From the above objectives, key issues were derived through questions that subsequently brought out the sub-themes regarding:

- how decision-making was influenced by critical success factors (CSF's);

- what risk allocation practices impacted risk management;
- how risk allocation enabled decision-making;
- how risk mitigation influenced the success of the project; and
- what relationship there was between risk allocation and project success.

The use of the case studies enabled the researcher to examine how proper decision-making led to the success of the implemented projects. Furthermore, the impact of economic issues affecting the projects played a major role in their execution.

The two executed case study projects are shown in **Figure 4.12** below.

Figure 4.12: Map of Zambia, global position and location of the two case studies

After: Sichinga, 2012(http://www.google.co.zm)

4.12.1 Advantages and disadvantages of case studies

Any methodology used for purposes of research, has both advantages and disadvantages. Yin (2009) and Grunbaum (2007) posited six advantages portending to the use of case studies. These are that:

- occurrences being executed can be studied;
- facts about a phenomenon can be obtained;
- they are essentially qualitative in nature;
- various data sources are made use of;
- localised explanations can be derived hence enhancing the case study; and
- that there are various types that can be used depending on the research purpose at hand such as the building of a theory as well as exploration.

These case studies therefore provided the advantage of allowing the researcher to understand the nature of decision-making in the projects. This was done by examining allocated risk to the investors as well as the mitigation plans that were employed prior to the project's commencement. Secondly, they enabled the researcher to identify pertinent risks and critical success factors in the implemented projects. Thirdly, gathering these facts enabled the researcher to examine the processes applied in the implementation of PPP projects. A comparison of the two case studies enabled the researcher to identify features that can bring about successful projects in a developing country context.

The case study method disadvantages gave the researcher the opportunity to avoid procedures that were not effective in the inquiry process of the projects. These disadvantages have been identified in several studies by researchers such as Voss et al (2002) and Yin (2009) hence provided solutions on how they could be dealt with. The five disadvantages identified were:

- handling the problem of case study generalisation;
- that case studies generate 'soft' data;
- ethical problems when dealing with situations and people;
- the boundary difficulty of the studied case; and

- dealing with the 'Hawthorne effect' due to the researcher's presence as research is being conducted.

4.12.2 The case study generalisation problem

How credible a case study's generalisations are is the main issue in point here. It is the researcher's duty to interpret the data of the research while transferring knowledge gained to various cases, is outside the ambit of the study. However, poignant unique features of the case studies are points that could find wider application, particularly in a developing world context. These features are aspects that upcoming PPP projects could utilise in view of the difficulties governments go through in establishing new laws and modes of procurement. It was essential that there was clarity especially during the discussion and interpretation in addressing the research question as well as gaps identified in the literature review.

4.12.2.1 Generation of 'soft' data

A close examination of the two case studies convinced the researcher that quality interpretations could be gleaned from them with respects to decision-making. This was fortified by the fact that various sources had been consulted to ensure there was rigour in the analysis. Data sources that added depth to the analysis included interviews, literature as well as documents. Use of the internet, gave a 'bird's eye-view perspective' to the case studies in accessing information that could not be readily available.

4.12.2.2 Difficulty of boundary definition

The main research question was the guide in defining the boundary for the case studies. In particular, the purpose was to investigate how risk allocation had affected project success through risk identification and mitigation. Scouring through the PPP Act No. 14 also ensured that the boundaries of investigation were clarified. The aim of any PPP project is to ensure that the private sector delivers infrastructure as a partner of development. Risk allocation, as seen in the questionnaire analysis discussions, could encourage or discourage investors. Examining how these two case studies were implemented successfully, therefore, limited the boundaries of the investigation.

4.12.2.3 The 'Hawthorne effect' solution

This is an incipient difficulty owing to the researcher's presence in studying natural occurrence of situations. Invariably, it is because the researcher defines the entire process of study - starting with the topic, objectives, what questions are asked as well as analysing the findings and their meaning. Objectivity becomes necessary in attaining the needed answers.

4.13 Private sector involvement in border infrastructure development

Border infrastructure is one of the key areas that the Zambian government has targeted to improve (Banda, 2011; Sichinga, 2012). The project was targeted at improving trade routes by reducing transport costs for regional and international trade. The targeted trade corridors are shown in the **Table 4.14** below.

The objectives main of the Corridor Development Project are to (MFNP, 2010):

- reduce Africa's total import value of 11.5% which is transport related. In comparison with other regions, shows that this figure is considerably high. For example, for North America, it is at 6.7% while for Asia, it is 7.2%;
- minimise transport costs in Southern African countries which are estimated to be 12.7 per cent, which is considered to be above average; and
- help reduce Zambia transport related costs that are at 17.1%.

The PPP Act No 14 therefore aimed at involving the private sector in the development process in improving regional transit border points.

Table 4.14: Trade corridors for Development

	Corridor name	Targeted countries	Corridor details
1	Beira Corridor	Mozambique, Zimbabwe, Zambia, Democratic Republic of Congo	Road – 1,580 km Rail – 2,557 km
2	Nacala Corridor	Mozambique, Malawi, Zambia	Road and rail – 1,744 km
	Durban Corridor	South Africa, Zimbabwe, Botswana, Zambia, Democratic Republic of Congo	Road and rail – 2,731 km
4	Dar-es-Salaam Corridor	Tanzania, Zambia, Zimbabwe	Road and rail – 2,480 km
5	Walvis Bay Corridor	Namibia, Zambia, Burundi	Road and water – 3,216 km
6	Mpulungu (Great Lakes) Corridor	Zambia, Malawi, Rwanda	Road and water – 2,040 km

(After MFNP, 2010)

Zambia is a member of a number of regional groupings such as the Regional Economic Communities (RECs), Southern Africa Development Community (SADC), the Common Market for Eastern and Southern Africa (COMESA) and the New Partnership for Africa's Development (NEPAD). These regional groups agreed to improve transit border point infrastructure to the stature of 'one-stop-border-points' (MFNP, 2010). The challenge of development using PPPs, necessitated developing the private sector by the Zambian government through the Private Sector Development (PSD) programme. Several border entrances were earmarked for development. Among them were Mwami (in Eastern Province), Nakonde (in Muchinga Province), Chanida (with Mozambique), Kipushi, Jimbe, Chirundu (Central Province) and Kazungula (in Southern Province). The row out of these projects will be done on PPP basis and will extend to all other border outlets with funds permitting (Banda, 2011). According to Sichinga (2012), Zambia established the PSD Reform Programme which achieved the following milestones:

- it was sixth worldwide in getting credit;
- fourth best reformer for starting a business;
- it was the best in COMESA on getting credit;
- it was third in COMESA on overall ease of doing business;

- second in SADC in starting a business and getting credit;
- fourth in SADC in paying taxes;
- fifth in SADC in overall ease of doing business;
- it was recognised being among the top ten global reformers; and
- improved its ranking on the "Doing Business Index" from 90 in 2009 to 76 in 2010.

4.14 Kasumbalesa Border Post Building project

Kasumbalesa, also called Kasile, is a Katanga province border town which is 96km south-south-east of Lubumbashi in the Democratic Republic of Congo (DRC), and is connected by railway and road. The town is about 15km north of the mining town of Chililabombwe of Zambia. There is a lot of cross border trade business between the two towns. It is a transit route for trucks that come from the Southern Africa Development Community (SADC), mainly taking mining implements to the mineral rich DRC. The infrastructure at the border was very dilapidated for a long time Zambia ranks 66^{th} to 78^{th} out of 125 countries in terms of efficiency of customs and transparency of border administration which is really poor (Sichinga, 2012).

A border operations assessment (BOA) was conducted by the SADC/USAID Southern Africa Trade Hub (SATH) Integrated Border Management (IBM), at Kasumbalesa border. This was done on October 10-14, 2011. The assessment aimed at scrutinising the critical role played by informal traders in the SADC region's economies. Border clearance procedures for goods for small traders or informal cross border traders (ICBTs) were documented. The methodology used to carry out the BOA was through interviews in seeing what challenges traders faced. Those interviewed were:

- the Zambia Revenue Authority;
- Immigration department of the Ministry of Home Affairs;
- the Road Transport and Safety Agency (RTSA);
- Ministry of Health;
- clearing and forwarding agents; and
- members of the Zambia Cross Border Traders.

The interviews resulted in an action plan that was developed by a Joint Border Committee (JBC) that was composed of border stakeholders. Crossing time baselines were established using data collectors to record time of arrival and departure as well as extracting information from the Zambia Kasumbalesa Venture Capital (ZKVC) traffic management system. Border infrastructure and traffic management at Kasumbalesa is the responsibility of ZKVC which is a public private partnership with the Zambian government. The Zambian government provided land while the private sector funded the infrastructure. The period of operation for the PPP would be 25 years using a Build Operate and Transfer (BOT). Concern had been raised since other key government agencies such as the Zambia Bureau of Standards (ZABS) and Ministry of Agriculture, were not found at Kasumbalesa border. Goods such as copper concentrates, copper cathodes, cobalt concentrates and other minerals necessitated the establishment of these agencies at the border. On average freight trucks would spend 24 hours to cross Kasumbalesa border to DRC.

4.14.1 Kasumbalesa border challenges

Although infrastructure improvements had been noted by implementing the PPP at Kasumbalesa, they were a number of existing challenges that needed to be addressed. These were (Sichinga, 2012):

- the short border hours which were from 06:00 to 18:00;
- the need to shorten the interval for examining declaration forms to ZRA Customs called Direct Trader Input (DTI) which were submitted hourly;
- the lengthy period in collecting declaration forms by DRC officials from ZRA for verification;
- the period for bond acquittals for goods moving inland into Zambia was too long;
- staff shortages for those conducting risk assessment and physical examination hence having no checks and balances;
- stoppage of work by certain agencies during lunch breaks;
- the road infrastructure constraint giving a 6 hour window instead of 12 hours for traffic movement on either side of the border;

- physical examination being hampered by rains and hot temperatures as these are conducted in the open air;
- the porousness of the border rendered it susceptible to small traders and smugglers;
- the high user fees of US$ 133 for a 7 axle truck; and
- inadequate border facilities such as ablution blocks making drivers pay for using private showers outside the border complex.

The challenges dealing with infrastructure were immediately actioned through the signing of a PPP. This was assented to on the 26th of November, 2015 and works commenced on the 18th December 2015. Statutory instrument (SI) No. 99 of 2015 of the Government of Zambia, stipulates that the constructed facilities would recover its investment through user fees. The 'user fee', as defined by the SI "is a charge payable for a vehicle for a single border crossing into and out of the Republic, whether lader or empty". The construction of the border facilities was an implementation of Act No. 14 of 2009 PPP framework. Through the signed concessionaire agreement, a Design, Build, Operate and Transfer (DBOT) costing US$25 million, was commissioned on 4th March 2011.

4.14.2 Implementation of the border post project

The Kasumbalesa Border Post building project was wholly financed with foreign capital under a Design, Build, Operate and Transfer (DBOT) type of contract. Motivated by the government's need for the private sector to participate, the project was granted approval for implementation through the PPP Unit under the Ministry of Finance and National Planning. The project consisted of financing, designing, constructing, procuring, operation, maintenance and transfer of border buildings with a total area of 100,000 m^2. Construction costs were $25 million with an operating period of 40 years. Upon expiry of the concession period, ownership of the buildings will go to the beneficiary countries of the Democratic Republic of Congo and Zambia. The contractor used to build the project was Gomes Haulage from Zambia. This was probably because of fraternal relationships as the investors were from Israel. The project involved constructing two

similar Customs and Excise buildings and extensive parking spaces on either sides of the border. These are separated by approximately 400m of no-man's land.

4.14.3 Kasumbalesa Border Post risk profile

Risk profiling for projects is done in several ways. Yescombe (2007) used project phases in creating a risk profile while Munya (2010) used a rating criteria in evaluating PPPs. Shen et al (2006) combined the two approaches mentioned above which the researcher found appropriate in coming up with an acceptable method to profile the risks for the Kasumbalesa Border project. Shen et al (2006) categorised risks as those related to the project, government, clients, the design, contractors, consultants and the market. This methodology was adopted for **Table 4.15.** It was beyond the scope of this research to delve into risks dealing with the Democratic Republic of Congo military insurgency. The researcher therefore limited analysis of risks to decisions related to the development operations of the PPP project at the border by the investor. In deciding to implement the project, preponderant risks to the scheme were assumed by the developer.

The project risks were divided using Shen et al (2006):

- project-related risks;
- government-related risks;
- design-related risks;
- client-related risks;
- consultant-related risks; and
- market-related risks.

Inevitably, studying risks in this way offers a 'bird's eye view'. The literature review stated how that Chan et al (2011) studied 34 key risk factors inherent with Target Cost Construction Contracts projects in Hong Kong. On the other hand, Li et al (2005) reported on the findings of a survey on perception on risk allocation of 46 risk factors in PPP/PFI projects in the United Kingdom. Chan et al (2011) observed that in both researches, the 'preferred' risk allocation was determined by the level of the majority opinions. The study by Chan et al (2011) concluded that risks to be borne by the client

and contractor were in line with previous findings on risk allocation. The preferred risk allocation refers to the "perceived party best capable to manage the risk" which is the party which has more than 50 per cent ownership of such a risk, as applied in studies conducted by Li et al (2005), El-Sayegh (2008) and Joslin and Konchitchki (2018).

This study showed the relevant aspects that the project focused on encapsulated in 7-point risk factors adopted from Shen et al (2006) shown in **Table 4.15** below.

4.14.4 Kasumbalesa Investment Analysis

Development is based on decisions that have long term time frames. Owing to these extended time frames, uncertainty is a risk factor in the implementation of the project. The decision to invest depends upon internal and external factors to a project that must be accurately forecasted. Solutions to risk factors must be proportionate to the uncertainties faced by the project. The amount of uncertainty must be assessed for decisions to be made on whether to implement a project or not. Using the net present value method (NPV) estimates the opportunity cost to the investor in executing the venture. The NPV calculates future risks of projects based on economic assurances of the present day. In other words, the opportunity cost of mobilised project capital increase in light of futuristic perceived circumstances. Mobilised capital funds consist of equity and debt which is also known as the weighted average cost of capital (or WACC). This is the capital utilised in financing the project. As a discounted cash flow method, the NPV evaluates the income benefits against the cost of the investment. If the income benefits are equal or exceed the cost of the investment, the project would be deemed viable. The investor would then ensure that necessary processes follow in implementing the project.

Table 4.15: Kasumbalesa Border risks

No.	Nature of risk	Risk definition and mitigation
1	Project-related risks	These are management risks that are related to the numerous processes a project comprises of. Risks related to this were channeled through a committee that was tasked to ensure that all project related matters were to be handled expeditiously. Included in project-related risks were: • cost and time overruns resulting from poor contract management; • contractual disputes; • inclement weather patterns; • delays of tendering and selection procedures; and • poor communication between the contractual parties.
2	Government-related risks	These are risks that involve government departments facilitating the carrying out of the project. All relevant government departments were consulted so as to ensure a smooth flow of project related issues. Furthermore, a joint committee was formed to deal directly with the border infrastructure project. Risks consisted of: • inadequately approved project budgets; • deferment of obtaining permissions; • changes in government regulations and laws; • possibility of generating national instability; • inadequate project controls; and • administrative intervention.
3	Client-related risks	Clients are exposed to risks related to the implementation of the project. Project finances were adequately mobilised so that they would not impede the progress of the works. Risks comprise: • insufficient project budgets; • inadequate project brief; • disparities in project specifications; • postponements in clearing contractors claims; and • lack of project control.
4	Design-related risks	These are risks associated with the strategy of executing the project. Buildability aspects were analysed in seeing ways the project could be built. Increase to project time was an option considered in dealing with design-related risks. Risks included the following: • insufficient soil investigations; • delays in design; • addressing difficulties brought by inclement weather patterns; • obscurities and discrepancies in design; and • design fluctuations.

5	Contractor-related risks	Risks involve the capacity of the contractor in undertaking the works. The contractor's project profile was examined particularly with regards to projects he had undertaken before awarding him the construction of the border infrastructure. Included in these risks were: • insufficient calculated estimates; • monetary difficulties; • inadequate experience; • insignificant management; and • struggling to control nominated subcontractors.
6	Consultant-related risks	These consist of risks that examine the competence of the consultant. The consultant's qualifications were thoroughly scrutinised to avert risks associated with the threat of incompetence. Risks encompassed are: • deficiency of experience; • implementation delays; and • insignificant interaction.
7	Market-related risks	These are risks associated with project's inability to be fully functional in meeting business challenges. An economic exercise was conducted to ensure the viability of the project. Included were risks related to: • escalation in remunerations; • deficiencies with technical workers; • materials price rises; • unavailability of materials; and • scarcity of essential materials.

4.14.5 Advantages of Net Present Value Approach

There are three notable advantages for using the NPV. These are (Munier, 2014):

- that the opportunity cost of capital will be compared with the physical implementation of the project;
- alternative risk profiles could be simulated hence evaluating how risky the project would be so as to ascertain the level of discounting to be applied; and
- no locale is established in terms of measured rate of return or maximum payback time.

Limitations for use of the NPV have largely focused on what discount rate to be used to take into account perceived risks in the project. Munier (2014) discussed the need to use sensitivity analysis to augment observations seen with NPV limitations in deciphering economic and financial risks. Sensitivity analysis examines the likely results of output variables such as IRR, NPV and the Payback period.

4.14.6 Evaluation of the Kasumbalesa PPP project

In order to come up with cash flows for the project, the researcher obtained the Bill of Quantities as well as payment certificates that were issued during the execution of project. Figures for the project were carefully computed as shown in **Appendix G**. The resulting NPV, payback period were calculated as shown below in **Figure 4.13** taking into account the rate of inflation and interest rates that constituted the internal and external factors affecting the construction of the Kasumbalesa border project.

4.14.7 Observations on the Kasumbalesa NPV calculations

Figure 4.13 shows that the project achieved a positive NPV value of K187, 044, 870.24 (in unre-based kwacha currency) breaking even at the 35^{th} and hand-over of the BOT project at the 40^{th} years, respectively.

Discussion of the project in the line with the research objectives listed under point **4.12** is in **Chapter 5**. Several risks were identified on the project and these were related to:

(a) contractual obligations;

(b) client obligations;

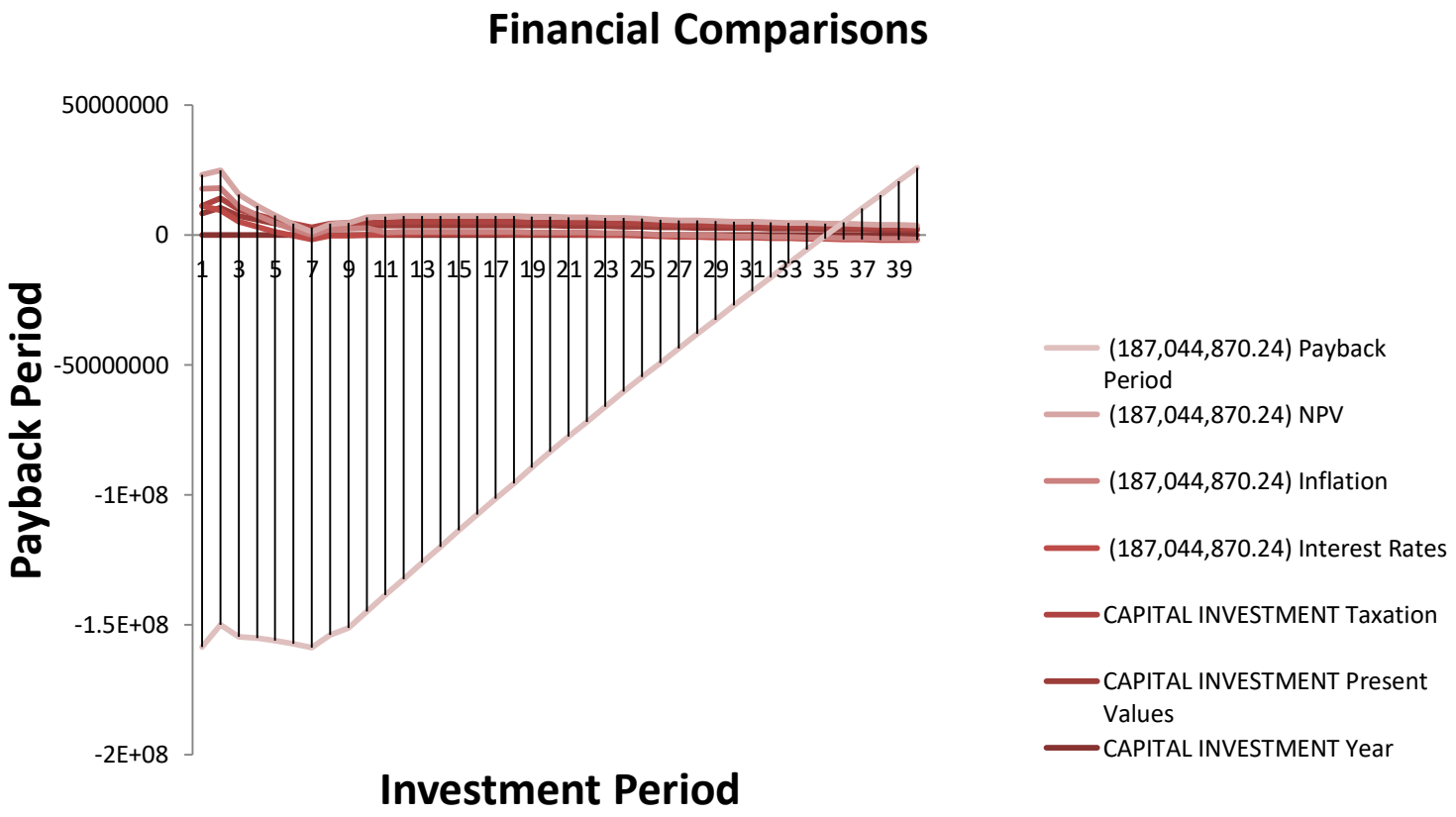


Figure 4.13: Net Present Value and Payback Financial comparisons Kasumbalesa Border project

(c) the design;
(d) the contractor;
(e) the market; and
(f) the consultants engaged.

Table 4.15 gives the full list of these risks and explains the associated repercussions on the project.

4.15 The University of Zambia East Park Mall Project – the overview

The University of Zambia was built in 1967 by the first government of Zambia. Over the years, there has been little expansion of the initial infrastructure that was built on the campus. The university is surrounded by residential areas. These include Kalundu and Roma to the north and Rhodes Park in the south west. Kalingalinga lies in the south while to the east are Handsworth Park. All these residential areas are low-density with high cost properties and their residents have a lot of potential to carry out business activities at the proposed developments. Other properties near the University include Manda Hill and Arcades shopping centres, both located on the main trunk route of the Great East Road. These facilities have a plethora of business entities such as super markets, department stores, cinemas, restaurants, pubs, banks and travel shops among other things.

Another facility with appreciable opportunity for economic activity is the University of Zambia and the Commonwealth Youth Centre. The University has several departments and disciplines with personnel in academic, administrative, technical and general support staff. There are also contracted private firms which provide various types of services to the University. The University community of students and staff offered a large pool of possible consumers of goods and services for the expected developments. There are two service stations, in Munali, in the east and at Arcades Shopping Centre in the west. Within a radius of 5 km, there are four existing hotels. These are the Protea, Blu, Chainama and Cresta Golf View hotels. The Chainama Hill's Golf Club which is east of the project's location has an 18-hole championship golf course.

4.15.1 Site topographical conditions

The land in the project area is gently inclined towards the northern direction with an average elevation of 1245m above sea level. In general, the project had little earth moving operations for the low-rise to medium structures as the land was considerably flat. The project area is well-drained with the main drain running from the south to the north through the proposed development site. Other minor drains are either on the surface or underground. They all deliver their water to the main drain which eventually empties into two lakes at the northern side of the site. Another drainage line runs along the eastern side on the Kamloops Road. It originates from the south-eastern end of the University of Zambia and eventually results in a stream that crosses Great East Road near Mumana Pleasure Resort. The water table on the eastern side of the project area is estimated to lie at 1.2m below ground and rises to 2.6m at the ridge between the drainage channels with a northerly flow of the water. Geotechnical investigations reveal that the coarse grain-soils underlying the site essentially well graded, compact to very sandy and gravel. This indicated that the soils were suitable for building foundations at shallow depths with no requirement for piling for low to medium rise buildings. Climatic conditions existing on the site are summarised in **Table 4.16**.

Table 4.16: Site climatic conditions

	Weather type	**Months experienced**	**Weather characteristics**
1	Rainfall	• November to April	• 800 to 900mm annually • Humidity high in rainy season and low in dry season
2	Winds	• Generally but mostly between July and October, light,	• Wind speeds range from 7.2km/h to 14.8km/h
3	Cold Hot	• July is the coldest, with a 7 degrees Celsius recorded • October, hottest with 32 degrees	• Mild coldness • Can be stuffy with little breeze

4.15.2 Existing site services

The project site is adequately serviced with access roads, electricity, telephone, and water supply as well as for sewerage and solid waste. Access to the University campus is

through Great East Road and Kamloops Road. The Zambia Electricity Services Corporation (ZESCO) has serviced the entire campus and receives minimum power interruptions for both the students and staff. Water for drinking and other general use is supplied by the water utility company, Lusaka Water and Sewerage Company Ltd (LWSC). Two boreholes have also been drilled to supply water for irrigating the extensive lawns. As for solid waste, the University is adequately connected to the LWSC sewer network. The whole area is linked to a local reticulation system which incorporates pumps and tanks. There is capacity to expand the system with the inclusion of new facilities. Due to the poor solid waste management in Lusaka generally, accumulation of effluent causes blockages in undesignated areas. The Zambia Telecommunication Limited (ZAMTEL) has serviced the entire campus through its Roma Township Exchange, providing excellent internet facilities to the University community.

4.15.3 East Park Mall project specifications

The development strategy for the project was to be implemented through a public private partnership based on a BOT model. This was an international competitive tender that was floated by the Zambia National Tender Board (ZNTB) in the second half of 2006 (see **Appendix H**). The University of Zambia (UNZA) conceptualised the PPP under two BOT auspices, namely:

(a) Design Build Operate (DBO) which was to be used in the implementation of the business park and hotel; and
(b) the Design Build Operate Transfer (DBOT) planned to be used for construction of the sports complex, students hostels and staff houses.

The expressions of interest (EOI) for the PPP stipulated the following requirements:

- that UNZA did not have financial resources though it had sufficient land for development;
- the land would be leased between 15 – 20 years;

- it provided UNZA to have a single point of reference for responsibility during the course of project implementation;
- formal agreements were to be entered into by the parties regarding lease fees or profit sharing terms, the period of operation, parties to the contract as well as providing for dispute resolution; and
- technical issues regarding the design/construction agreements, and operation and maintenance agreements.

4.15.4 The East Park Mall evaluation and negotiation process

The University engaged Bitrust Real Estate Consult, a private firm registered with both the Valuation Board of Zambia and the Surveyors Institute of Zambia, as external advisors for the PPP project. Bitrust provided project management technical expertise during the entire process of the evaluation and negotiation processes. Their role as external project managers were that they (Wallace, 2002):

- offered specialist skills that were not available in-house;
- assumed specific responsibilities for dealing with other external bodies such as suppliers and other consultants as risk was transferred to them;
- were commissioned through a professional services contract; and
- that the execution of their duties was more flexible as external consultants in concluding the negotiations.

The Zambia National Tender Board (ZNTB) (which was later changed to the Zambia Public Procurement Authority – ZPPA) invited eight (8) local architectural firms but only one bid met the expression of interest (EOI) criteria. Other entrants who expressed interest were a South African based consortium. Although the South African consortium's proposal was attractive in terms of its overall design, it lacked detailed technical and financial data making it unacceptable for choice. After meeting the stringent ZNTB criteria, the Zambian consortium's proposal emerged successful. PPPs necessarily have to be made of consortiums made up of architects, legal advisers, engineers for the structural, mechanical and electrical services as well as a quantity surveyor. It was gratifying to see that the Zambian consortium was well composed in the

necessary technical skills required for the undertaking of a PPP project. The composition of the consortium enhances synergy in decision-making as PPP matters cuts across professions.

The negotiation process between UNZA and the Zambian consortium was long and protracted, ensuring that points of difference were debated and agreed. These commenced on September 29, 2008 and seven meetings were held to successfully conclude the negotiations. Bitrust guided the discussions by coming up with a list consisting of queries on the plausible organisation structure for the SPV to be used on the project as well as on how the investor would deal with different risks that would affect the implementation and its operation. Eventually, the SPV that was agreed upon for the project is as shown in **Figure 4.14** below. Risks associated with the project were debated and consensus was reached by adopting particular definitions as well as mitigatory measures to be undertaken.

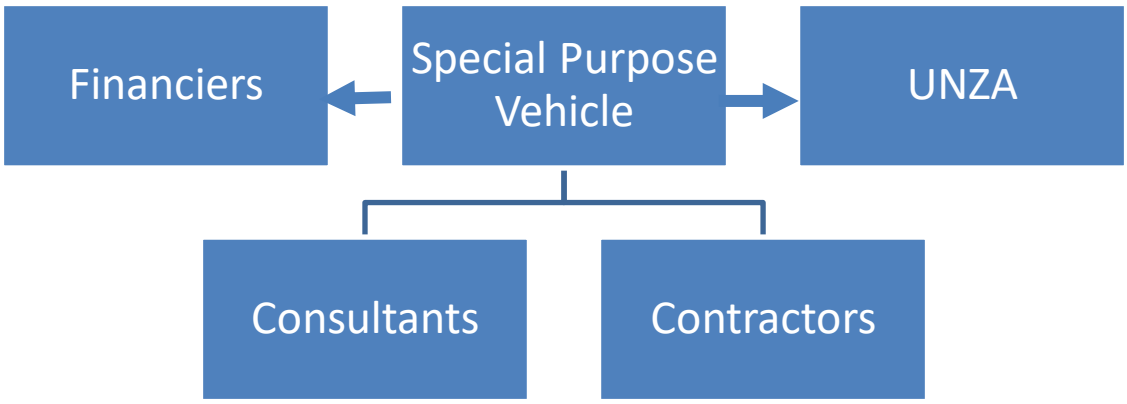


Figure 4.14: The UNZA East Park Mall Special Purpose Vehicle

The UNZA East Park Mall PPP project took special consideration of many factors. Being a novel scheme for the University, the committee that deliberated felt compelled to define the various risks that the project would face. Mitigation of risks is predicated on understanding the nature of the risk whether it stems from an epistemic or aleoteric source. As a result, the list of risks identified belonged to both groups. The manner these

were mitigated entailed a careful examination of the status quo in the nation at large. One debilitating factor was the participation of the private sector.

4.15.5 Observations on the University of Zambia East Park Mall NPV and Payback calculations

Table 4.17 gives the full list of these risks and explains the associated repercussions on the project. **Appendix G** gives financial information on the project's life cycle. Discussion of the project in the line with the research objectives listed under point **4.12** is in **Chapter 5**. Several risks were identified on the project and these were related to the:

(a) interest rate;
(b) exchange rate;
(c) residual value;
(d) construction cost overruns;
(e) insurance risk;
(f) lack of maintenance;
(g) government obligations;
(h) student unrests;
(i) market demand;
(j) operation risk;
(k) resource or input risk;
(l) technology risk;
(m) inflation risk;
(n) utility risk; and
(o) political risk.

Table 4.17 shows the definitions adopted for the various risks as well as the way such would be mitigated in the realisation of the project.

Table 4.17: Risk definitions and mitigation for the UNZA East Park Mall project

No.	Nature of risk	Risk definitions and mitigation
1	Interest rate	These were factors affecting the availability and cost of funds to a contract. If interest rates would rise, the costs of implementing the project were expected to escalate. This risk could be mitigated through the option of obtaining a fixed interest rate during the tenure of the loan being serviced. In this way, the investments would be protected from movements in the interest rates.
2	Exchange rate	This is the risk that the exchange rate will rise or fall thereby impacting on the ability of the project to service its loans. The risk of movements in the exchange rate would be managed by pegging the rental at the US$ equivalent prices so that obligations (interest rate payments) would be matched against the assets (cash inflows).
3	Residual value	This risk related to the uncertainty of the value of physical assets at the end of the contract. It would be mitigated by ensuring that a comprehensive, reliable maintenance programme was in place and implemented on regular basis. A maintenance committee was to be constituted which would include representatives from the University of Zambia.
4	Construction cost overruns	Due to price movements in the cost of materials as a result of inflation and exchange rate movements, this risk would arise. To manage this risk, the investors were advised to consider entering into fixed price contracts with all the contractors so that movements affecting the cost of materials would be transferred to contractors.
5	Insurance risk	This is the risk pertaining to the fact that all risks that are insurable as at a specific date later become uninsurable or the possibility of substantial increases in the rates at which premiums are calculated. To address this risk, self-insurance by the SPV could be necessary or if the uninsurable were to occur, termination of the PPP agreement would have force majeure with compensation to the investor.
6	Lack of maintenance	Lack of maintenance is a risk that affects (1) the cost of maintaining assets in the required condition varying with projected maintenance costs, or (2) having no maintenance carried out. To address this risk, several options were considered including performance monitoring, special security in the form of maintenance bonds. Furthermore, a Maintenance Committee would be set up with the University of Zambia being represented. The committee would be given terms of reference and reporting to the main board of the Special Purpose Vehicle (SPV). In addition to this, a maintenance plan would be devised that would be agreed upon by the University of Zambia.
7	Delays in completion of the project	This is the risk that the project would not be completed on time. To address the risk, a project flow chart would be used to monitor the progress on each activity so as ensure that all construction and support activities would be moving according to the planned schedule. In the likely event of some activities lagging behind, by constantly updating the project flow chart, corrective action would be possible to bring all

No.	Nature of risk	Risk definitions and mitigation
		activities within the planned time scale. Furthermore, all contracts with contractors would include a clause on liquidated damages to guard against deliberate delays in execution of the contracts. The delays in completing the project may also come about due to factors beyond the control of the contractors such as the shortage of materials, bad weather etc.
8	Unwarranted rental hikes	This is the risk that rental hikes may push the SPV out of business. A feasibility study was to be undertaken to assess the rentals that would be charged for the various premises and compared to what others were charging for similar properties within the same location. Furthermore, experts were to be sought that would assist in valuating appropriate rental values.
9	Government obligations	This is the risk that the SPV would not honour its obligations to the government. To address this risk, the SPV was registered with the Zambia Revenue Authority and all taxes as set from time to time would be subsequently paid. In addition, a proper management system was put in place which would place compliance with the laws of the land as priority. This would also be important in ensuring that the project received all the necessary support from the government and the local authority.
10	Student unrests	This is the risk posed by students that leads to loss of business, damage to property, etc. To address the risk posed by student unrests, insurance against loss of income would be explored. Furthermore, a fence around the area would be erected as well as a Police post so as to reduce the risk of damage to property that may be caused as a result of student unrests.
11	Not handing over project at the proper time	Through constant supervision and monitoring of the progress on the project, it will be easy to predict with accuracy when the works would be completed and on that basis, build expectations as to the date of hand over. To compliment this, since all contractors shall be on fixed price contracts, this will ensure that unnecessary delays are avoided.
12	Market demand	Property surveys done had indicated that there would be demand for office accommodation outside the congested central business district. The student hostels and staff houses will also be on demand due to the shortage of accommodation even at private colleges. This mix of tenants would ensure that there is constant demand for space. Furthermore, the design of the structures would be flexible and modern so that the buildings could weather obsolescence even after 25 years.
13	Operation risk	There was collective experience in the consortium to ensure the successful management of the properties. Discussions would be opened with international hotel chains that would express interest in running the hotel.
14	Subcontractor risk	All contractors and subcontractors would be required to arrange independent performance bonds and payments for works done would be against verifiable certificates of completion to be issued by appointed firms by the investors.
15	Resource or input risk	The investor would enter into long term contracts with suppliers of key inputs such as cement, blocks and steel to ensure their availability for the project and avoid falling to market conditions during shortages.

No.	Nature of risk	Risk definitions and mitigation
		Furthermore, a resource management tool would be put in place that will ensure that at any given time, the stores would have enough materials to last at least three weeks.
16	Technology risk	The designs of the buildings would ensure that modern architectural drawings are used that would be flexible enough to be changed in tandem with technology and preferences for the usage of the premises.
17	Inflation risk	This risk relates to the possibility that the actual inflation rate will exceed its projected rate. During the operations phase of the project, this risk would become more apparent. This risk would be mitigated by using index linked adjustments to unitary payments or user charges.
18	Utility risk	To ensure continued supply of power and water, the project would have stand by generator to provide electric energy to entire outlets within the project. In addition, a borehole would be drilled to supplement the conventional supply lines.
19	Political risk	Sources of political risk include elections and change of government policies. This may affect funding to the project as investors will naturally want to wait the elections are over. To mitigate this against this risk, the investor should ensure that a compensation clause is included in the contract with the University.

Figure 4.15 below shows that the project achieved a positive NPV value of K2, 213, 46.55 (in unre-based kwacha currency) breaking even at the 25th and hand-over of the BOT project at the 40th years, respectively.

4.16 Data Validity Tests

The aim of a reliability test is to assess the possibility of following the same procedure again and arriving at the same result. To achieve this, a clear documented procedure must be in place. Data validity ensures that the instrument used measures what is intended to be measured (Polit and Hungler, 1995). Content validity refers to the extent to which an instrument represents the factors under study. To achieve content validity, questionnaires included a variety of questions about risk allocation decision-making on development projects. Questions were based on information gathered during the literature review to ensure that they were representative of the issues towards project success in decision-making. Content validity was further ensured by consistency in administering the questionnaires. The questions were formulated in simple language for clarity and ease of understanding. Clear instructions were also given to all those who participated in the research.

4.16.1 Data reliability

Polit and Hungler (1995) referred to reliability as the degree of consistency with which an instrument measures the attribute it is designed to calibrate Adapted one-on-one interviews were carried out using the questionnaire and SPSS indicated that 83.329% of the factors in the instrument used dealt with PPP projects and were to a high degree (see **Table 4.22**).

4.16.2 External validity and replication

External validity is concerned with the ability to generalise beyond the immediate case study (Yin, 2003). In this research, the external validity was centred on whether decision-making influenced by critical success factors, risk allocation, mitigation and identification, had led to project success in Zambia.

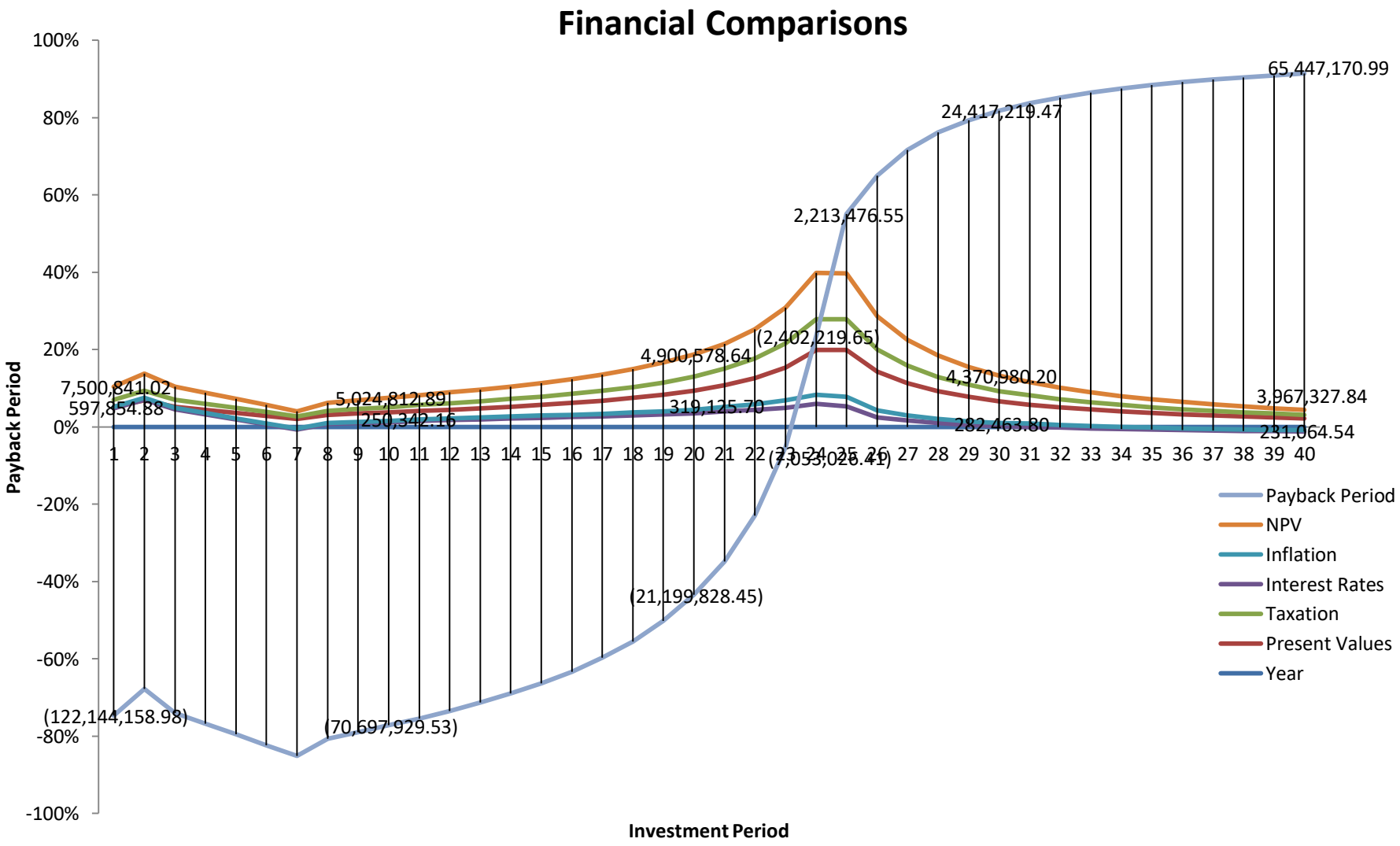


Figure 4.15: Net Present Value and Payback Financial comparisons for the UNZA East Park Mall project

4.17 Factor Analysis and Scale Validation

Exploratory factor analysis (EFA) was used with principal component analysis and a varimax rotation to extract the dimensions of PPPs. From the conceptual framework explained in **chapter 2**, decision-making factors were extracted based on the literature review, questionnaires and interviews with experts in the field. Using SPSS, principal component analysis and a varimax rotation were used to extract the dimensions of project success by means of decision-making in PPPs. Factor analysis reduces a given set of data by isolating distinct patterns in the examined phenomenon (Keppel and Saufley, 1980). The aim was to collate new variables that would be extremely interrelated as major reasons to explain the other factors in the phenomenon. Establishment of the new variables generated by principal component analysis enables comparisons to be done between samples. Using SPSS, these were generated so as to give a simpler explanation for the cause of success in PPP risk allocation decision-making on projects in Zambia.

Table 4.18 shows Eigenvalues and Extraction Sums of Squared Loadings generated from the SPSS programme. The cumulative percentage for Rotation Sums of Squared Loadings in the Total Variance Explained shown in **Table 4.18** is 83.329%. This indicated the degree to which the factors under each variable were able to talk about the same thing in PPP projects. 83.329% shows that the factors in the questionnaire dealt with PPP projects and were to a high degree.

Table 4.18: Eigenvalues and Extraction Sums of Squared Loadings

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.510	7.517	7.517	4.510	7.517	7.517
2	4.423	7.371	14.889	4.423	7.371	14.889
3	3.687	6.145	21.033	3.687	6.145	21.033
4	3.366	5.610	26.643	3.366	5.610	26.643
5	3.247	5.412	32.055	3.247	5.412	32.055
6	2.989	4.981	37.037	2.989	4.981	37.037
7	2.898	4.831	41.867	2.898	4.831	41.867
8	2.714	4.524	46.391	2.714	4.524	46.391
9	2.601	4.335	50.726	2.601	4.335	50.726
10	2.543	4.238	54.963	2.543	4.238	54.963
11	2.275	3.792	58.755	2.275	3.792	58.755
12	2.104	3.506	62.261	2.104	3.506	62.261
13	1.801	3.002	65.263	1.801	3.002	65.263
14	1.706	2.844	68.106	1.706	2.844	68.106
15	1.667	2.778	70.884	1.667	2.778	70.884
16	1.500	2.500	73.384	1.500	2.500	73.384
17	1.364	2.273	75.657	1.364	2.273	75.657
18	1.307	2.178	77.834	1.307	2.178	77.834
19	1.171	1.952	79.787	1.171	1.952	79.787
20	1.089	1.815	81.602	1.089	1.815	81.602
21	1.036	1.727	83.329	1.036	1.727	83.329
22	.988	1.646	84.975			
23	.881	1.469	86.444			
24	.804	1.339	87.783			
25	.755	1.258	89.041			
26	.728	1.213	90.254			
27	.660	1.101	91.354			
28	.648	1.079	92.434			
29	.580	.966	93.400			
30	.529	.882	94.282			
31	.441	.735	95.017			
32	.419	.698	95.715			
33	.371	.618	96.333			

Furthermore, SPSS was able to calculate the total variance in the variables used as 96.918% in eigenvalues (as in **Table 4.19** below) which showed a great consistency with

Table 4.19: Total Variance Explained

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
34	.351	.585	96.918			
35	.313	.521	97.440			
36	.301	.501	97.941			
37	.271	.452	98.393			
38	.200	.333	98.726			
39	.171	.285	99.011			
40	.141	.235	99.246			
41	.106	.176	99.422			
42	.098	.164	99.586			
43	.089	.148	99.733			
44	.063	.105	99.838			
45	.055	.091	99.930			
46	.042	.070	100.000			
47	7.732E-016	1.289E-015	100.000			
48	6.375E-016	1.063E-015	100.000			
49	3.388E-016	5.647E-016	100.000			
50	2.810E-016	4.684E-016	100.000			
51	1.876E-016	3.127E-016	100.000			
52	4.944E-017	8.240E-017	100.000			
53	-5.351E-017	-8.918E-017	100.000			
54	-1.048E-016	-1.747E-016	100.000			
55	-1.743E-016	-2.905E-016	100.000			
56	-2.823E-016	-4.706E-016	100.000			
57	-3.457E-016	-5.761E-016	100.000			
58	-4.635E-016	-7.725E-016	100.000			
59	-5.508E-016	-9.180E-016	100.000			
60	-8.075E-016	-1.346E-015	100.000			

which respondents were able to give their answers in the components examined listed in chapter 3. Eigenvalues were able to be computed on a Scree diagram as in **Figure 4.16** below**.** Although there was consistency noticed in the responses, however the diagram was negatively skewed and highly clustered. Each of the variables mentioned in chapter 3 were separately rotated to determine clear components that would be logically explained in elucidating what enables risk allocation to achieve PPP project success. This was done by obtaining data from rotated component matrix tables.

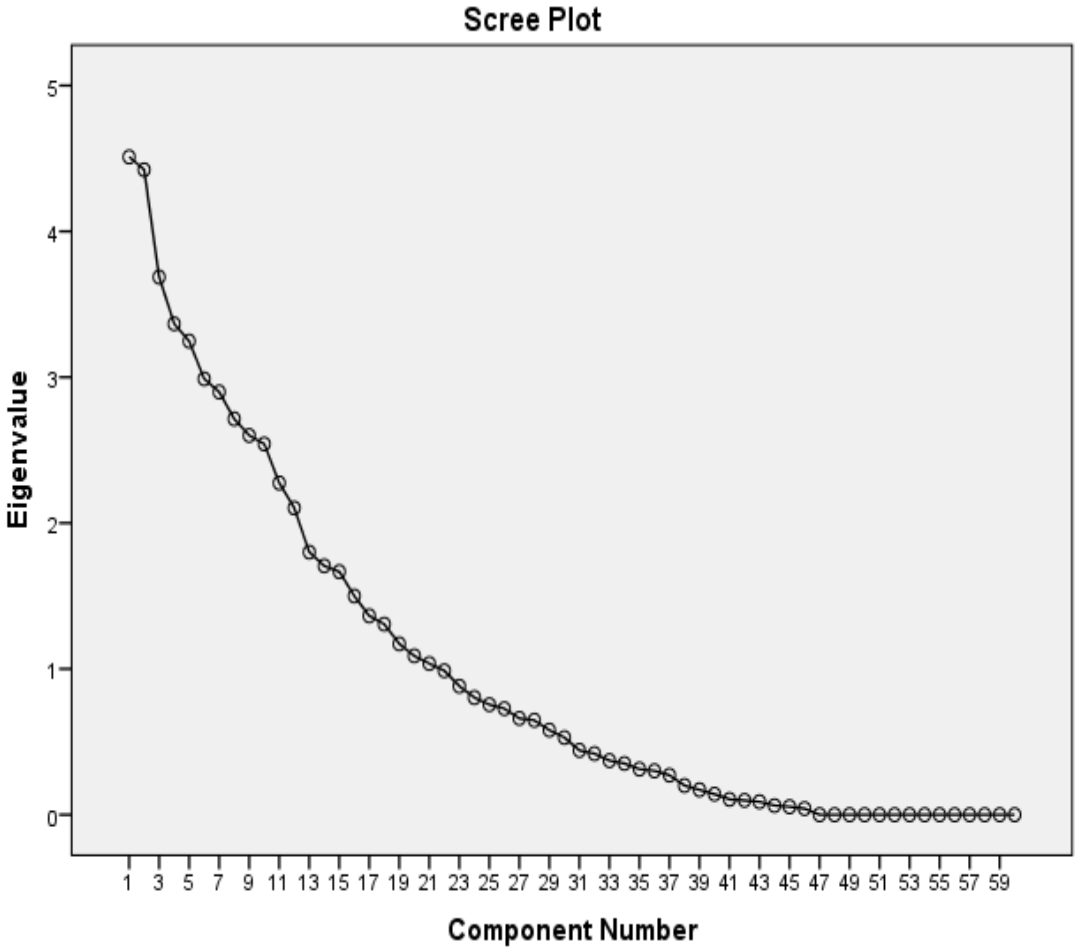


Figure 4.16: Scree diagram of eigenvalues

4.18 Rotated component matrix (RCM) tables for variables

Rotated Component Matrix tables were extracted for each of the five variables mentioned in the conceptual framework based on the Principal Component Analysis

method. The tables below show which factors under each variable were deleted and which ones were not. The undeleted variables were used for further analysis as they demonstrated high validity and consistency. The decision to delete or retain a factor was based on eigenvalues generated. Factors were deleted for double loading and producing eigenvalues below 0.5.

4.18.1 Risk identification RCM variable extraction

For **risk identification**, the variables that were deleted included variables 1, 3, 7, 9, 11 and 12. The undeleted variables 2, 4, 5, 6, 8 and 10 were used in Chapter 5 discussion as well as regression and hypothesis testing. This is depicted in **Table 4.20** below. 'Workshops' got a value of 0.703 and were first in the identification of risk.

Table 4.20: Rotated Component Matrix for Risk Identification

Rotated Component Matrix[a]						
Factor No		Component				
		1	2	3	4	5
1	Site visit				-.580	
2	Experience			.752		
3	Case studies			-.791		
4	Brain storming	.785				
5	Data bases					.752
6	Workshops	.703				
7	Check lists	.481			.666	
8	External consultants		.846			
9	Intuition					-.487
10	Allied organisation input		.815			
11	Risk rating matrix				-.639	
12	Feasibility study	-.414			.419	.610
	Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
	a. Rotation converged in 6 iterations.					

'Experience' and 'use of data bases' were second in the identification of risk for its allocation in a PPP contract with a value of 0.752 each. Others were brain storming

(0.785); allied organisation input (0.815) and external consultants (0.846). These would be discussed in next chapter 5.

4.18.2 Critical Success Factors RCM variable extraction

Table 4.21 below indicated that variables 2, 6, 8, 10 and 12 were deleted while variables 3, 4, 5 7, 9 and 11 were undeleted and were used for analysis on critical success factors (CSF).

Table 4.21: Rotated Component Matrix for Critical Success Factors

Rotated Component Matrix[a]							
Factor No		Component					
		1	2	3	4	5	6
1	Favourable legal framework				.640		
2	Sound economic policy		-.773				
3	Stable macro condition		.773				
4	Strong and good private consortium	.504					
5	Shared authority for public and private sectors	.668					
6	Social support	-.534				.635	
7	Thorough and realistic assessment of costs and benefits	.646					
8	Technology transfer to local enterprise			-.663			
9	Save time in delivering the project						.717
10	Benefit to local economic development						
11	Transparent procurement process			.593			
12	Good governance						
	Extraction Method: Principal Component Analysis.						
	a. 6 components extracted.						

Strong and good private consortiums had a value of 0.504 while 'Transparent procurement processes' had variance of 0.593. The rest of the factors with their values were 'a favourable legal framework' (0.640); 'Thorough and realistic assessment of costs and benefits' (0.646); 'Shared authority for public and private sectors' (0.668); 'Save time in delivering the project (0.717); and a 'Stable macro condition' (0.773).

4.18.3 Risk Allocation RCM variable extraction

Table 4.22 below indicated that variables 3, 5, 11 and 12 were deleted while variables 1, 2, 4, 6, 7, 8, 9 and 10 were undeleted and were used for further analysis regarding risk allocation.

Table 4.22: Rotated Component Matrix for Risk Allocation

Rotated Component Matrix[a]						
Factor No		Component				
		1	2	3	4	5
1	Pre-investment risk is managed by private companies		.806			
2	Political risks are shared	.779				
3	Permit approval risk is handled by the public			.522		.631
4	Technology risk is shared				.664	
5	Completion risk is managed by the public and the private		.523			.576
6	Cost overrun risk is managed by the private	.798				
7	Operation risk is managed by the private	.724				
8	Regulatory risk is managed by the public			.818		
9	Political risk is managed by the public					.647
10	Financial risk is managed shared		.764			
11	Debt servicing risk is shared				-.843	
12	Partnering risk is shared			-.614		
	Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
	a. Rotation converged in 10 iterations.					

The RCM extracted the following factors and their values that would be used in the discussion for risk allocation in Chapter 5: 'Political risk is managed by the public (0.647); 'Technology risk is shared' (0.664); 'Operation risk is managed by the private [developer]' (0.724); 'Financial risk is managed shared' (0.764); 'Political risks are shared' (0.779); 'Cost overrun risk is managed by the private' (0.798); 'Pre-investment risk is managed by private companies (0.806); and 'Regulatory risk is managed by the public' (0.818).

4.18.4 Risk mitigation RCM variable extraction

Table 4.23 below indicated that variables 3, 5 11 and 12 were deleted while variables 1, 2, 4, 6, 7, 8, 9 and 10 were undeleted and were used for further analysis for **risk mitigation**.

Table 4.23: Rotated Component Matrix for Risk Mitigation

Rotated Component Matrix[a]						
Factor No		Component				
		1	2	3	4	5
1	Pre-investment risk is managed by private companies		.806			
2	Political risks are shared	.779				
3	Permit approval risk is handled by the public			.522		.631
4	Technology risk is shared				.664	
5	Completion risk is managed by the public and the private		.523			.576
6	Cost overrun risk is managed by the private	.798				
7	Operation risk is managed by the private	.724				
8	Regulatory risk is managed by the public			.818		
9	Political risk is managed by the public					.647
10	Financial risk is managed shared		.764			
11	Debt servicing risk is shared				-.843	
12	Partnering risk is shared			-.614		
	Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
	a. Rotation converged in 10 iterations.					

As seen in table above, 'political risk managed by the public' is the risk mitigation method that must be implemented. Three of the top risks that must be mitigated are 'political risk is managed by public' (giving a variance of 0.647); 'technology risk is shared' (with variance of 0.664); and 'operation risk is managed by private' which gave a variance of 0.724. These three risks were expounded on during the analysis of the questionnaire discussion.

4.18.4 PPP project success RCM variable extraction

Table 4.24 below indicated that only variables 6 and 7 were deleted while variables 1, 2, 3, 4, 5, 8, 9, 10, 11 and 12 were undeleted and were used in the discussion of Chapter 5.

Table 4.24: Rotated Component Matrix for PPP Project Success

Rotated Component Matrix[a]							
Factor No		Component					
		1	2	3	4	5	6
1	PPP projects are completed within budget					.811	
2	PPP projects are completed within the scheduled time			.708			
3	PPP projects are produced according to the specifications – high quality			.744			
4	PPP projects stakeholders are satisfied			.523			
5	PPP projects generates profits in the operation phase	.739					
6	Risk management decisions in PPP projects leads to cost savings		.667				-.545
7	PPP projects provide integrated solutions for public infrastructure services		-.637				
8	PPP projects contribute to local economic development	.711					
9	PPP projects bring about technology transfer to local people					.657	
10	PPP project risk management decisions leads to realising value for money		.660				
11	PPP project risk management decisions leads to employment creation				.853		
12	PPP project leads to exchange of expertise						.868
	Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.						
	a. Rotation converged in 10 iterations.						

From the table, three of the top reasons for implementation of successful PPPs were:

(a) success of PPP projects satisfies stakeholders', giving a variance of 0.523;

(b) PPP project risk management decisions leads to realising value for money', which gave a variance of 0.660; and

(c) PPP projects contribute to local economic development', which had a variance of 0.711. These reasons for project success were expounded in Chapter 5 discussion of the results.

4.19 Summary

This chapter presented results obtained from the three research instruments used. The instruments used for the research design were panel group interviews, a questionnaire and two case studies. Quantitative data was obtained on risk allocation on implemented PPP projects in Zambia. Likert scales enabled the researcher to quantify the responses from the respondents. The ontological philosophical perspective adopted relied on themes derived from the panel group interviews. These were included in the questionnaire that sought to show the epistemological understanding that construction industry practitioners have regarding risk allocated to developers on PPP projects. Rotated Component Matrix from the SPSS programme was used to single out factors that would be potently used in the other PPP schemes.

CHAPTER 5 : DISCUSSION OF THE RESULTS

5.1 Introduction

This chapter discusses results obtained from the structured interviews, questionnaires and case studies. The research aimed at investigating how effective the introduced PPP law was in implemented projects. In doing so, there was need to establish risks considered before the projects were commissioned. Treatment of allocated risk is one that can be approached from various angles. Clarity of the philosophical assumptions made for the research design, are therefore critical to understand. This chapter begins by stating the philosophical assumptions and worldview that informs as well as shapes the theoretical framework's content. The pragmatic constructionist paradigm was used to explain PPP implementation in order to generate meaning from the projects reviewed.

5.2 The study's philosophical interpretive framework

A mixed methodology research was discussed in Chapter Three for interpreting risk allocation in the PPP mode of development. Consequently, the research strategy used was pervasively qualitative with an admixture of quantitative elements. In using structured interviews, the researcher was conscious of respondents' answers in interrogating the problem of risk allocation in PPPs. Use of structured interviews ensured that gaps presented by the participant's answers, were further elaborated. To ensure that greater value was added in the answers given, the researcher varied questions posed to participants. It was necessary to engage participants at a more personal level during this process of inquiry regarding their involvement in PPPs. This informality enabled participants to freely contribute opinions that gave clearer perspectives to the problem under study.

The study was done in the larger context of increased use of the PPPs on the African continent. To sufficiently gather data that could be used for generalisations in Zambia (as well as other African countries), inductive logic was used in analysing the structured interviews, questionnaires and case studies (Creswell, 1999). The reviewed literature on PPPs utilised transaction theory to examine risks in implemented PPP contracts. Two hypothesis were devised that were tested using SPSS. Configuration of the field data in

SPSS enabled the researcher to quantitatively analyse the results. This was because of the Likert scale used to gather the questionnaire data. The underlying philosophical belief was that PPPs could be adapted for developmental use in Zambia. Hence the adopted approach was post-positivism. This necessitated collection of verifiable data using scientific means by way of panel interviews, a questionnaire and two case studies. The validity of the means through which data was collected, structured the form of the report.

5.3 Interview results discussion

Interviews were conducted to a select panel of 11 individuals using questions in **Appendix E**.

5.3.1 Critical success factors

Interviewees were asked if they thought the introduction of Act 14 of 2009 had helped in the implementation of PPPs in Zambia. Eight critical factors were singled out as follows:

(a) good working structure;
(b) delegate work to the private sector;
(c) clarity of policy;
(d) publicity or sensitisation of PPPs;
(e) developing capacities;
(f) thorough PPP knowledge;
(g) stable macroeconomic environment; and government guarantees.

5.3.1.1 A good working structure

A good working structure was considered critical by 40% of the respondents. By a working structure is meant knowing the specific functions that need be done with efficiency by parties to the contract (Munier, 2014; Chan et al, 2011; Akintoye, 2003). The challenge of failure due to the work structure to follow procurement laws is a risk that makes the PPP contract vulnerable to legal attack (Knutson and Huettel, 2018; Yescombe, 2007). Due diligence must therefore be exercised in ensuring work progresses during the four phases of a PPP. The use of specialised external advisers

throughout the phases is considered a necessity (Wu et al, 2018; Yescombe, 2007). Specialised advisers are recommended particularly when public institutions undertake this mode of development. The reason is that public institutions lack the required experience to handle such projects. Transferring the risk of efficient day to day management of the concession eases work as a way of ensuring that the Special Purpose Vehicle (SPV) is effective. Akintoye (2003) and Li (2003) included the item of 'good working relations' under 'PPP governance". Wu et al (2018), Yescombe (2007) and Jefferies (had a similar approach when he discussed the fact that PPPs need implementation of total project management). Hueskes et al (2017) and Skelcher (2010) stated financial correctness as the reason why good governance in PPPs projects must be done. It would therefore be very difficult for good working structures to be reality when the industry lacks both skills and finances in order to better handle PPP projects.

5.3.1.2 Delegate work to the private sector

30% respondents stated that 'delegating work to the private sector'. After the privatisation exercise between 1990 – 2000 (Kazimbaya-Senkwe and Guy, 2007), there was left a lean industrial sector, mainly driven by the mines. The Zambia government, through the Private Sector Development (PSD) programme, sought to revamp the country's industrial base using this sector (Mukela, 2006). Massive redundancies were reported by the Central Statistical Office (CSO) that provided figures for the construction industry resulting from the privatisation programme as shown in **Table 5.1**. In the same report, the CSO reported that between March 1992 and December 1993, the construction industry, for both private and parastatal sectors, lost 7,600 jobs.

Table 5.1: **Employment trends for the Construction Industry, 1990 -1994**

Year	1990	1991	1992	1993	1994
Percentage reduction	33.4	33.1	27.8	22.1	18.5

(After CSO, 1992, 1993)

This gave an average loss of 345 employees, coming third after the manufacturing and agricultural sectors over the same period that lost 9,900 and 7,800, respectively. Other sectors recorded fewer losses shown in **Table 5.2** below:

Table 5.2: Labour losses after privatisation in other industries

Industry Name	Industry loss
Mining	4,500
Communications	2,600
Finance and business services	1,800
Trading restaurants	1,500
Administration and services	1,200
Power and Water	900

(After Mukalula, 1995)

It was clear that privatisation had an adverse effect on the general industry resulting in unemployment (Mukalula, 1995). Through the introduction of the PPP law, the challenge of unemployment was expected to be eradicated by the participation of the local private industry. The nature of a PPP project is to delegate work to the private sector since skills are readily available. In so doing, the private sector is expected to invest in projects and bear all the legal risks that go with PPPs (Cui et al, 2018; Alshawi, 2009; Yescombe, 2007). This is because the private sector is the party able to bear the risk through the use of funds set aside for developing the project (Shrestha et al, 2017; Akintoye, 2009; Rwelamila et al, 2003).

5.3.1.3 Clarity of policy

20% of the respondents stated that 'clarity of policy' should be a hallmark for the success of PPPs in Zambia. Respondents stated that there is some blurriness in some of the clauses of the PPP law. By 'clarity of the policy', there should be no ambiguities in the governing policy regulating the course of procurement (Hueskes et al, 2017; Bracey and Moldovan, 2006; Chan et al, 2010; Jefferies, 2006). Risks that can arise on projects due to lack of clarity in policy virtually affect every aspect of the PPP contract. Belkhir et al (2017) and Farlam (2005) advised the need to gain information on aspects dealing with policy, the concession's obligations and total project spectrum. For instance, procedures must be stipulated for the entire process regarding implementation strategy for any developers that will express interest.

5.3.1.4 Publicity and sensitisation of PPPs

20% of the respondents indicated that this was a necessary critical success factor. PPP publicity and sensitisation to the general public must be done before the implementation of projects. Communities, in which the projects are constructed, are stakeholders of the development that investors will add to their landscape (Balog et al, 2017; Bartley and Larbi, 2004). Often, projects will affect displacement of individuals in the communities which could instigate resistance. This is a risk that needs to be avoided. Communities are therefore sensitised and the project publicised so as to solicit views on the best way of implementation. Publicising the project is a way of reducing the risk of rejection by the community and a wide variety of other risks that will affect the implementation stage. Shen et al (2006) listed seven risks affecting the implementation stage that must be avoided so that a project does not go into operational disturbance and other strategic planning processes. The first two of the risks were project and government related. It is because these risks have the potential to cause cost and time overruns, poor contract management and would initiate delays in tendering and selection procedures (Shen et al, 2006). Vital decisions are therefore made at the project's inception prior to its execution. Other risks that Knutson and Huettel (2018) and Shen et al, (2006) pointed out were market, design, and contractor related. These risks affect the project in delays and ambiguities in design and the nomination and controlling of subcontractors.

5.3.1.5 Developing capacities

PPPs are a specialised field for the implementation of projects. 'Developing capacities' received a 20% response from respondents. The development of capacities regarding different aspects of PPPs needs to be done with consistency. This is because the realisation of the project depends upon the PPP law that governs it. Davies and Giovannetti (2018) pointed to the development of project management skills so as to ensure efficiency at all PPP stages as this reduces inadvertent risks. He also advised developing the legal framework, communicating lessons from *ex-ante* and *ex-post* project valuation as well as ensuring a consistent strategy and policy approach by the public sector (Yescombe, 2007). The party to benefit would therefore need to lay down the specifications that would eventually be handed over to them once the concession is

served. The potential benefits filtered out to the community in creating an incremental process of additions to their building portfolio. Developing capacities reduces the risk of random implementation of projects as key needy projects would be the ones' to take priority for development (Wu et al, 2018). In other words, allocated risk has a sense of 'owning the project'. Once capacities are developed, there will be greater responsibility in seeing projects to the end by recipient communities.

5.3.1.6 Thorough PPP knowledge

Only 10% of the respondents indicated that thorough PPP knowledge is a critical success factor. PPPs are regarded as complex projects as they fall in the category of the New Public Management (NPM) which, among many things, encourages decentralisation of government through the privatisation of public services (Ayee, 2005; Davies and Giovannetti, 2018). Inevitably, NPM working structures blur the boundary between the public and private sectors. Ayee (2005) and Yescombe (2007) saw this blurriness as a 'roll-back' of having public services being provided by the private sector instead of governments. The argument instilling NPM is that there will be greater 'value for money' that will be provided by the private sector enabling central government handle other economic matters. The type of contract by which such 'value for money' will be delivered to the general public, becomes a matter of concern. BOT contracts offer efficient delivery of services (Cedrick and Long, 2017). Risk transfer in the BOT contract naturally falls on the investor with the government being a recipient of the developed infrastructure after the determined concession period (Kartashova, 2018). The manner, in which risks are handled by development directors, is a matter of negotiation (Frank and Shen, 2016). In order to ensure that thorough knowledge infiltrates the schemes, there must be insistence that the developed infrastructure be operated on proper standards that would not compromise 'safety for profit' (Davies and Giovannetti, 2018). This would need to be the same for working conditions for those that will be driving the PPP agenda in curbing corrupt practices (Farlam, 2005; Chan et al, 2010).

5.3.1.7 Stable macro environment

Only 10% of the respondents indicated a 'stable macro environment' as a critical success factor. Countries ravaged by civil unrest fail to be benefactors of foreign direct

investment (FDI) (Malikane and Chitambara, 2017; Mourao, 2018). Bull and McNeill (2007) pointed to three reasons for increased capital inflows in developing countries:

i) reduced barriers to the movement of capital;

ii) improved technological advances for information and communication; and

iii) global policy changes.

Parker and Figuera (2010) gave five reasons that support the argument of stable macro environments for the implementation of PPPs in developing countries. These are:

i) ensuring that adequate feasibility studies are done during the planning stage so that risk sharing between the parties would not be distorted;

ii) to make detailed financial and economic analysis of the project to enable the investor service their debt and avoid the recipient government covering costs;

iii) that governments are adherent to the contractual agreements made at the on-set of the PPP project;

iv) the provision of strong institutional arrangements so as to allay delays in completion of the project as well as avoid over-estimated costs built into the project; and

v) guaranteeing of a transparent PPP competitive environment so as obtain a better deal from private investors for the project.

Above these, Frank and Shen (2016) argued for a well-developed capital market for the realisation of the macro factors listed above that make projects succeed. Stable macro environments are what make all the above factors, in fact, lead to the successful execution of PPPs with relatively fewer risks for the parties involved.

5.3.1.8 Government guarantees

This was the last item that the focus group listed as a critical success factor getting only 10% from the respondents. PPP projects are implemented at a huge cost and may often include several participating partners who will form a private consortium (Toumi et al, 2018). Debt financing is used to fund both the PPP consultative process as well as the construction of the project. The challenge posed in the delivery of PPPs is an economic one that is bounded by economic theory. Seven tasks must be performed with varying

degrees of risks to either the public or private sector that have financial implications. These are (Dahiya et al, 2017):

i) definition of the need to be met by the project;
ii) getting the infrastructure designed;
iii) securing of the finances;
iv) erecting the infrastructure;
v) having the infrastructure maintained;
vi) service provision by operating the infrastructure; and
vii) paying for the services the infrastructure is providing.

Ultimately, the financing burden is the private sector's responsibility. There are four reasons as to why this must be so (Deleze and Korkeamaki, 2018; Bettignies and Ross, 2010). Although governments are able to borrow development funds cheaply than the private sector, consortia are also known to secure finances at low rates. Secondly, the government have to repay the loan using tax payer's money whether the project succeeds or fails. The private consortia can off-set such a risk by placing the debt with a bank (Heider et al, 2015). Thirdly, the fear of being downgraded by borrowing huge development funds on international platforms can place the country's credibility as a risky investment destination. And lastly, getting such finances enables the private sector to become efficient in the delivery of the project to the public's benefit.

The private sector, nonetheless need guarantees for undertaking debt finances for PPP projects which Marzouk and Ali (2018) and Merna and Njiru (2002) categorised as follows:

i) tender guarantees;
ii) performance guarantees;
iii) advance payment guarantees
iv) retention bonds;
v) completion guarantees; and
vi) maintenance bonds.

The importance of these guarantees to PPP projects cannot be over emphasised. Each of these guarantees plays a critical role in allaying various risks that the project will face in the different phases of implementation. The above listed guarantees function as follows in PPP projects (Smith et al, 2014; Marzouk and Ali, 2018):

i) Tender guarantee

A tender guarantee is simply an assurance to the entity floating the tender of the tenderer's unequivocal acceptance if selected. In this case, the tenderer accepts to bear whatever risks will arise once awarded the project.

ii) Performance guarantees

This bond safe guards the client against poor performance by the contractor during the period of construction. Should the construction period be extended, this guarantee is to be proportionately amended. The performance bond acts as incentive for the contractor to carry out works well and to the required specifications. Typically, the value of the work covered is 10% but attracts a premium of 1 – 2% per annum of 100% (Stafylas et al, 2017; Marzouk and Ali, 2018). PPP contractual documents, like ordinary projects, ensure that that the client is covered with such a guarantee.

iii) Advance payment guarantee

In cases where money has been advanced to the contractor and is proved to be under-performing, this guarantee enables the client to recover such payments. It is therefore incumbent of the contractor to diligently execute works that will be part of the contract. Premiums are up to 1 – 2% per annum of the advanced sum (Stafylas et al, 2017).

iv) Retention bonds

In traditional contracts, retention monies consist of a percentage that is withheld and accumulates over the course of the contract for use in rectifying the defects on the project should the contractor fail to meet such a required obligation. A retention bond is used as payment to the contractor as well as his subcontractors, without the deduction of this sum during the contract process. The use of these accumulated funds simply transfers the cost of financing from the contractor to the client (Marzouk and Ali, 2018).

v) Completion guarantee

The contractor awarded the works pledges to complete them by a specified time indicated on the construction programme. Therefore this guarantee assures the client of having the project completed in the agreed time. This risk is averted by ensuring that funds are available during the course of implementation (Stafylas et al, 2017).

vi) Maintenance bonds

Maintenance bonds protect the client from the risk of non-performance and are considered as an alternative to a retention bond. This bond ensures that once the contract is completed, the contractor would perform his obligation stipulated under the defect and liability clause (Merna and Njiru, 2002).

5.4 Risks allocated to parties on projects for project success

Interviewees were asked concerning allocated risks which would make implementation of PPPs difficult. Thirteen risks were pointed out by respondents. These were:

- political risk;
- high interest rate risk;
- lack of consistent economic policies;
- foreign exchange risk;
- global market influences;
- land acquisition difficulties;
- lack of design;
- construction coordination risk;
- force majeure;
- social risk;
- investment risk;
- poor governance risk; and
- financial risk

These are discussed below.

5.4.1 Political risk

Political risk was identified as the most critical risk. Dikmen et al (2009) were able to study the influence of political risk on BOT projects. They found that what ensured 'best value' was having a project with 'minimum technical and financial risks'. But this meant that certain guarantees would need to be provided before implementation of the project. The three risk guarantees would needed to ensure 'best value' were for subordinated loans, political risk as well as international arbitration guarantee. As PPP projects use multilateral financing, these guarantees are necessary to off-set loans (Dikmen et al, 2009). With subordinated loans, investors would pay back their debts to Senior Lenders before meeting their dividend obligations (Yescombe, 2007).

Further, Saunders and Cornett (2008) argued that the political situation of a country could be used to measure that nations' risk. Wang et al (2000) proved how that political risk could be mitigated by key contract clauses in the PPP project. They singled out foreign exchange and revenue risks as being buttressed by key PPP contract clauses. The confiscated hydro project in Pakistan after the downfall of the Bhutto government is a case in point of how international arbitration guarantee saved the investors from losing their investment. Arbitration in the case was done through the United Nations and the investors were paid the money invested together with accrued interest. Wang et al (2000) noted that under political risk, were included expropriation, sequestration, adverse government action or inaction, and payment failure by government. Yescombe (2007) also noted that the initial set-up of a programme for the PPP project can be a political risk that may need to be harnessed carefully. Governments, particularly in developing countries, are in some rush to show that their policies are working.

5.4.2 High interest rates

Seventy per cent of the respondents indicated that high interest rates were a hindrance to the implementation of PPP projects. High interest rates threaten the lack of investment in any country. Local banks ensure that monies would be returned with a healthy profit (Wang et al, 2000). They further stated that this either caused investors to undertake projects or opt to invest in other countries. A reduction in interest rates therefore leads to

a promotion in borrowing and spending. A country's financial market remains sensitive to the global fiscal environment. Invariably, this introduces a volatility level that must be measured and managed so as to control the risks that interest rates would make towards development (Saunders and Cornett, 2008). The provision of sufficient liquidity in the economy would help mitigate excessive market fluctuations and avoid depressions (Ng, 2018). Investigating the volatility of interest rates reveals information about the management strategies followed by the financial sector and the effectiveness of the central bank policy (Papadamou and Markolpoulos, 2018). Choudhry and Hassan (2015) proved that exchange rate volatility has a significant effect on a country's trade policy and international trade especially when risk factors are minimised. The effect is one that discourages investment.

5.4.3 Lack of consistent economic policies

Ten per cent of the respondents stated that the lack of consistent policies is a project risk to the implementation of PPPs in Zambia. Ng (2018) discussed two of the ten rules of economic policy for a country dealing with the implementation of public infrastructure. Investor confidence is boosted by a country's consistency in such economic policies. Ahadzi and Bowles (2004) noted the effect of a turbulent economy on bidding processes making negotiations for PPPs unmanageable as well as expensive. Angelides and Xenidis (2009) pointed to critical issues of finance for PPP projects to ensure completion when threatened by inconsistent policies. The lack of strong capital markets could discourage investors. There have been several projects that have been advertised through the MOFNP PPP Unit but few to date have been implemented in Zambia. Mitigation for this risk is at three levels (Wang et al, 2000). Getting a government guarantee is the first measure. This would enable adjustment of the tariff or extension of the concession period so that the investor recoups monies invested. Secondly, the investor could get insurance to cover the political risk. And thirdly, maintaining good working relations with authorities. Ng (2018) advised of a reduction of excessive inequalities in an efficient way so as to promote equity in income and wealth distribution. Major projects that are undertaken by the government must have clear benefit-costs tests expedited by professional economists.

5.4.4 Foreign exchange risk

Developing economies, such as Zambia, use exchange rates. There are a variety of ways in dealing with the risk due to foreign exchange rates. Chan et al (2010) advised for a stable macroeconomic environment for a PPP to be successful. Wang et al (2000) proposed three separate measures of mitigation. Firstly, that the government guarantees the stability of the exchange rate by working with a fixed rate. This allows for the provision of adjusting the tariff or the possibility of extending the concession period. Secondly, through the use of a dual-currency contract where there would be provision for portions of the project to be paid in Zambian Kwacha while payments could be relegated to foreign currency. Thirdly, through the use of hedging tools such as forward and swap. Saunders and Cornett (2008) identified commercial and investment banks as major forward contract participants. A forward contract is initially negotiated between a financial institution and PPP project beneficiary with the investor acting as an intermediary. This is why governments have to guarantee PPPs once details of the project are mooted out in terms of the type of development, delivery and expiration dates of the bond given to the investor (Saunders and Cornett, 2008). The use of '*micro hedging'* in cases where a forward contract is used, the underlying deliverable asset must be closely matched to the asset (or liability) being hedged (Stafylas et al, 2017). In this way, residual unhedged risk known as '*basis risk*' could be catered for (Saunders and Cornett, 2008). Basis risk is included in the PPP life cycle and covers the *salvage value* of the project. It is however understood to both parties that the project would be handed over 'as new' to the government by the end of the concession period (Mukalula, 2007, Yescombe 2007).

5.4.5 Global market influences

The drive for PPPs is not exempt from global happenings. Government's diversification in the use of this procurement mode enables the utilisation of resources for needy areas of the economy. Whitfield (2010) argued that by so doing, though PPPs could thrive in the short-term, they have potential to distort economies in the long term and prove disastrous. Chan et al (2010) in their Hong Kong study of critical success factors established the necessity of a stable macro environment. Furthermore, Chan et al (2010)

advised for a better understanding of various risks that would affect a project's success. This would enhance better negotiation periods by stakeholders so as to harness the full potential of the businesses they could benefit from in the PPP project (Boamah, 2017). Decisions for tariff adjustment and extension of the concession period would need to be made to deal with this risk (Wang et al, 2000). The concessionaire could also obtain government guarantee to provide financial help, if such would be needed.

5.4.6 Land acquisition difficulties

This is one risk that received a 10% occurrence during the focus group interview. Due to the need for development, there is a readiness for land to be made available for investment when there are no shortages of land. Chowdhury (2013) noted how the acquisition of land could be a problem in less developed countries (LDCs). He reported that there were 60,000 local disturbances in China in the year 2005 when various state projects were undertaken across the nation. Eviction of the locals is not at all taken kindly by governments without compensation. Wang (2007) argued that China's adoption of international custom and practices had benefited the country as well as its citizens in attracting investors. Costs related to the acquisition of the land should be included as part of the overall project costs (Chowdhury, 2013).

5.4.7 Lack of design

Only 10% of the respondents indicated that this was a risk to be contended with on PPP projects. Implementation without laid out designs, endangers their success of PPP projects. Zou et al (2007) established that design was one of the risk factors that was essential to the success of a PPP project. Ahadzi and Bowles (2004) ranked the design component as the lowest in their research. Li (2005) agreed with Zou et al (2007) regarding design on major PPP projects. Decision-makers must, therefore, ensure that designs as well as how the project's programme progress, are carefully inspected. The design brief must be very clear so that clearly informed decisions are engrafted into proposals. Lack of design has an effect on the length of time it takes to negotiate, on implementing as well as completion of the project. Designs adopted need to ensure that projects have the capability of churning investment returns when they at their low business capacity.

During the proposal stage for the University of Zambia proposed hostels, low business demand during closures was considered by the investors. Adopting contemporary designs was agreed so that hostels could be offered for rent to those that needed accommodation in the real estate industry. In Australia, this was one of the critical success factors for the SuperDome's design project for its all-year round investment viability (Jefferies, 2006). Solino and Vassallo (2009) proposed unbundling components of PPP projects so as to boost competition among building consulting firms. Grouped schemes expose the contractor as well as the project funder to uncontrollable risks which must be minimised at all costs (Walsh, 2003). Satisfying the limitation of uncontrollable risks, particularly of a design nature, could be set as a pre-condition for the awarding of PPP projects.

5.4.8 Construction coordination risk

PPPs are a complex undertaking. Once the bidder has been awarded the project, it is incumbent on the investor to ensure its success. Only 10 per cent of the respondents indicated the risk due to coordination during construction. Wang et al (2000), Akintoye (2003 and Li (2003) have included other risks that could arise during construction coordination phase:

- land acquisition and compensation;
- restriction on import equipment and materials;
- cost overrun increases in financing cost;
- time and quality;
- contractor default;
- default by concession company;
- time, cost and scope of identified but related work and variations;
- environmental damage consisting of on-going protection of geological and historical objects; and
- force majeure events.

Satisfaction of the project to contract specifications eradicates the majority of the risks stated above. Detailed specifications must therefore be in place to hasten the work as well as to ensure that the contractor progresses as scheduled.

5.4.9 Force majeure

Ten per cent of the respondents indicated that force majeure was a risk against the successful implementation of PPPs in Zambia. Force majeure events make a project's continuity untenable as these arise from neither party to the PPP contract (Wang et al 2000; Yescombe, 2007). This risk often leads to a project being terminated due to difficulties that may be beyond the control of the investor. Three other termination reasons have the option of being rectified using insurance cover. These are (Yescombe, 2007):

- defaulting by the project company;
- when the public authority decides to do so; and
- dealing with the residual value of the project.

However, force majeure termination needs major ramifications. With termination comes the need to decide whether other possible investors to be handed the project (to be cured, so to say) would be guaranteed success. As this risk is one allocated to the investor, decisions will, nonetheless, need the intervention of the lenders and the benefiting institution. If the investor so wishes to obtain other loans to proceed with the project, there will be need to adjust the tariff as well as extend the concession period (Wang et al, 2000). This will provide the investor to recover what would have been invested in the project. However, Yescombe (2007) suggested that the lenders would need to take control which means decisions should ensure for them to have a direct agreement with institutions benefiting from PPPs. Warning notifications need to be given to the lenders when (Yescombe, 2007; Kolb and Tykvova, 2016):

- the SPV defaults;
- there is an accumulation of penalties by the SPV;
- default in payment deductions; and
- if there is proven non-performance of the project by the SPV.

5.4.10 Social risk

Ten per cent respondents stated that social risk can militate against the successful implementation of a PPP. Social risk deals with society buying into the project. This risk could curb vices such as corruption and vandalism that could hinder investor confidence. Newell et al, (2009) and Wang et al (2000) proposed maintenance of good relationship with the government authorities at state or provincial level in dealing with this risk. Investing companies entering into joint ventures with local firms could significantly reduce vandalism. Such a decision could also guarantee quality of works with expected knowledge transfer that will be shared between the joint venture companies. Fleurbaey and Zuber (2017) and Zulu and Muleya (2009) argued for fairness so as to attain a 'riskless environment'. A riskless environment is untenable as projects face innumerable risks (Smith et al, 2014). But provision of such an environment helps in dealing with the social vice of vandalism as employment could be made available.

5.4.11 Investment risk

Ten per cent of the respondents were able to indicate that investment risk is a matter of concern for PPPs in Zambia. Investment risk becomes a reality to the investor once commitment is made at financial close to the PPP contract (Pongsiri, 2002). There are major decisions that need be made by the government that has proposed the project as well as the one investing in the project. Equity is usually the central aspect of concern. Multinational lending institutions are comfortable to deal with countries than individual companies (Bull and McNeil, 2007). To narrow its exposure to risk, project guarantees must be couched around non-performance of sovereign obligations (Nkeki, 2018 and Merna and Njiru, 2002). Saunders and Cornett (2008) discussed how sovereign (a country's) risk assists investment decisions through the assessment of their credit and national standing qualities. Nkeki (2018) found that fixed assets could be used as collateral for investment loans but are dependent on the nation's debt standing. The national standing is the most critical for investment decisions to be for any country.

5.4.12 Poor governance risk

Poor governance risk was stated by 10% of the respondents as being a project risk. Risk allocation enables the choice of the governance structure that a PPP will have (Joyner, 2007). Chan et al (2010) established that efficiency was needed for a PPP to be successful. Furthermore, Herzberg (2005) stressed the need for governments to improve policies that aid the governance of the PPP structure through its stakeholders. Stakeholder inputs must be managed so that there is accountability during the phases of the project. The myriad possibilities of actions that involved groups will exhibit, must be addressed so that equity in society prevails. Dixon et al (2005) argued that the success of a PPP project could be hindered by not meeting the requirements of the stakeholders. Inevitably, this is owing to poor the governance regime the project adopts in managing the process of implementation.

5.4.13 Financial risk

Ten per cent of the respondents indicated that financial risk towards projects. Availability of finance to undertake projects such as PPPs is obtained from multinational organisations. It is ironic that respondents viewed this as a minor issue with regards to risks on PPP projects. This risks' urgency is because the banking sector in Zambia remains under-developed to be able to finance large PPP projects. Petersen (2011) noted the close relationship decision processes in actor centred institutions with strategic policy sectors such as finance. A number of reasons are available for finance being a risk for large projects that are linked to the country's political and debt positions in view of the time horizons for investments of this nature. Yescombe (2007) and Merna and Njiru (2002) posit how hedging helps to curb risk due to adverse movements in interest rates or inflation in financial markets. Decisions regarding financial risks impact the projects' solvency (Wang et al, 2000). Shan (2011) postulated that the selection of a project's implemented decisions are motivated and directed by a set criterion. The set criteria impinges on having a strategy that the investor hopes will maximise their interest of getting a good investment return (Simpson, 2004). In view of an under-developed financial sector, Merna and Njiru (2002) and Saunders and Cornett (2008) opined the use of four hedging tools that curb lack of national liquidity, namely:

i) forwards;
ii) futures;
iii) swaps; and
iv) options.

Owing to the fact that investments are over a period of time, investors have to take into account volatility of currencies in developing countries. Selection of hedging instruments aimed at curbing risks, are essential decisions made regarding investments before their implementation: listed above. In promoting investments, developing countries create enabling environments that consist of factors such as (Mukalula, 1995):

- political stability;
- guarantees against such things as nationalisation;
- freedom to externalise profits and dividends;
- flexible labour laws;
- positive work ethics and culture;
- stable economic environment free from inflation;
- availability of appropriate infrastructure;
- availability of social amenities;
- availability of adequate security; and
- availability and accessibility of market.

Implementation of PPP projects, in view of the factors listed above, inevitably takes a project-finance approach of risk allocation (Platon et al, 2014). Such an approach enables financiers to detail risks that will affect the overall project coming up with a (risk) matrix. Another way would be for project owners or sponsors to guarantee their support of the investor yet in no way obviating their responsibility in repaying the investment loan. Gallimore et al (1997) established the necessity of gathering information that would aid financial assessment of a project. Invariably, data from the case studies indicated that investors took a project-finance approach towards risks that were facing the projects.

5.5 Investment objectives discussion

Interviewees were asked on what investment objectives (or themes) PPPs were being implemented under. Four objectives were given. These were:

- social infrastructure development;
- private sectors getting a profit benefit;
- getting economic infrastructure;
- improvement of social infrastructure;
- improvement economic infrastructure; and
- business diversification.

'Social infrastructure development' was first. PPP developers usually have objectives in mind. The findings established that projects being implemented were aided by the PPP policy and Act No. 14. A number of respondents agreed that the law had instigated such objectives (40% of the respondents) while 60% of the respondents stated that they were 'not sure'. There were no responses for those that stated 'no'. Those that had answered 'not sure' did so because they had not read Act No. 14 hence, could not correlate what was happening in the industry with the introduction of the legislation. This suggested that though there is legislation that oversees PPPs, there is lack of understanding of what is involved, let alone, lack of increased investment.

Investment is only considered when there would be an adequate return to the investor. Weighted average cost of capital (abbreviated as WACC) is what investors often use to balance their equity and debt as they do so. Companies that will have readily available resources (i.e. their own money; equity); make decisions to invest in projects that are floated on the international market (Frank and Shen, 2016). It is to the advantage of the company investing to have a high gearing value in order for it to embark on Greenfield projects. The gearing (the ratio between equity and debt) must be high at the beginning of the project and taper towards the end. Such decisions would have to be weighed against a 'risk free environment' although such is inconceivable. But for purposes of analysis, this comparison is done to weigh the company's worthiness of undertaking the

project. For this, a capital asset pricing model (or CAPM) is utilised that compares the company's business against the government's debt. Essentially, corporate investment is negatively related to the cost of capital (Frank and Shen, 2016). Lower interest rates in developing countries, hence encourage investment. The Zambian banking situation has had high interest rate that has hindered investment in key projects such as those dealing with energy. Companies that vie for investment must therefore have their risk profiles that must equate the WACC (Yescombe, 2007) that will be able to match the project's eventualities.

5.5.1 Discussion of financial decision-making tools

Six financial decision-making tools were identified in ensuring that PPP projects were successful. These were:

- financial appraisals;
- cash flow analysis;
- profit and loss analysis;
- development concept;
- cost benefit analysis; and
- life cycle costing.

It was observed that projects applied a combination of decision-making tools. The other decision-making tools used were profit and loss analysis, development concept, cost/benefit analysis and life cycle costing. However, such tools are very basic in examining the financial worthiness of PPP projects. Such tools are vague in assisting proper risk assessment of the project leading to successful implementation of projects (Chimanse, 2017). Ronnie (2017) found that benefit analyses method were an insufficient basis for decision-making as they allowed room for political manoeuvring. The above listed decision-making tools are reputed to cause double counting of benefits, disregarding costs and raise serious inconsistent comparability problems. He recommended methodological stringency as a way improving benefit analyses that would be done on mega projects (Ronnie, 2017). Furthermore, Vickermore (2017) recommended the use of methods that had the potential of measuring a number of risks

so as to evaluate their effect on the project outlook, before and after. He called this the 'agglomeration of impacts'. By 'agglomeration of impacts', meta-analytical methods must be used that are able to show the viability of the project from an in-depth financial perspective (Simpson, 2003; Holmgren and Merkel, 2017). Smith et al (2014) suggested simulation methods such as the Monte Carlo model.

The financial decision tools listed above do not offer in-depth analysis of projects although the information they provide is useful in determining the investor's status. Yescombe (2007) and Holmgren and Merkel (2017) recommended the use of equity internal rate of return (IRR) method as these show the levels of risk during the different phases of implementation. Therefore, a company with high gearing (or a good WACC value), can be capable of handling the attendant risks prior to the commencement of the project. In other words, companies with better liquidity are capable of taking on risks facing the project. Furthermore, using the combination of CAPM and a PSC, offers decision-makers to evaluate participating competitors against each other. WACC and CAPM present simulated scenarios that offer decision-makers computation of variables that could highlight present and future problems regarding a project's success (Holmgren and Merkel, 2017). Value for money (VFM) is the major consideration when a PSC is used (Akintoye, 2009). VFM is computed when a public sector project uses a PSC. The expected costs to be expended are hypothetically compared to works done the traditional way (Akintoye et al, 2003). An adjusted PSC which has public risk transferred to the private sector forms the basis of comparison in the concession bids using the net present value (Akintoye, 2003). Value for money (or VFM), is the difference between a risks adjusted PSC and that of the concession's net present value. Use of the net present value enables an investor to undertake the risk as there is assurance of obtaining invested funds with perceivable interest rates (Yescombe, 2007). Financial management is therefore a critical component in the implementation of PPPs. A critical concern was levelled at ensuring that evaluated projects attain accuracy in their estimates (Akintoye, 2003).

5.5.1.1 Spearman's rho accuracy analysis

Spearman's rho calculations were used to determine the accuracy of use for project evaluation of five of the financial decision-making tools recommended by the focus group. The five financial decision-making tools were the:

- payback period of the project;
- internal rate of return;
- life cycle costing;
- discounted cash flow; and
- net present value.

Respondents for the interviews indicated that financial evaluation and monitoring tools have greater accuracy. Spearman's rho calculations gave a high degree of their accuracy of **97.75%**. However, results for the interviews revealed that construction professionals utilise evaluation and monitoring tools that estimate the short term than the long term range of projects. As PPPs are long term projects, the degree of accuracy in evaluation and monitoring tools should include those that envision the long term (Smith et al, 2014). The need for accurate estimates is what developers require for investment projects. Callegari et al (2018) showed that 97.53% of contractors exceeded their initial estimates for energy projects in Brazil. Heider et al (2015) argued that economic and financial risks on a project are the first to be considered in terms of their frequency and severity. Reducing evaluation and monitoring errors entail implementing projects on time (Soin, 2013).

5.6 Questionnaire results

A number of demographics were collected regarding respondent organisations seeking to use the PPP mode of development. The information required was about:

- the organisation's description;
- the number of employees in the organisations;
- what type of projects the organisations had participated in; and
- the level of PPP experience of the staff.

5.6.1 Demographics presentation

Results from the presented demographics in **Chapter 4** indicated that 95% of PPPs have been floated by public institutions. Although public institutions had asked for expressions of interest for the projects, the majority were not implemented. Projects that were executed were largely for housing developments (46.8%), roads (27.70%), commercial developments (89.4%), power and energy (6.40%), telecommunication and water sanitation (2.10%).

Recent developments have been the inclusion of toll gates being constructed on main highways across the country using the PPP mode of contracts. The Zambian government did this to speed up the collection of toll fees needed for the rehabilitation of the road infrastructure. Key sector areas such as that power, energy and water sanitation have not been strategically targeted. Implementing such projects requires enormous resources and is faced with numerous risks. Akintoye (2003) noted how projects under the telecommunications sector are easily taken up. It is therefore evident that investors are willing to engage the Zambian government on projects that have less risk. In Pakistan, a hydro-electric power project was forcibly possessed when the Bhutto government fell (Akintoye, 2003). Inevitably developers as hoarders of project risk are less keen to commit resources in conflict areas. There is need for the Zambian government to have a strategy that must ear-mark key projects (such as power and energy) that must be taken up by investors while easier ones are left to the local business enterprise.

Regarding PPP experience, results indicated that the majority of the participants had not participated in such projects. This suggested that the subject of PPPs is largely an unknown territory by the majority of the construction professionals. Introduction of the PPP law did not change the mind-sets of most of our professionals in seeking to venture out and understand various intricacies of Act No.14. In other words, there is a basic understanding of what PPPs are all about. The majority of the respondents knew about PPPs but are unaware of the total spectrum. Since the introduction of the law, some professionals stated that there has been little awareness done by the MOFNP PPP Unit. Investment analytical tools were singled out as the neediest area in assisting

procurement processes related to evaluating bids. Unravelling what financial model developers would have used was also identified as critical. The attractiveness of the planned projects by developers often made evaluation processes regarding their debt profile and eventual financing costs, not scrutinised effectively. Inevitably, the risk given to the developer in executing the project would be exaggerated when assessed.

5.6.2 Involvement in PPP projects

Results indicated that the majority of organisations are unwilling to use the PPP mode of development. The unwillingness by organisations in using the PPP mode of development could be indicative of their mistrust in the law. Cui et al (2018) established that lack of understanding the contracting modalities, knowledge management and social impact of PPPs as hindering application to viable projects.

5.6.3 Type of implemented PPP contracts

Results indicated that the two favourably used PPP contracts were the BOT and DFBOM types. Both contracts are advantageous in the way they place risk to the developer. In both cases, developers have the option of negotiating for better terms for the envisaged concession period.

5.6.3.1 The BOT contract and risk allocation

Of the PPPs implemented, the BOT type of contract (with 68.09%) was widely used as it best fitted the aspirations of Act 14 for the government's Private Sector Development (PSD) programme. Two reasons account for the usage BOT contract on PPP schemes; the first was financial while the second placed leverage on the developer's risk allocation. Due to budgetary constraints, economic resources mainly go to alleviating the social needs of the Zambian people. The need for additional resources is also evident from financing deficits normally projected in the Ministry of Finance and National Planning (MOFNP) yearly budgets (MOFNP, 2008). Lengwe (2004) stated that other than its meagre internally generated resources, Zambia has to rely on outside support in order to enable her provide the needed social amenities aimed at public service delivery in an effective and efficient manner.

In view of the fact that the developer acts as an agent of the state, there is need for incentives so as to achieve efficiency in PPP projects. Qui and Wang (2011) developed a model that examined the motivations, efficacies and price adjustments in BOT agreements. They found out that efficiency in a BOT contract was a by-product of price regulation and license extension. With government partnering with the private sector, immense benefits accrue to both parties. Extending the license causes the developer to improve the PPP product enabling both parties to the contract to get the best from the project. Merna and Njiru (2002) argued about the positive impact that privatisation of state-owned enterprises can have on capital markets. They stated that it causes governments to reduce on pressure that arises from purchasing inputs hence having to constantly service deficits and inflation. Merna and Njiru (2002) further argued that BOT under privatisation leads to the making of tradable securities. Saunders and Cornett (2008) suggested that these could be raised through investment banking, in particular, using debt and equity securities. Liquidity of the project must be of primary importance to avoid insolvency which could lead to disputes and claims that may create antagonistic relationships where cordial ones existed (Cartlidge, 2006). This is a risk that any PPP project should avoid as it delays the completion as well as expending of huge sums of money.

5.6.3.2 The Design, Finance, Build, Operate and Maintain contract

This type of contract obtained 10.43% response from respondents. Financing high capital intensive projects remains critical in Sub-Saharan countries. Bull and McNeill (2007) argued that attractive economic policies are desirable to enable investors implement high geared schemes. Oftentimes, governments prefer market-led off-take contracts that allow generation of revenues after completion of construction activities (Merna and Njiru, 2002). A few contract-led projects could be allowed that synergise developers and users. DFBOM fall in the latter category. Reluctance to use this mode of development is due to fear of intermediary abuse of the parties to the contract (Smith et al, 2014).

5.6.4 PPP planning and construction periods

Results indicated that there was a reduction in terms of the planning duration for PPPs. Owing to encouragement drawn from the implementation of PPP projects in the Zambian construction industry; the planning period has gradually reduced from "within 3 years" to "within a year". However ideal such a period lead, this is not the experience of some of the floated PPP projects on the drawing board. Mukalula and Muya (2014) stated that the planning period prior to construction works, lies between 6 to 10 years. The relationship between the periods of planning and construction raises the issue of long term financing for purposes of investment (Merna and Njiru, 2002). Long term finance can be a risk to the developer when they do not adhere to agreed timely loan repayments. This risk needs be managed with care.

Wang et al (1999) suggested three options in mitigating such a risk after financial closure. First, there was need for equity financing and cooperation with government partners. Secondly, alternatives to contract payment could be adopted. The use of land development rights is a plausible solution in dealing with this risk. Lastly, the raising of equity by offering the public stock could both enhance the project as well as ensure that indigenous nationals have a stake in the project.

PPPs normally have a period of financial recovery before yielding profits. Critical to the process of implementation, is the obtaining debt instruments from financial institutions. Debt instruments enable PPP projects to defer the servicing of securities till revenues are realised. The planning stage can therefore secure senior and subordinated debt, which will be assets to the PPP project. Senior debt is the finance utilised in curbing the risk of defaulting to major lenders (Merna and Njiru, 2002; OECD, 2008). Subordinated debt is one that services any other lender to the project. However, the interest rate of a subordinated debt is higher than the senior debt (OECD, 2008).

The planning period has to take into consideration, not just the construction works that would commence once finances are mobilised Grimsey and Lewis, 2007). PPPs can face difficulties in sourcing funds to implement the project, a risk that developing countries like Zambia experience. Raising debt capital introduces various fees that must be part of

the spectrum of the projects' finance picture. There are management, commitment, agency, underwriting, success and guarantee fees that must be planned for. The use of pension funds that are invested in government securities could be used for critical projects such as in energy in developing countries like Zambia (Merna and Njiru, 2002).

5.6.5 PPP construction period for project success

Long construction periods are fraught with numerous financial risks as investment funds used for projects are affected by global supply and demand (Bull and McNeill, 2007; Saunders and Cornett, 2008). Therefore, the executing of projects in time becomes very essential. As loans are over a period of time, decisions for time-related risks must be carefully chosen. Merna and Njiru (2002) listed the following time-related risks:

(a) currency risk;
(b) interest rate risk;
(c) equity risk;
(d) commercial risk;
(e) liquidity risk;
(f) counterparty risk;
(g) country risk or political risk; and
(h) accounting and economic risk.

Therefore, projects that would be completed "after 3 years", can be adversely affected by changes in any one of the factors listed above in risk allocated to the developer and must be mitigated in the following ways:

5.6.5.1 Currency risk

This is a risk borne by the investor who participates in foreign country projects (Aggarwal et al, 2011). Documenting the risk exposure for Chinese corporations around the world, Aggarwal et al (2011) found that magnitudes were between 20 – 40% of projects undertaken which are deemed to be extremely high. This exposes projects experiencing this risk, to get into insolvency. Wang et al (2000) suggested three measures to curb the risk being - extension of a concession, tariff adjustment as well as

securing of a guarantee from the government. Government guarantees act as collateral during the period of the project and are viewed holistically as sovereign risk of a country (Merna and Njiru, 2002; Saunders and Cornett, 2008). This risk is a component of the PPP contract sum from the investor which is later passed to the user as a tariff (Wang et al, 2000).

5.6.5.2 Interest rate risk

Interest rate risk refers to the volatility of the local currency's shift in comparison to those on the international market (Joslin and Konchitchki, 2018). The effect of the rate's alteration valuated by the difference in its income and expense is the most common measure used in capital markets (Saunders and Cornett, 2008). Projects constructed in a free market capital economy are exposed to this risk hence, hedging them against interest rate shocks is critical as these affect secured funds for investment (Deleze and Korkeamaki, 2018). Extended periods of project implementation therefore require financial instruments that have a longer maturity to abate such a risk. It is however advantageous if the project is constructed within a few years. In mitigating this risk, Wang et al (2000) suggested obtaining government guarantees to ensure that rates are fixed or use a floating rate.

5.6.5.3 Equity risk

Equity risk concerns finances that are raised by investors as contribution to a special purpose vehicle (SPV) for expenses on a project. Raising construction equity for large PPP projects is a challenge in the context of a developing country. Two types of equities are available for undertaking investments. These are public investment in equities (PIPE) and seasoned equity offering (SEO) (Dahiya et al, 2017). Dahiya et al (2017) suggested three primary motives that undergird the choice of equity:

- being market timing;
- asymmetric information; and
- financial distress.

These difficulties create an imperfect financial market causing high risks. Kartashova (2018) have suggested using public equity in sharing this risk. The assured return on invested funds, would encourage PIPE investments from the private sector, leading to the development of the sector. This causes the project to have longer completion time. In mitigating this risk, government could guarantee such investments (Wang et al, 2000).

5.6.5.4 Commercial risk

These are risks affecting the project's completion, operation, as well as its expected transput (Toumi et al, 2018; Yescombe, 2014). Efficiency during the implementation stage helps reduce exposure of the risk for the investor's supply and demand sides of the PPP project (Merna and Njiru, 2002). In view of time, decisions affect project requirements not being delivered on schedule as well as limiting the securing of the necessary clientele for the business's success. These problems threaten the project's viability to recoup its investment.

5.6.5.5 Liquidity risk

Exposure to this risk occurs when the project's anticipated viability fails to meet the financial obligations (Jean-Loup, 2017). Decisions must be made to ensure that the PPP investor adheres to what is stipulated in the contract before and during the construction process. Lack of adherence brings about detrimental repercussions of lenders demanding default fees which could affect the project's solvency. When an investor becomes insolvent, this has implications on the progress of the project while finances for further development are organised. Credit risk of this nature can be mitigated by governments enacting laws enhancing information sharing particularly through financial institutions such as banks (Kusi et al, 2017).

5.6.5.6 Counterparty risk

This is essentially a credit risk as a result of default of the parties to the PPP contract. Inevitably the completion period of the project will be affected. Heider et al (2015) warned of financial institutions hoarding liquidity when faced with this threat. Furthermore, Arora et al (2012) noted how that counterparty risk is rated highly in financial markets. These are based on agreements which may be in breach of other

obligations entered in such as with banks. Lending institutions would therefore fail to extend credit to such investors hence delaying their completion times. Essentially, the allocated risk of an investor may stand in jeopardy owing to those that they would be linked to.

5.6.5.7 Country risk or political risk

Belkhir et al (2017) and Timurlenk and Kaptan (2012) identified this risk with political and economic factors affecting the country's ability to pay its external debt on time. Frank and Shen (2016) and Yescombe (2007) have further pointed out that this risk goes beyond the fulfilling of obligations identified as sovereign risks. Warnes and Warnes (2014) argued that political risk presented a negative effect and raised the cost of equity for international investors. Over-pricing of risks of this nature by investors is inevitably resorted to as a way of curbing the uncertainties to the project that could arise through political and economic factors. Consequently, when adverse factors are perceived not to be under a government's control, the project's implementation period could take longer (Smith et al, 2014). Wang et al (2000) and Deleze and Korkeamaki (2018) further pointed to the following country factors in impeding the progress on projects:

- when the project is expropriated;
- the withholding, delay or cancellation of required project licences;
- denial of the resolution of contractual disputes;
- upbraiding the ability of converting and remitting local currency; and
- when laws adversely affecting the operations of the project are enacted.

5.6.5.8 Accounting and economic risk

Accounting risk is a retrospective assessment of a company's risk structure while economic risk focuses on their wider repercussions as pertaining to the project's operations (Toumi et al, 2018; Platon et al, 2014). In terms of implementing a project on time, these risks oversee the effect that interest rates have on loans obtained from multinational companies and are used by proprietors during the development process (Davies and Giovannetti, 2018; Soin and Collier, 2013). Low interest rates are an advantage to investors in accelerating construction activities on projects while higher

ones have the opposite effect. With high interest rates, developers usually slow down on their projects. However, having the project implemented in the shortest possible time guarantees better returns for the developer.

5.6.6 Financial evaluation on PPP projects

Risk evaluation for a PPP is one of the most important activities that must be done before a project is implemented. During the evaluation process, risk is apportioned to the party best able to handle it (Munier, 2014; Akintoye, 2003). The calibre of institutions assessing project threats is also an important aspect for risk to be allocated appropriately (Shrestha et al, 2017). At this stage, both qualitative and quantitative methods are used to gauge the ability of such institutions tasked to assess as well as judge the worthiness of the project to be executed (Smith et al, 2014).

Vlueten et al (2010) identified four levels of assessment for professionals that need to be applied beyond a cursory 'knowing', 'showing how', 'knowing how', but must lead to 'actual doing'. The level of getting the project 'done' is a hands-on experience for PPP professionals. There is a superfluity of issues that must be noted by experts at this level which are not the scope of this research. After the assessment of the calibre of the assessors is completed, a risk matrix (or risk register) is generated (Knutson and Huettel, 2018). A risk matrix that needs to be implemented must have the following vital elements (Knutson and Huettel, 2018):

- it must deal with the risk arising (financial or otherwise);
- risk must be apportioned to the contractual party able to handle it;
- there must be a consideration of palliative measures that need to be executed for the contract to succeed; and
- the financial effects of any risk to the developer.

5.7 Descriptive statistics for risk identification for project success

The prominent results from the questionnaire survey indicated the following risk identification methods:

- experience (11%);
- site visit (10.77%) ;
- brainstorming (10.68%); and
- workshops (10.45%).

These four methods are discussed below.

5.7.1 Experience's relevance to project success

Experience is a necessary component for project success when related to risk allocation. Knutson and Huettel (2015) surmised that risky choices are a balance of gains and losses. Ambition is therefore important to choices made in projects. Davies and Giovannetti (2018) studied projects successes and failures and found that accomplishments of schemes were inhibited by ambition. When ambition is the overriding desire to overcome risks facing a project, there would be greater gains than losses in the implementation of PPP projects.

5.7.2 Site visit

Conducting a site visit involves collecting essential data that aids the developer's decisions on the implementation of a project. Risks related to the site would be the focus of the visit especially those that pertain to engineering (Smith et al, 2014). The condition of the site and whether certain services are readily available in executing the scheme are relevant issues to note. Shrestha et al (2017) and Lawrenz et al (2012) investigated how site visits are structured and recommended three variables that need critical attention for such performance. They noted the:

- need of getting the setting;
- useful reflections on how certain hurdles would be overcome; and
- need to focus on the intended purpose of the project.

5.7.3 Brain storming

Brain storming allows the project owners to survey avenues available for the successful execution of the scheme. This method also enables the proprietor to investigate mitigatory measures that could be put in place when certain courses of action are agreed

to be used on the project. As PPPs involve several professions, their suggestions could enable successful implementation of various innovative tools for curbing project risks. Smith et al (2014) discussed the two categories of risk classified as epistemic and aleoteric that confront development schemes. Epistemic risks arise due to a dearth of expertise while aleoteric are the outcome of geological unpredictability (Cui et al, 2018). Expression of these risks is bounded between decision outcomes and what sequence of action would successfully ameliorate the risk so as exploit the opportunity.

5.7.4 Workshops

Risk identification also involves the use of workshops (Vickermore, 2017). These take the form of sharing case studies in seeking to see differences in project implementation. Dahiya et al, (2017), Curristine (2007), Farlam (2005), Herzberg and Wright (2005) and Jefferies (2006) utilised this form of risk identification method. A number of issues ranging from policy reforms to enabling the private sector capitalise on use of the PPP method can be dealt with as workshops foster wide consensus of views. For instance, Jefferies (2006) recorded how the SuperDome project of Australia utilised workshops in developing businesses around the scheme to rival other major venues near the vicinity.

5.8 Critical success factors (CSFs) influencing decisions on PPP success

As stated in **Chapter 2** of the literature review, studies in critical success factors (CSFs) have captured the attention of many authors (Wu et al, 2018, Cui et al, 2018, Wang et al, 2000; Li (2003); Khanda (2011); Jefferies (2006); Chan et al (2011) and Yescombe (2007). Khanda (2011) used criticality indices to determine CSFs for Zambia. It was noted that PPPs are a Greenfield owing to country's little experience. There was therefore need to use implemented projects to shape legislation. This was the main reason for the lack of response on the floated projects across the country by the PPP Unit in the Ministry of Finance and National Planning. Statistical descriptives were collected for critical success factors aiding PPP attainment. The four topmost CSFs indicated were as follows:

- save time in delivering the project (9.82%);
- benefit to local economic development (9.78%);

- thorough and realistic assessment of costs and benefits (9.97%); and
- shared authority for public and private sectors (9.60%).

These are discussed below.

5.8.1 Saving of time in project delivery

Saving of time in delivery of the PPP project is a critical success factor that affects risk allocated to the project developer. In comparing the virtue of time saving, Knutson and Huettel (2018) and Chan et al (2010) argued that it consisted in a combination of factors when they used factor analysis in studying the 18 CSF used by Li (2003) in Hong Kong. Saving time was the result of (Chan et al, 2010):

- having a stable macroeconomic environment;
- shared responsibility between the private and public sectors;
- transparent and efficient procurement process;
- stable political and social environment; and
- has judicious government control.

5.8.2 Benefit to local economic development

The deficit in infrastructure development is narrowed down by investments undertaken under PPPs. This is a key component of what PPPs are able to achieve as government's have restrictive national budgets. Cedrick and Long (2017) showed the motivating factors for investing in energy. Rwelamila et al (2003) showed how negative perceptions regarding PPPs were overridden by implemented projects. Zulu and Muleya (2009) stressed the need for quality infrastructure which would benefit the local community. Ultimately, economies benefit by ensuring that credible investors implement projects that add value to a nation.

5.8.3 Thorough and realistic assessment of costs and benefits

Assessment of BOT projects must be done thoroughly. While the PSC is a method that may be used to test the validity of privately financed projects, Merna and Lamb (2009) insisted that deeper financial analysis be done by use of the Net Present Cost (NPC), the Net Present Value (NPV) and the Internal Rate of Return (IRR) in a bid to derive value

for money (VFM) on projects. Kumaraswamy and Zhang (2003) showed how 'state of the art' methods as provided in use of NPC, NPV and IRR could curb incipient threats in projects for developers to readily accept allocated risk. Using these tools enables both parties of the PPP contract to evaluate the costs and benefits of the project. The NPV prepares the developer in shoring against drastic future threats that could impede the success of the project (Yescombe, 2007). However day to day returns must be carefully monitored with information in the IRR that spans the life of the scheme (Wang and Ke, 2009). Using the yield curve, Joslin and Konchitchki (2018) showed how macro-economic issues could affect the implementation of PPP projects. Care must be taken in assessing the project's cash flow particularly between the phases of the investment. Circumventing this threat by concentrating on the cost-benefit ratios in the NPV enables the investor to readily accept the risk.

5.8.4 Shared authority for public and private sectors

PPPs are a synergy of public and private sectors. Authority is one aspect that must be managed effectively if PPPs are to succeed. In their review of over 10,000 PPP projects, Davies and Giovannetti (2018) showed the importance of asymmetric information. Kumaraswamy and Zhang (2003) recommended that joint teams be used in the management of risks on projects. Manuj and Mentzer (2008) recommended the use of inter-organisational 'relational' joint risk management approaches as a strategy in dealing with PPP complexities. Contractually, it is very difficult to achieve 'shared authority' on PPP projects hence the limiting of risk to the party best suited to deal with it (Akintoye, 2003). In so doing, acrimony between the parties during the execution of the project is reduced.

5.9 Risk allocation descriptive statistics

Results obtained from the SPSS gave the following for risk allocated on PPP projects. 10.20% respondents stated that 'debt servicing on projects must be shared'. This was followed by 8.34% of the respondents that felt that 'political risk must be shared'. The third component of risk allocation concerned the 'permit approval' and 'cost overrun risks' of the PPP which got 8.30%, respectively.

Respondents felt that 'permit approval risk' should be handled by the public while 'cost overrun risk' must be the responsibility of the private sector. Respondents stated that 'pre-investment risk' be managed by private sector companies which had a result of 8.25%. Next was 'financial risk' on projects which respondents stated that it should be shared between the private investor and public which got a result of 8.21%. This was followed by 'completion risk' being shared between the private investor and public which had a result of 8.16%. Respondents felt that 'technology risk' should be shared which got a result of 8.12%. This was followed by 'partnering is shared' getting a result of 7.94%. The last factor got a result of 7.85% which was for 'political risk is managed by the public'.

As noted before, results obtained were highly skewed. Respondents felt the necessity of ensuring that risk allocation for the projects be a shared matter than leaving it entirely to the investor. Only three factors out of the nine had different risk allocated to either the public or private investor while the majority felt that risk be shared. This could explain the 'greenfield' nature of PPPs in the implementation of projects in Zambia. The other reason could be the confidence placed in the PPP legislation in accomplishing what it is intended (Cui et al, 2018). Shared responsibility could shield prospective investors from unwarranted criticism (Hueskes et al, 2017; Zulu and Muleya, 2009).

5.9.1 Shared debt servicing

'Shared debt servicing' obtained 10.20% response from respondents. This is a stipulated PPP service-fee mechanism that ensures that the public participates in the payment for implemented by the investor. The method certifies the investor to charge the public a portion of the invested funds in a bid to repay loans utilised for accomplishing the development. In this wise, allocated risk utilises the usage of the facility in the loan repayment structure (Joslin and Konchitchki, 2018). Hence the payment structure for the project must be able to cover the operating expenditure, obligations and equity returns (Jean-Lou, 2017). If the loan repayment structure is to be short, this will have an effect on the service fees from the public. To avert the risk of making the project unsuccessful, affordable payment terms to be made by the public are evenly spread over an extended

contract period (Cui et al, 2018). In this way, the debt servicing will be shared in a manner that ultimately creates a win-win situation for the users, private developer and recipient of the project (Kartashova, 2018). The developer must therefore initially assess the facility's demand in equating the revenue so as to liquidate borrowed funds over the contract period.

5.9.2 Shared political risk

Sharing the 'political risk' obtained 8.34%. Belkhir et al (2017) noted two negative factors that political risk induces on projects i.e. they increase the investing firm's cost of equity as well as capital. In places of conflict, political risk has a high impact towards the project. This was the experience in Middle East and North African countries (MENA) that have seen a reversal of developmental projects after the 'Arab spring' (Belkhir et al, 2017). Shared political risk ensures that the investors' loss is owned by the parties implementing the project (Yescombe, 2007 and Merna and Njiru, 2002). For places of conflict, the investor's desire would be to make quick profits so as to hand-over the project to the recipient government as the risk for sequestration would be too high. Consequently, to own the risk of developing in 'conflict region' would necessitate higher fees from users (Yescombe, 2007; Munier, 2014). The two case studies for this research presented an aspect of 'conflict' regarding 'student unrest' and the Democratic Republic of Congo (DRC) insurgency wars, respectively. Based on this historic verifiable information, it was in this wise that the investors double factored the risks thus extending the contract periods for the two projects prior to hand-over to their respective clients.

5.9.3 Permit approval and cost overrun risk

The result of these two factors was 8.30% and their mean was 4.5745. Healey (2009) warned that when the data is skewed, the mean can be a misleading method of interpreting the data. The standard deviation for both factors were also similar which was 0.65091, meaning that the distribution was diverse. The tendency of standard deviation being close to the zero value, evidently showed the allocated importance of

permit approval and cost overrun risks that are handled by the recipient community and investor, respectively.

PPPs require the relevant permit approvals with various government entities before they are implemented. Mukalula and Muya (2014) identified about 17 stages required for various permits prior to the project's execution. Permit approval often takes long and hence the necessity for such a task being undertaken by public (Cui et al, 2018). The time period needed to get such permits would take three years or more which could be discouraging to an investor. However, when the community is involved, this will enable them own the project as they interact with local enforcement agencies for the implementation of the project that will eventually become theirs. Obtaining various permits attracts costs which could be paid by the community as a way of fostering that sense of ownership for the project. But at times, the investor may be called to make a contribution to the payment so as not to delay the process (Kartashova, 2018).

Once the project begins, time for implementation would need to be managed carefully. Mega-projects often experience time overruns that translate into costs. Due to the complexity of such projects, financial overruns must be attended to as they have a bearing on borrowed funds that are scheduled to be paid back on time. Callegari et al (2018) showed that 97.53% of contractors exceeded their initial estimates for energy projects constructed in Brazil. The investor necessarily has to bear the risk of cost overrun because they are the recipient of the funds and must be able to utilise the finances for the successful implementation of the project.

5.9.4 Pre-investment risk

Pre-investment risk is a risk allocated to the private investor and had a response of 8.25% from respondents. In fact, this is a risk that an investor considers before they embark on a project. There are a number of factors that need be considered particularly in terms of the various risks that could affect the project. Ling and Lim (2007), Jean-Loup (2017) and Heider et al (2015) posited that economic and financial risks are the first to be considered in terms of their frequency and severity if and when BOT venture is undertaken. For BOT projects, foreign exchange matters are very critical as they could

cause budget overruns. Jean-Loup (2017) and Ling and Lim (2007) delineated financial and economic risks as consisting of:

i) inflation;
ii) interest rate fluctuation;
iii) default by contractors/subcontractors;
v) labour and material price fluctuations;
vi) import/export restrictions;
vii) financial failures;
viii) restriction in repatriation of funds; and
ix) gap in knowledge.

In contrast, De Marco et al (2012) and Frank and Shen (2016) called economic and financial risks as 'financial and revenue' risks. In delineating financial and economic risks in this way, they limited the 'financial indicator' to the 'funding' of the project while that of 'revenue' to the 'recovery of monies invested due to use' of the BOT type of contract for the project. It is essentially in the separation of the indicators wherein the novelty of their research was. Although such parameters are common, the boundaries set for them, makes their research a commendable read (Deleze and Korkeamaki, 2018). Five risk identification sources were singled out, namely, country, financial revenue, project and the structure and members of the SPV. De Marco et al (2012) concluded that the capital structure induce SPV related risks that influences the equity share. The related risks that had a specific drive to the project were the size, complexity and the structure of the concession. In like manner, risks related to the structure of the concession were carefully handled to ensure the success of the projects. Risks that would affect the implementation of the projects were examined so as to cause minimal disruptions. To ensure the success of the University of Zambia East Park Mall, the investor initially constructed the commercial entity of the mall so as to have an inflow of revenue as the rest of the project would be implemented (Saad and Samet, 2017; Smith, 2015).

5.9.5 Financial risk

Financial risk obtained a response of 8.21%. This is a risk allocated to the investor as they are responsible for implementing the project. Since the project takes time to be executed, it is affected by other related risks such as interest rates, the country's inflation and regulations regarding financial institutions. Interest rates affect finances borrowed in order to construct the development. PPP schemes take a long time to complete and require methods for hedging unstable interest rates. Use of a floating interest rate could ensure that the project stays in the estimated cost of construction. According to Heider et al (2015), Yescombe (2007) and Saunders and Cornett (2008), the interest swap is the common form of financial hedging for development projects.

5.10 Risk mitigation descriptive statistics

Results from respondents indicated that 'permit approval risk' which received the highest response of 8.727%, be treated. This was followed by 'delay in financial closure' and completion risk that were to be mitigated by treatment and termination, respectively. These got 8.40% each from respondents. The fourth prominent result was for 'political risk' that got a response of 8.40%. Hackett and Statham (2016) and Balog et al, (2017) stated that risks on projects can be terminated, treated, transferred or tolerated. This will depend on the prevailing conditions regarding the project.

5.10.1 Permit risk mitigated by treatment

Treatment of risk by insurance is the traditional method of dealing with unknown situations at the on-set of the works as well as during the project. The developer therefore ensures that all perilous perceived conditions likely to subsist on the scheme are insured risks (Smith et al, 2014). Yescombe (2007) considered such insurable risk as threats to a project following under force majeure. Obtaining necessary permits prior to the project's implementation reduces unforeseen costs arising from delays. Eirinaki et al (2018) developed a pre-permitting system framework to curb wastage of time and resources on developments that were done in New York City. PPPs are therefore no exception. Prior planning can save the much needed resources that could be utilised in the proposed development.

5.10.2 Delay in financial close

Protracted negotiations often precede the end of the public procurement phase. Before the on-set of the proposed scheme, the developer expends huge amounts of resources in presenting the business case for the PPP project (Munier, 2014). This period may range from 3 to 6 years comprising of meetings aimed at exhaustive discussion of the development. Developers are often apprehensive of the time it takes to close out the deal and would factor attendant negotiation costs to the project (Asenova and Beck, 2003). Inevitably, this also affects the determining of the concession period.

Performance of sensitivity analysis helps in the assessment of financial statements and the generated risk matrix of the venture so as to ascertain the viability and success of the project (Munier, 2014).

5.10.3 Completion risk

Completion risk covers a wide range of issues that encompasses financing costs, delayed revenue to the local authority the proposed venture is vested in as well as from the project (Kartashova, 2018; Yescombe, 2007). The envisaged potential of the scheme will therefore be eroded due to increased construction costs, reduced incomes and will ultimately affect sponsors' returns and financiers Cover Ratios (Saunders and Cornett, 2008). The financiers' Cover Ratios are important in justifying the business case for the project. In all these, the developer's interest is not to unnecessarily extend the targeted service availability date for the proposed enterprise. Hackett and Statham (2016) therefore proposed that completion risk be dealt with by elimination as it threatens to eclipse set objectives for the project. Risks associated with termination make the project questionably viable or else would require drastic changes to the proposition.

5.10.4 Political risk

Political risks are associated with government actions that affect the project (Belkhir et al, 2017). These have wider effects regarding the scheme's viability to its handover. Matters of expropriation engender aspects of having the project mitigated through termination. This is upon the understanding that such risks would not be sustainably dealt with except with the change of various parameters regarding the project (Hackett

and Statham, 2016). Developers have confidence in the PPP law in Zambia owing to the political stability that the nation has enjoyed. This has further encouraged the setting up of multi-facility zones that will booster the productive capacity of the country. In so doing, various skills will benefit by way of employment (Davies and Giovannetti, 2018).

The amount of business at the Kasumbalesa Border Post is what enabled the developer to build the border infrastructure. This was irrespective of the political instability that the DRC has had over the last 40 years. Further, the setting up of new mines in the Katanga Province encouraged the establishment of the PPP project. With new mines, various products were imported from around the world in terms of equipment that were mainly transported by road coming through Tanzania, Mozambique, Namibia and South African ports.

5.11 PPP project success descriptive statistics

Four of the key results regarding project success that influence risk management decisions were that PPPs:

- aid employment creation, which got a result of 8.58%;
- guarantee high quality construction goods and exchange of expertise getting 8.53% response, respectively;
- bring about transfer of technology to local people, getting a result of 8.49%; and
- projects are done in time, which gave a response of 8.44%.

Three of the prominent results are discussed below.

5.11.1 Success through employment creation

Employment creation is fundamental to construction work that is available and is often used in a country's political rhetoric. Mukalula and Muya (2017) reported the upward trend in construction works in Zambia that were reflected in the Annual Reports of the Bank of Zambia of 2010, 2013 and 2015. Related construction works through the Road Development Agency (RDA) toll gates on major trunk roads, have further ushered in jobs (Miti, 2018). Although job tenure is limited owing to the period and nature of construction, implemented PPP projects, nonetheless, provided employment.

5.11.2 Success through quality works and expertise

Adherence to specifications is what guarantees quality works on projects (Hackett and Statham, 2016). Sharma and Jena (2008) reported on the implementation of roads, railways and ports by the Indian government using PPPs. They also reported the gains that the projects made to the various stakeholders involved in the sectors mentioned (Odeck and Welde, 2017). One major triumph conveyed by the use of the PPP contract were the special skills benefitted by participating companies as well as the quality infrastructure constructed (Sharma and Jena, 2008; Smith, 2015). Participating companies utilised joint venture synergies to gain expertise by working closely with the developers (Mourao, 2018).

5.11.3 Success through timely completion

Timely completion remains a key factor that PPPs must ensure if envisaged profits would be realised (Yescombe, 2007 and Munier, 2014). Risk management for any project demands stringent assessment and analysis in order to avert factors that may cause failure (Munier, 2014). Yescombe (2007) discussed the necessity of curbing delays that could arise through subcontractors and design. Systematically overlaying activities is one of those suggested avenues that the developer could utilise in getting the project completed on time (Hueskes et al, 2017). Project 'unbundling' has also been suggested by many other authors to speed up works (Jean-Loup, 2017; Akintoye, 2005).

5.12 Development phase with most risk

The average respondent's scores computed showed the following regarding the four phases of development:

- construction (4.09);
- negotiation (pre-construction) (4.00);
- commissioning (2.28); and
- project hand-over (2.09).

5.12.1 Construction phase

The realisation of the PPP project, which has hitherto been a proposal, is what the construction phase consists of. This segment has a variety of risks associated with the project site as well as the process of construction. Boamah (2017) and Yescombe (2007) enumerated risks that must be dealt with before the financial close to the contract and during the process of construction. To cover technical aspects arising from this segment of the development, 10% is normally built into the project as contingency. Risk of delays and cost overruns are the major attendant risks that must be guarded against by the promoter (Cui et al, 2018; Merna and Njiru, 2002; Munier, 2014).

5.12.2 The negotiation phase

The negotiation phase helps bidders to explain their proposals to the ultimate beneficiaries of the project when 'Expressions of Interest' are called for. There are several ways that the bidding procedures are carried out whether it is through restricted, negotiated or competitive tendering (Mourao, 2018; Yescombe, 2007; Merna and Njiru, 2002). The developer is expected to carry out a thorough evaluation of the bid in view of the risks that the proposed project will have. In situations that require post-bid evaluation, the developer could carefully look at aspects of the proposal that would be lacking. Student unrest was one of the considered risks during the UNZA East Park Mall negotiations. Re-educating students on the need for such infrastructure could curb riotous behaviour as well as provide for recreation. This would be an application of 'relational' risk management approach to the project (Smith et al, 2014; Kumaraswamy and Zhang, 2003).

5.12.3 The commissioning phase

Project commissioning has in view the date projected for operations after the practical completion of the construction works. The developer is in a race against time to ensure that the financial structure envisaged for the project will work. Delays in completion of the project will drastically affect financing costs and revenues from operating the scheme (Munier, 2014). The consequences will be cost overruns in loan repayments. A plethora of risks will therefore need to be studied and mitigatory measures put in place

to cover the project's usage, expected network servicing the scheme, revenue payment, operating costs and maintenance (Yescombe, 2007, Merna and Njiru, 2002).

5.12.4 The hand-over phase

The project hand-over is an exciting time for the ultimate project owners. It is important to ensure that the maintenance clause built in the contract would have been done to the letter otherwise; huge maintenance costs would cripple the hitherto successful scheme. Further, due to years of operation, major aspects of the project would be nearing their life-cycle. It is in this wise that the last major renovation works for the project to be handed over should ensure replacement of all depleted and obsolete machinery (Mukalula, 2007). Employing monitoring manpower could lessen the problem of non-performance of PPP projects (Wu et al, 2018; Nisar, 2007). Mourao (2018) and Ndandiko (2006) cited the lack of capacity for the failure of 3P projects in Africa.

5.14 Case study discussion

Two PPP projects were studied. These were the Kasumbalesa Border Post and the University of Zambia East Park Mall PPP projects. In order to benefit from the case studies examined, five things were noted:

- the research questions;
- what the project proposed to achieve;
- the agreed units of analysis;
- linkage of the data to the project's criteria and proposition; and
- the agreed criteria on how the findings would be treated.

5.14.1 Research approach

The basis of inquiry into the two case studies was on their successful implementation. Both projects, since their inception, have operated unabated. Such a qualitative study has assumptions. One basic assumption, therefore, was to inquire the basis of the acclaimed success for the projects. Such reality may be subjective and hence the need to use instruments of inquiry that lessen biasness. In other words, the instrument must be dependable. In arriving at conclusions, the researcher uses inductive reasoning in testing

theory through observation. Case studies must consequently be credible so that inferences arising from the study are transferable. To aid this process, use of the research objectives in **Chapter 1** was necessary. The key components of the objectives addressed:

- how decision-making was influenced by critical success factors (CSFs);
- what risk allocation practices impacted risk management;
- how risk allocation enabled decision-making;
- how risk mitigation influenced the success of the project; and
- what relationship there was between risk allocation and project success.

In order to assess the projects effectively, risks were defined and profiled for each project. Financial comparatives showed the break-even points and net present values.

5.14.2 The Kasumbalesa Border Post PPP project

This section summarises and discusses issues raised in line with the research objectives listed above. Appendix G shows figures used to calculate the net present value (NPV) and break-even points (which is the payback period) for the project generating **Figure 4.13.** A constructionist paradigm therefore guided the discussion. The philosophical assumption asserted regarding the project concerned the basis of its implementation. Epistemologically, the Democratic Republic of Congo is fraught with instability. Yet even with that risk, the developer went ahead with building the border infrastructure. Ontological and epistemological themes arising from the interviews and questionnaires were analysed using the pragmatic-constructionist positivistic paradigm.

5.14.2.1 How was decision-making influenced by critical success factors?

Figure 4.13 showed that the project took a long time to break-even i.e. at the 36th year with reserves of US$ 685,750. In order to cover risks associated with the project, a higher discount rate was used. The discount rate used took into account the time value of money and exceptional risks affecting the project. The degree, to which risks were perceived particularly in repaying the loans for the implementation of the project in terms of interest, probably exacerbated the discount rate that was used. Chapman (2014),

Joslin and Konchitchki (2018) and Zulu and Muleya (2009) have argued that investors were prone to a number of risks in the implementation of PPP projects in a developing country. Accounting for such risks often causes investors to 'over-price' them to ensure good returns from the project. It was not the aim of the research to extract the amount of return but considered the fact that risks were factored in the project (Jean-Loup, (2017).

Three critical success factors were singled out by the developers. These were:

- stable macro conditions;
- favourable legal framework; and
- shared authority for public and the private sector.

These CSFs were the main reasons cited for undertaking the project.

5.14.2.2 What risk allocation practices impacted risk management?

Risk allocation practices impacted the entire contract documentation. The developer bore full responsibility for the project. In view of the risks of implementing the project at a border point that has at times known instability, the investor considered such a risk as exceptional (**Table 4.15**). This was considered significant hence would bring about a huge impact on the project. The risk of having the project taken over by the government was firmly considered. This is known as sequestration. After the Patriotic Front led government was elected into office in 2011, the investor was ordered to vacate the border premises due to national security concerns.

This risk was managed by including it in the pre-investment documentation that was submitted. In other words, the developer considered the possibility of losing the project. In 2015, the decision was reversed. Dibb et al (2014) discussed the need for tightening border security particularly in light of known terrorist attacks experienced in America and Britain after the year 2000. Leaving border management to the investor was seen as a security risk to the country. The government took into account the continued instability in the DRC especially after taking the reins of the nation's leadership. Management of the commercial entity of the border premises was later returned to the investor after

consultations with other stakeholders with the overall running under the Zambian authorities.

5.14.2.3 How did risk allocation enable decision-making?

The investor proceeded to undertake the project in spite of the risk analysis conducted. According to Sichinga (2012), 500 trucks cross the Kasumbalesa border post every day. This invariably suggested that the project was deemed viable in view of the border fees that were pegged at $133 for every 7 axle truck. The investor therefore had all the confidence of recovering invested funds from the built asset. Construction costs after the project was completed were valued at $25 million. A cursory calculation for monthly returns based on the estimated volume of traffic by Sichinga (2012) using the border crossing works out to be K66, 500 per month. This means that revenues obtained could pay back construction costs within 32 years. Additional border transactions considerations to this calculation were not taken into account though assurance was given for operations by the governments concerned. The concern of the investor was to ensure that monies owed would be paid even though the project was risky. Smith (2015) argued that an investor could choose to undertake a project if there is anticipation of debt repayment. This is what enables project owners to handle difficult risks. Akintoye (2003) argued the fact that one who is better placed to handle the risk makes the decision to undertake development. Control is the key word in assuming epistemic risks affecting projects (Smith, 2003 and Smith et al, 2014).

5.14.2.4 How did risk mitigation influence the success of the project?

The break-even point of 35 years did not justify the accepted viability of the project. Recalculating the break-even point (without taking into account the time value of money) revealed that the new point would fall between the 31st and 32nd years. The calculations took into account just the revenue for heavy-duty (trucks) traffic passing through the border (Sichinga, 2012). Other revenue emanating from small vehicles and trucks which were of a single-axle nature would obviously increase amounts collected. In so doing, the revenue collected would reduce the years for the break-even point. It was not the aim of this research to investigate issues connected to the matter of the

break-even point other than the consideration that the investor deemed the project viable. This being the case, the data that was used to verify the viability of the Kasumbalesa Border project would have considered only part of the information in the feasibility studies. Statistics stated by Sichinga (2012) indicated that 500 trucks cross the Kasumbalesa border point daily.

5.14.2.5 What relationship was there between risk allocation and project success?

Due to continued instability in parts of the DRC, justification for awarding the contract would have considered the project risky consequently using high interest premiums. For this to happen, the weighted average cost of capital (WACC), used a high interest rate to cover returns for borrowed funds as well as operations. Invariably, this gave the investor more time on the DBOT project and greater returns in the initial phase of the project as can be noted with hand-over to be done after 40 years (see **Figure 4.13**). This was to avert financial distress that could arise for sponsors and lenders. Kapambwe (2003) and Ndandiko (2006) argued that BOT projects of a PPP nature in Sub-Saharan Africa are faced with numerous risks making them impossible to execute. That is why sponsors and lenders, who agree to support the implementation of PPP projects, must be assured that revenue risk will not occur or be kept to minimum levels. A revenue risk arises when project cash flows (Merna and Njiru, 2002):

- are insufficient to cover the construction costs;
- are unable to service the debt; and
- are incapable of generating the benefactors anticipated investment rate of return.

It is therefore imperative that BOT projects be executed with efficiency. Qiu and Wang (2011) examined efficiencies with which BOT projects are implemented. They recommended regulation of the price as and when the concession period is extended. Further, BOT projects can succeed when governments guarantee a specific level of revenue to the investor (Knutson and Huettel, 2018; Wang et al, 2000). In doing so, this risk is mitigated. Invariably, the operations of the border must be under the control of the investor to ensure the recovery of invested funds. Other than that, tax payer's money would need to be used to off-set the loan the investor owes.

5.14.3 The University of Zambia East Park Mall project

The negotiation process for this project was protracted but fruitful, achieving a win-win situation for the developer as well as the recipient. A number of risks were discussed and reviewed during the process. Invested funds were also reviewed over the venture period using outlays shown in **Appendix G. Figure 4.15** showed the net present value and payback periods for the project. The process of analysis was therefore inductive. Using such a process, the researcher was able to use observations from the project to verify the theory for generalisation to similar schemes (Bryman, 2008).

5.14.3.1 How was decision-making influenced by critical success factors?

Embarking on the construction of the mall by the University, was seen as a viable project. It was observed that the developer's investment pay back period would be achieved around about the 23rd year while hand-over of the project would be be achieved at the 40th year (**Figure 4.15**). Decisions on the project were, therefore influenced by the following critical success factors:

- favourable legal framework;
- thorough and realistic assessment of costs and benefits;
- shared authority for public and private sectors; and
- transparent procurement process.

The enactment of the PPP law ensured that the university utilise its unusable land. Osei-Kyei and Chan (2015) identified transparent procurement in their review of critical success factors from 1990 to 2013. A transparent procurement process assures investors of fairness before and after the award of the project.

5.14.3.2 What risk allocation practices impacted risk management?

There was a thorough review of the risks that were to be experienced before, during and after the implementation of the project. Risk management needs a review of all risks so that alternative ways to be reviewed in handling the threat. With regards to risk allocation, it meant that it needed to be adequately done for the project. The developer proceeded in implementing the mitigatory measures related to the construction. For

instance, the development area was cordoned off with major security measures put in place by foot patrol guards. This is because one of the risks addressed for the project was the insecurity brought about by student unrest (see **Table 4.17**). Ahmadabadi and Heravi (2019) pointed out that projects must include 'adverse public attitude' in their risk assessment for project success.

5.14.3.3 How did risk allocation enable decision-making?

Project consultants stipulated all the possible risks and ensured that there was verification in terms of the attendant economic conditions prior to the commencement of the works as well as a forecast of the same for the future. This was a prudent way of making sure that the developer understood and owned such risks as would be handled by them. **Table 4.17** discussed the various risks for which plausible solutions for mitigation were identified. Although the total envisaged project for UNZA would not be embarked on with regards to the houses and hostels, nonetheless, the assurance of yielding revenues from the scheme could begin with the mall development. Ahmadabadi and Heravi (2019) found that 'risk allocation and 'good partnering' would better aid decisions made on PPP projects.

5.14.3.4 How did risk mitigation influence the success of the project?

It was observed that national economic parameters took a gradual increase which affected the pace of constructing other developments of the project. Some of the notable factors were the increase in interest rates and inflation that had a corresponding effect on fuel and the price of materials. Sensitivity calculation was not conducted on the figures shown in **Appendix G** that could assist in ascertaining potential variations brought about by project input disparities. However, the analysis discussed the major repercussions of the notable factors that were identified by the focus group and the questionnaires. The focus group pointed out the need for accurate estimates for the project. This in turn will be the basis for charting a way on what mitigation measures would be necessary. Srinivas et al (2013) stated the need for contingency in the way projects risks are dealt with. Contingency clauses would cater for the risk of unforeseen expenses arising from changes.

5.14.3.5 What relationship was there between risk allocation and project success

Nineteen risks were identified, defined and possible mitigatory measures were suggested (see **Table 4:17**).Ten of the topmost risks were:

(a) interest rate;
(b) exchange rate;
(c) residual value;
(d) construction cost overrun;
(e) insurance risk;
(f) lack of maintenance;
(g) delays in completion of the project;
(h) unwarranted rental hikes;
(i) government obligations; and
(j) student unrests.

The developer thoroughly reviewed the risks that would attend the project (see **Table 4:17**). It was in the interest of the recipient to address the risk of the "Residual value" of the project after the concession period. 'Lack of maintenance' was therefore considered with the suggestion that a committee be set up to report to the board of the Special Purpose Vehicle (SPV). This allocated risk to the developer also ensured that materials incorporated in the design were durable. As a result, the project's trajectory (shown in **Figure 4.15)** gave an even evaluation (represented by the S-curve) of the project. This meant that risks affecting the project, particularly in the period before the breakeven point, were carefully valued. Comparing the East Park Mall project with the Kasumbalesa Border one, shows that this was the point of divergence. The Kasumbalesa project projections had a longer period prior to the break-even point even when Sichinga (2012) showed that construction of border infrastructure would be profitable. Increased trade as well as developments in the DRC, guaranteed the success of the project. In the same way, steady flows in construction contribution noted in the 2010, 2013 and 2015 Bank of Zambia Annual reports, also assured the achievement of positive returns in the UNZA PPP project for the developers (Mukalula and Muya, 2017).

5.15 Rotated Component Matrix extracted factors

Using the Principal Analysis method, Rotated Component Matrix (RCM) tables were extracted for the factors being investigated. **Chapter 3** listed the factors and their variables. Variables under each factor, whose generated eigenvalues were below 0.5 and double loaded, were deleted. Analysis of the undeleted factors (that have least variances), are discussed in line with the set objectives of the research. RCM tables were produced for the risk allocation factors of:

(a) risk identification;
(b) critical success factors;
(c) risk allocation;
(d) risk mitigation; and
(e) PPP project success.

5.15.1 Risk identification extracted variables

The risk identification variables extracted shown with their indicating variances were:

(a) workshops (0.703);
(b) experience and data bases (0.752);
(c) brain storming (0.785);
(d) allied organisation input (0.815); and
(e) external consultants (0.846).

5.15.1.1 Workshops for risk identification

The order of the extracted variables for risk identification was different from the questionnaire descriptive statistics which had ‘experience’, ‘site visit’, ‘brain storming’ and ‘workshops’. Extracted variables identified ‘workshops’ as the first followed by ‘experience and data bases’, ‘brain storming’ and ‘allied organisation input’, respectively. The two research methods yielded similarities for ‘workshops’, ‘experience’ and ‘brain storming’. Workshops were identified as an effective tool for risk identification by Jefferies (2006), Dahiya et al (2017), and Curristine (2005) as well as Herzberg and Wright (2005). This is because of the wide consensus of views from

practitioners that can be obtained in such platforms. In obtaining wide consensus, brain storming is used as a tool in identifying risks.

5.15.1.2 Experience and databases for risk identification

'Experience' and 'databases' had the same variance response from the Principal Analysis method (which was 0.752). Lack of PPP experience can cause a practitioner's inability to identify project risks. Ahmadabadi and Heravi (2019) developed a risk assessment framework that integrated risk interaction and stakeholder expectations. Using the Decision-making trial and evaluation laboratory (DEMATEL) method, Zhang et al (2019) identified inadequate supervision as a critical success factor in the growth of Sponge City PPP projects. Supervisory skills arise from experience. **Figure 4.4** showed the disparity in Zambian construction professions' service years, industrial and PPP experience.

Databases are used to keep past information on various aspects needed for future decisions to be made. Databases are necessary for infrastructure that is developed using PPPs. For instance, Cui et al (2018) utilised a three phase word frequency analysis and cluster analysis in arriving at six main research topics for PPP infrastructure. Researchers could be motivated to identify research gaps to support the growth of infrastructure.

5.15.2 Critical Success Factors extracted variables

The rotated component matrix (RCM) produced the following Critical Success Factors for PPP risk allocation consideration:

(a) strong and good private consortiums (0.504);
(b) transparent procurement process (0.593);
(c) favourable legal framework (0.640);
(d) thorough and realistic assessment of costs and benefits (0.646);
(e) shared authority for public and private sectors (0.668);
(f) save time in delivering the project (0.717); and
(g) stable macro condition (0.773).

Examining the variances generated in the Principal Component Analysis in **Table 4.21** showed that 'strong and good private consortiums' and 'transparent procurement process' were the first two factors with results of 0.504 and 0.593, respectively. These two factors fall into the ambit of governance and effective management of PPPs. A 'favourable legal framework', is ranked third, as a critical success factor. The legal framework is therefore a development strategy that must be preceded by 'strong and private consortiums' and bidding processes that is 'transparent' for the successful implementation of PPPs in Zambia.

5.15.2.1 Strong and good private consortiums

Lack of strong and good consortiums render a PPP project uncompetitive (Ahmadabadi and Heravi, 2019). The ability of a consortium to win the confidence of financiers averts the risk of lack of liquidity. There are a number of risks that the consortium has to deal with from the initiation of negotiations to the financial close of the PPP transaction. Several risks must be identified and analysed with a determined response before executing the contract (Smith et al, 2014; and Yescombe, 2007). The financial close is the last stage before the project receives confirmation for implementation. After the years of ownership by the developer, the scheme is handed back to the 'concessioners' (Cui et al, 2018; Grimsey and Lewis, 2004).

5.15.2.2 Transparent procurement process

There must be transparency as well as non-discriminatory clauses in the legal framework to be attractive hence allaying inadvertent risks during the tenure of the project (Tvano, 2010). Wu et al (2018) and Walsh (2007) posited four such risks that concern the legal and regulatory framework. These are risks that:

- all necessary conditions affecting the project be met before it is executed;
- that judicial review was sought from the local council's planning authority of the area;
- the vulnerability for uncontrolled risk could be experienced when the local authority identified incomplete grouped schemes during submission; and

- envisaging what future legislative changes could pose as risk to the PPP project if such were unforeseeable at the time of signing the contract.

5.15.2.3 Favourable legal framework

The legal framework shows developers the rational for the risks transferred to them in the PPP project (Walsh, 2003). Value for money (VFM) and accounting management are the basis of risk transfer. VFM is a critical component in the transference of project threats. Capital operations are cushioned by VFM in terms of recovering of costs expended towards the project. It is therefore essential that components are examined in the regulatory framework. These set the rules in the way various relationships among stakeholders are used to guide averted risks when a project is undertaken. Chambwe (2017) opined that the framework of the Zambian PPP Act No.14 was very deficient in influencing decisions, particularly at the financial level. Walsh (2003) reasoned that risk allocation's aim was to control the consequence of the threat and value for money (VFM) to the contract. Disjointed regulatory systems discourage investors. Regulations attract certain risks to investors which bring additional costs to projects which come as transaction charges (Marques, 2017; Hurst and Reeves, 2004; Skelcher, 2010).

The key issue is to ensure that there is transparency in the selection of the private investor (or developer) as well as the disbursement of resources available in the PPP. Frameworks help reduce the level of risk due to corruption and opportunism. Knowledge transfer from the PPPs has been suggested as a way of avoiding disputes among the stakeholders (Skelcher, 2010). In a bid to have accountability, a futuristic approach must be adopted not to place investor's funds are risk (Hueskes et al, 2017).

5.16 Risk allocation RCM extracted variables

The rotated component matrix (RCM) generated the following factors for PPP risk allocation (see **Table 4:22**):

(a) political risk is managed by the public (0.647);
(b) technology risk is shared (0.664);
(c) operation risk is managed by the private (0.724);
(d) financial risk is managed shared (0.764);

(e) political risks are shared (0.779);
(f) cost overrun risk is managed by the private (0.798);
(g) pre-investment risk is managed by private companies (0.806); and
(h) regulatory risk is managed by the public (0.818)

The top allocation risks extracted by the RCM Principal Component Analysis were that 'political risk to be managed by the public' that gave a variance of 0.647.

5.16.1 Political risk is managed by the public

According to Belkir et al (2017), political risk is a catalyst for negative investment. That is why the public needs to know that political interference can debilitate development. In their management of such development, their focus must be the improvement of the infrastructure they may be supervising. Development must make individuals fostering such, be relegated to the shadows (Yescombe, 2007 and Merna and Njiru, 2002).

5.16.2 Technology risk is shared

Sharing technology risk involves the efficient and effectiveness functioning of equipment, materials, processes. Dikmen et al (2009) noted the comprehensiveness of the technical risk. In their view, technology risk comprised the following:

- construction risk;
- design risk;
- operation risk and maintenance risk;
- seismic risk;
- environmental risk;
- safety risk; and
- transfer risk.

All the above risks can bring grave financial consequences upon the project. That is why the expertise involved in the process of implementation is vital. As far as PPPs are concerned, 'best value' must offer minimum cost to the public as well as the developer. Dikmen et al (2009) proposed the appliance of effective tender-evaluation stratagems in dealing with risks associated with technology.

5.16.3 Operational risk management

Among the difficult issues identified regarding the operation of risk allocation by Chinyio and Fergusson (2003) were 'absence of a risk management culture', 'difficulty in ascertaining the efficacy of risk assessments', 'differing perceptions on the magnitude of risks' and the 'lengthy duration of PFI schemes'. They advised that adequate time be devoted to training risk analysts and its evaluation. Furthermore, they also advised against 'over engineering assessed risks' in a bid to assuage financial escalation in the contract'. Thoroughly understanding the nature of risks could utilise better mitigation avenues as well as arriving at accurate concession periods for projects (Smith et al, 2014).

5.17 Risk mitigation RCM extracted variables

The rotated component matrix (RCM) produced the following factors for PPP risk mitigation (see **Table 4:23**):

(a) political risk is managed by the public (0.647);
(b) technology risk is shared (0.664);
(c) operation risk is managed by the private (0.724);
(d) financial risk is mitigated by both (0.764);
(e) political risk are mitigated by both (0.779);
(f) cost overrun is managed by the private (0.798);
(g) pre-investment risk is mitigated by private developers (0.806); and
(h) regulatory risk is mitigated by the public (0.818).

Risk mitigation is an important component in a project's life cycle. It is a recognised fact that any project that is being implemented faces various risks that must be managed in order for a project to succeed (Belkhir et al, 2017).

5.17.1 Political risk is managed by the public

Belkhir et al (2017) noted the negativity that political risk fosters on the developer's cost of equity and capital. For the public to manage 'political risk', suggests their ability to be part and parcel of the project, which is the essence of PPPs. The public, as participating communities, are able to secure pieces of land that would not be easily acquired by the

developer. Since the project would benefit communities in which they are implemented, political risk is thereby managed.

5.17.2 Technology risk is shared

The sharing of technology risk is discussed above under the major heading of risk allocation. In view of the fact that 'technology risk' is associated with a number of other risks, sharing ensures ownership of the project. In this way, the cost to the public is minimised substantially (Dikmen et al, 2009). There is necessity to include a clause that will ensure that the public is covered for obsolete technology at the time of handing over the project to them.

5.17.3 Management of operation risk by the private sector

The private sector has upper hand in managing operation risk. This is because their work ethic ensures that they derive profits from the projects they are involved in. Efficiency systems are therefore applied to ensure that the project succeeds regarding monitoring and assessment of risk factors (Chinyio and Fergusson, 2003).

5.18 PPP project success RCM extracted variables

The rotated component matrix (RCM) generated the following factors for PPP Project Success (see **Table 4:24**):

(a) PPP project stakeholders are satisfied (0.523)
(b) PPP projects bring technology transfer to local people (0.657)
(c) PPP project risk management decisions leads to realising value for money (0.660)
(d) PPP projects are completed within the scheduled time (0.708)
(e) PPP projects contribute to local economic development (0.711)
(f) PPP generates profits in the operation phase (0.739)
(g) PPP projects are produced according to specifications – high quality (0.744)
(h) PPP projects are completed within budget (0.811)
(i) PPP project risk management decisions leads to employment creation (0.853)
(j) PPP project leads to exchange of expertise (0.868)

Ultimately, project success is the aim of a PPP and is shown by:

(i) stake-holder satisfaction;

(ii) technology transfer to the local people; and

(iii) the realisation of value for money in the project.

5.18.1 Stakeholders satisfaction

Stakeholders' satisfaction is derived from the accomplishment of the project. In so doing, the project will have the following qualities (Eaton and Akbiyikli, 2003):

(i) that it will be viable;
(ii) it will be affordable; and
(iii) will be bankable.

The above qualities show the necessity of a proper financial perspective for the project. Stakeholders must be satisfied that their financing method covers equity. This foresees the event of project failure that exposes the equity investor to the risk of loss. Such a risk is of top priority (Asenova and Beck, 2003). For the satisfaction of stakeholders, bankable projects must have their profitability and liquidity observed. Profitability and risk are positively correlated and would assure lenders of a return on capital invested (Smith et al, 2014). Proper cost-benefit analyses done could satisfy stakeholders as well as contribute to the local economic development of the areas projects is implemented.

5.18.2 Technology transfer to local people

Ultimately, the PPP project reverts to the people in whose area the project is implemented. Technology transfer is one incentive that empowers locals. In seeking to do so, provision for renewing the technology as well as extension of intellectual property rights must be taken into consideration (Smith et al, 2014). Developers must minimise perceivable technological obsolescence (Hardcastle and Boothroyd, 2003).

5.19 Results triangulation for the research

Five research questions were the basis of investigation (**Chapters 1, 3, 4 and 5**). The research methodology in **Chapter 3** stated the need for triangulation of the research questions derived from interviews, questionnaires and case studies. The questions were:

5.19.1 *Which critical success factors (CSFs) were utilised in PPP projects?*

The questionnaire survey obtained three results in answer to the above question. These were:

(a) saving time in project delivery (with a response of 9.82%);
(b) benefit to local economic development (with a response of 9.78%); and
(c) transparent procurement process (6.21% from respondents but this factor was second last on the list).

Using Rotated Component Matrix results, two results were prominent. These were:

(a) strong and private consortiums, which gave a variance of 0.504; and
(b) transparent procurement process which had a variance of 0.593.

Benefit to local economic development had no variance registered. From the above, it was apparent that saving time in the delivery process has to start with the negotiation stage through to the hand-over. Key to this process is to ensure that there is transparency to all stakeholders in how the project is disbursed to the preferred bidder.

5.19.2 *What risk allocation practices are considered in risk for PPP projects?*

The questionnaire survey obtained two results in answer to the above question. These were:

(a) debt servicing on projects must be shared (with a response of 10.20%); and
(b) political risk must be shared (with a response of 8.34%)

Using Rotated Component Matrix results, two results were prominent. These were:

(a) political risk is managed by the public, which had a variance of 0.647; and
(b) technology risk is shared, which had a variance of 0.664.

Risk allocation practices are a matter of the PPP Act. Through the Act, risk can be better managed using statutory instruments that can provide developers with better incentives. With projects speedily implemented, there can be minimisation of the risk allotted to the developer.

5.19.3 *How does risk allocation impact decision-making on PPP projects?*

The questionnaire survey obtained two results in answer to the above question. These were:

(a) it impacts what type of work experience technocrats have (which had a response of 11.00%); as well as
(b) site visits (which had a response of 10.77%).

Using Rotated Component Matrix results, two results were prominent. One of the results was the same as in the survey. This was 'experience' which gave a variance of 0.752 with the second being 'data bases with a variance of 0.752.

PPP technocrats must therefore have the necessary experience if they are to be astute with contractual issues for this mode of development.

5.19.4 *What mitigation methods are used on PPP projects?*

The questionnaire survey obtained three results in answer to the above question. These were:

(a) permit approval risk must be treated (giving a response of 8.727%);
(b) delay in financial closure is mitigated by treatment (with a response of 8.63%) and
(c) completion risk is mitigated by treatment (with a response 8.45%).

Using Rotated Component Matrix results, three results were prominent. These were:

(a) political risk is managed by the public with a variance of 0.647;
(b) technology risk is shared with a variance of 0.647; and
(c) operation risk is managed by the private sector giving a variance of 0.724.

Obtaining insurance is critical for developers in light of protracted negotiations as a way of mitigating costs expended in the contractual process.

5.19.5 *Is there a relationship between risk allocation and project success?*

The questionnaire survey obtained three results in answer to the above question. These were:

(a) PPP is successful as it creates employment with a response of 8.58%;
(b) successful as it guarantees high construction goods and exchange expertise which gave a response of 8.53%; and
(c) brings about transfer of technology which gave a response of 8.49%.

Using Rotated Component Matrix results, three results were prominent. These were:

(a) PPPs satisfies stakeholders, which had a variance of 0.523;
(b) PPPs realise value for money, giving a variance of 0.660; and
(c) PPPs contribute to local economic development which gave a variance of 0.711.

These six results give credence to why PPP must be used as a mode of development.

5.20 Regression Analysis and model summary

Regression analysis was performed on the empirical data in order to establish the nature of relationships between the two independent variables and the dependent variable. The independent variables were risk allocation and risk mitigation while. This was done by way of calculating the Pearson Correlation Coefficients shown in **Table 5.3** below**.**

Table 5.3: Pearson Correlation Coefficients

Correlations				
		PPP Project Success	Risk Allocation	Risk Mitigation
Pearson Correlation	PPP Project Success	1.000	-.111	.108
	Risk Allocation	-.111	1.000	.033
	Risk Mitigation	.108	.033	1.000
Sig. (1-tailed)	PPP Project Success		.229	.236
	Risk Allocation	.229		.413
	Risk Mitigation	.236	.413	
N	PPP Project Success	47	47	47
	Risk Allocation	47	47	47
	Risk Mitigation	47	47	47

From **Table 5.4**, it can be deduced that R, the Pearson Correlation Coefficient for risk allocation and PPP project success was -0.111. This indicated that ***there was a weak negative relationship between the two variables***. This goes to show that allocating risks to the stakeholders stated in the questionnaire ***was negatively impacting on the success of PPP project success***.

The value of R, the Pearson Correlation Coefficient for risk mitigation and PPP project success was 0.108, showing ***that there was a weak, positive linear relationship between the two variables***. This implies that the risk mitigating measures employed on PPP projects ***contributed to the success of PPP projects but the impact was very minimal***. **Table 5.4** below shows the model summary for the independent and dependent variables the study.

Table 5.4: Model Summary for Independent Variables and the Dependent Variable

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.157[a]	.025	-.020	.35580	.025	.557	2	44	.577

a. Predictors: (Constant), Risk Mitigation, Risk Allocation
b. Dependent Variable: PPP Project Success

The model summary (shown in **Table 5.4**) showed the impact of the two independent variables (risk allocation and risk mitigation combined) on PPP project success, the independent variable. The model R value was 0.157; this depicted ***a weak, positive linear relationship between the two independent variables and PPP project success***. The implication of this is that decisions made in terms of risk allocation and risk mitigation had a minimal impact on PPP project success. Furthermore, R^2, the Coefficient of Determination was found to be 0.025. This showed that only ***2.5% of project success could be attributed to risk allocation and risk mitigation***.

5.21 Hypothesis Analysis

Hypothesis analysis that was stated in the conceptual framework of chapter 3, gave the following summary of coefficients shown in **Table 5.6** below. Of concern was the bias in the sample used. The sampling error calculated by SPSS for 'Risk allocation' was -0.115 while that for 'Risk Mitigation' was 0.111. As noted before, responses from respondents for 'Risk allocation' were highly skewed giving a result of -0.115. This presented asymmetrical values for analysis while for 'Risk Mitigation'; the values were positive indicating normality in the distribution.

Table 5.5: Summary of Coefficients

Coefficients[a]									
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
Constant	4.440	.954		4.655	.000	2.517	6.362		
Risk Allocation	-.144	.187	-.115	-.769	.446	-.521	.233	.999	1.001
Risk Mitigation	.084	.112	.111	.748	.458	-.142	.311	.999	1.001
a. Dependent Variable: PPP Project Success									

The study was designed to test two hypotheses: **H1** and **H2** which stated that "Risk allocation decision-making contributes positively to PPP project success" and "Risk mitigation decision-making contributes positively to PPP project success" respectively. The hypotheses were based on **a two-tailed test at 5% level of significant, with 95% confidence interval**. The lower and upper bounds in **Table 5.5** above are summarised in **Table 5.6** below.

Table 5.6: Hypothesis Analysis

Hypothesis	5% level of significance	Lower Bound	Upper Bound	t	Decision
H1: Risk allocation decision-making contributes positively to PPP project success	0.05	-.521	.233	-.769	Accept **Ho**
H2: Risk mitigation decision-making contributes positively to PPP project success	0.05	-.142	.311	.748	Accept **Ho**

As summarised in **Table 5.7** above, hypothesis 1 was rejected on the premise that empirical data does not support the researcher's prior assumption that "Risk allocation decision-making contributes positively to PPP project success". The test statistic t was -7.769 which fell below the lower bound value of -0.521. Hypothesis 2 which stated that "Risk mitigation decision-making contributes positively to PPP project success" was equally rejected. This was so because t, the test statistic was 0.748, a value above the upper bound value of 0.311. ***Based on the hypothesis analysis, it can be inferred that***

decision-making in the area of risk allocation and risk mitigation, did not contribute to PPP project success hence accepting the hypothesis Ho.

5.22 Proposed framework for decision-making for project success

One pertinent issue pointed out in the foregone discussion and analysis of the focus group, questionnaire and case studies focused on the lengthy implementation period for PPP projects. There were 17 steps identified in the procedure of Act No. 14 of the PPP law from the proposal of the project to its execution with the process taking a period of one to three years. Cost implications of the procedure were not the ambit of this research project. Decision-making, however, starts from the before the conceptualisation of the project. The government departments give consent starting with the registration of the concept until the final clearance is given by the Office for Promoting Private Power Investment (OPPPI) in the Ministry of Mines, Energy and Water Development.

The proposed decision-making framework shown in **Figure 5.1** below took into consideration the key element of time i.e. from the moment the project is proposed to its implementation. In essence, the framework is designed to limit financial epistemic risks to a minimum. These risks were discussed in some detail in the literature review and research findings, chapters 2 and 4, respectively. Akintoye et al (2003) examined the six stages that the Office of Government Commerce (OGC) uses as a gateway for PPPs for developing a risk management framework. They concluded that there would be differences of consideration that would be dependent on the circumstances of the project.

This research therefore established a different critical success factor set in terms of order from that found by Cui et al (2018), Yescombe (2007), Grimsey and Lewis (2004), Wang et al (1999) Wang (1999), Cheung et al (2010), Yescombe (2007), Akintoye and Beck (2009) and Hodge et al, 2010).and Jefferies (2006). Studies done in China by Wang et al (1999) placed emphasis on issues of time while for Australia, constant use of the facility was prime (Jefferies, 2006).

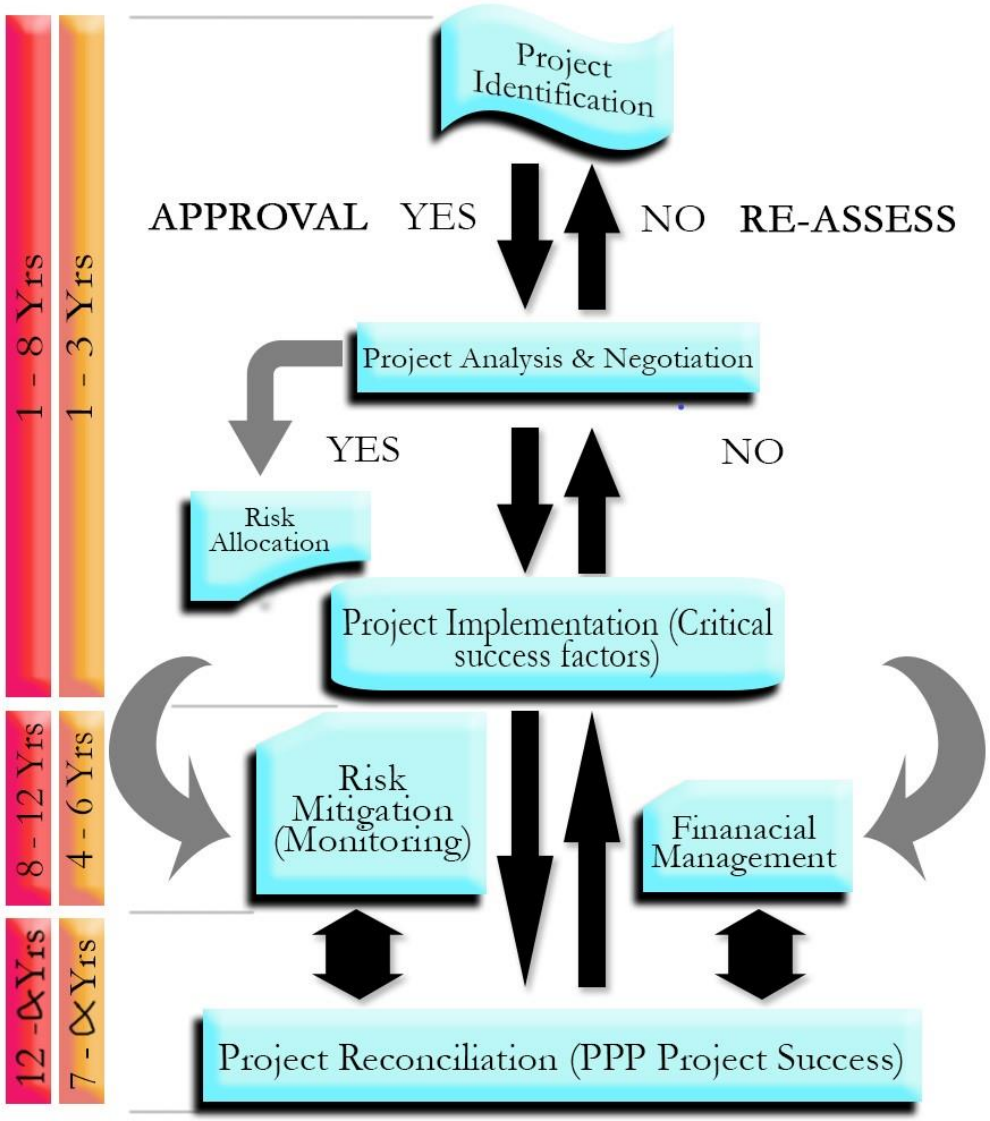


Figure 5.1: Proposed decision-making framework

The seminal study done Li and Akintoye (2003) combined the many facets that make PPP work but concluded by pointing to difficulties in handling risk; its need of being handled by the party best able. Only the developer has that 'bird's eye view' of the project, driven by the motive of profit (Frank and Shen, 2016).

The suggested framework capitalises on using Zambian CSF during the project implementation that must be checked during the monitoring as well as prudent financial management. In order to achieve greater value for money (or benefits), allocated risks must constantly be aligned to CSFs for the project success (Cui et al, 2018). For this to

happen, stringent project analysis must be done. Project specific risks must be evaluated. If at these critical stages, there would be a mis-alignment of the risks envisaged, then the entire project must be re-assessed. Financial management is an important aspect in re-assessing the project's financial viability amid epistemic risks (Heider et al, 2015). Investment is only considered when there would be an adequate return to the investor. Weighted average cost of capital (abbreviated as WACC) is what investors often use to balance their equity and debt as they do so. Companies that will have readily available resources (i.e. their own money or equity); make decisions to invest in projects that are floated on the international market (Frank and Shen, 2016). It is to the advantage of the company investing to have a high gearing value in order for it to embark on Greenfield projects. The gearing (the ratio between equity and debt) must be high at the beginning of the project and taper towards the end. Such decisions would have to be weighed against a 'risk free environment' although such is inconceivable (Jean-Loup, 2017). But for purposes of analysis, this comparison is done to weigh the company's worthiness of undertaking the project. For this, a capital asset pricing model (or CAPM) is utilised that compares the company's business against the government's debt (Toumi et al, 2018). Essentially, corporate investment is negatively related to the cost of capital (Frank and Shen, 2016). Lower interest rate in developing countries, hence encourages investment. The Zambian banking situation has had high interest rate that has hindered investment in key projects such as those dealing with energy.

Companies that vie for investment must therefore have their risk profiles that must equate the WACC (Balog et al, 2017; Yescombe, 2007) that will be able to match the project's eventualities. Once threats to the project are examined, the best party to handle them would be allocated that risk in the contract (Joslin and Konchitchki, 2018). In view of the limitation set by the hypothesis of this study, discussion into the combination of the factors mentioned above could not be delved into. These would be work in progress by way of future research as more PPP projects are implemented.

The focus group was again approached to critique the decision-making framework for implementation in the Zambian construction industry. Various suggestions were given

that aided changing of some aspects to the framework. Eventually, 8 out of the 11 individuals consulted, were able to verify the workability of the framework shown in **Figure 5.1**. This gave a **72.73%** response in favour of the use of the framework.

5.23 Summary

This chapter discussed the results obtained from the focus group interviews, questionnaires and case studies. From the tested hypothesis for risk allocation and risk mitigation, there is much that needs be done for these two components to be able to contribute to positively to PPP project success. Pearson coefficient established that decisions made in terms of risk allocation and risk mitigation had a minimal impact on PPP project success, attributing only ***2.5%***. This suggested that only a few factors were contributing to project success, foremost of which was of little tangible benefits to the local population. Results of the examined CSF showed that for PPPs to be successfully used as governance, management and development tool, benefit to economic development was a necessary component for the realisation of Act No. 14. PPP implementation periods have further negatively affected the replication of such schemes through protracted negotiations hence hindering development. In order to chart the way forward, a decision-making framework was proposed with the aim of reducing the implementation time hence making PPPs in Zambia effective management wise. The framework would shorten the project implementation time to about three years so as to encourage developers to undertake developments in risk laden Sub-Saharan Africa.

CHAPTER 6 : CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

In the previous chapter, focus group interviews, questionnaires and two case studies were discussed. Various factors affecting risk allocation and mitigation for PPP project success in Zambia were deliberated. This chapter presents the conclusions and recommendations as well as limitations and areas for further research.

The aim of the research was to establish a risk allocation decision-making tool for the successful implementation and management of PPP contracts in Zambia. The specific objectives of the study were to: determine critical success factors for decision-making in PPP projects; establish risk allocation practices considered in risk management for PPP projects; evaluate to determine critical success factors (CSF's) utilised in decision-making in PPP projects; evaluate how risk allocation impacts decision-making on PPP projects; to establish the relationship between risk mitigation decisions and PPP project success; and to establish the relationship between risk allocation and PPP project success. The aim and specific objectives of the study were achieved through: literature review; focus group interviews with 11 seasoned PPP professionals that had between 5 to 10 years' experience with the initial implementation of PPPs in Zambia's construction sector; a questionnaire survey with 47 respondents from the industry as well as a survey of two successfully implemented case studies that were used to validate decision-making processes in PPPs. These were located at the University of Zambia and Kasumbalesa border. A decision-making framework was proposed that was also validated by the focus group who was initially interviewed for the study in obtaining primary data.

6.2 Conclusions

The conclusions drawn were based on literature review information. It was noted in the literature review that PPPs as a mode of development, are part of the New Public Management (or NPM). Material in the literature review was used to extrapolate further information specifically designed for the questionnaire. Professionals who worked on the implemented case studies were formally interviewed on risk allocation decision-making processes the projects had. Conclusions were therefore drawn from the findings

in the interviews; questionnaire survey as well as case studies. These were aligned with the specific objectives of the study and are presented in the next sections.

6.2.1 Critical success factors (CSFs) utilised in decision-making

The study established that CSFs were used in decision-making when implementing PPP projects in Zambia. Using SPSS, Principal Component Analysis iterations regression analysis revealed, in orderly form, the following seven out of the twelve factors:

(a) strong and good private consortiums;
(b) transparent procurement process;
(c) a favourable legal framework;
(d) thorough and realistic assessment of costs and benefits;
(e) shared authority for public and private sectors;
(f) save time in delivering the project; and
(g) stable macro condition.

Therefore, the foremost critical success factor was the 'formation of strong and private consortiums'. The order derived from the questionnaires was, however, different from results obtained from the regression analysis. With the analysis of responses from questionnaires, 'save time in delivering the project' was placed first. Noted was the fact that the seven factors CSFs were results of questionnaires as well as the regression analysis. Chapter 4 gave an analytical discussion of the CSFs. The case studies also pointed to efficient time delivery. Although the full scope of the UNZA developments has not been done, construction of the mall would provide funds that were to be used to spur the expansion of the project. The construction of the Kasumbalesa Border Post was within the estimated time frame to capitalise on expected profits. Although there was political interference that affected the operations at the border, workable partnerships were agreed to enable business to proceed. Khanda (2011) found the need for strong private consortiums as a CSF for Zambia. These could foster good working structures as the focus group interviewees indicated. The Private Sector Association, the OPPPI together with the PPP Unit in the Ministry of Finance must see if the above tenets are driving the implementation of PPPs in Zambia.

6.2.2 Risk allocation practices for successful PPPs

Risk allocation practices are closely connected to their identification. Interviewees stated that 'experience' was used in risk allocation practices while the regression analysis added the 'use of data bases' in identifying it. However, it was noted that there is little PPP experience among professionals. This is because the PPPs are 'Greenfield' in Zambia since the enactment of the law in 2009. The pace of implementation has also been very slow. Although there were a number of projects ear-marked as PPP projects, many of them are still at 'drawing table stage'. In view of this, the need to showcase successful projects such as the Kasumbalesa and UNZA East Park Mall must be constantly reviewed through workshops. The workshops could also chart the way forward in terms of PPP practice in Zambia. In short, very little by way of workshops and reviews are being done. As a result, the PPP Act may slowly become irrelevant. ***This a challenge that the Ministry of Finance PPP Unit can take up by way of sensitising the nation as well as floating the benefit of other would-be projects.***

6.2.3 Risk allocation impact on decision-making

The impact of risk allocation is directly connected to its identification. It is only when risks are identified that their impact would be seen on projects, whether negatively or positively. The hypothesis evaluation stated that only about 2.5% of project success could be attributable to risk allocation. ***In other words, the majority of the decisions made on PPP projects have had little success. That is why there is a failure of replicating these projects across the nation even though there was a long list of lined-up schemes to be implemented.*** This means that the last 10 years has been one of trial and error. Decision-makers need to understand the various synergies that PPPs introduce when used for contract implementation. It is not enough that PPPs are executed but remediation is a critical component of the decisions that will make the project's successful. The matter of experience comes in the limelight at this point. Risks need to be technically valued from a managerial and financial perspective. These need financial understanding of how risks have been valued so as to be managed over the concession period of the project.

The two case studies in chapter four were analysed using the payback and NPV methods. Both projects were constructed using the Design, Build-Operate-Transfer (DBOT) methods. ***However, the two projects gave two different scenarios on how risk information impacted them***. Stable macroeconomics information gave the UNZA East Park Mall a better forecast than the Kasumbalesa Border Post Development. That is what explains the different break-even points over the 40 year concession period. This study could not carry out a Monte Carlo Model which could show possibilities of how envisaged epistemic risks could be dealt with over the course of the project. ***For both projects, decision-makers needed to be well versed with financial analytical tools to help evaluate risks accounted for in determining their PPP suitability***. It was noted that simple scoring methods were used for choosing the best rated bidder for the project. Awarding the contract by use of the simple scoring method required the highest total score of the developed rating criteria. Evaluating the bidder's NPV for the concession period could provide low costs to the public, as the ultimate payers of the project. This could be combined with the simple scoring method. Using the NPV enables financial and economic risk characteristics of the project to be measured carefully over the concession period. Synergies by construction professions with those equipped in unraveling economic and financial aspects of PPP projects such as the Economic Association of Zambia (EAZ), can lead to effective use of this mode of development.

6.2.4 Risk mitigation impact on decision-making

Respondents stated that risk mitigation methods contributed to the kind of decisions developers adopted for their projects to succeed. The mitigation methods were either for the short or long term. Short term approaches assured the continuance of the project during the construction phase while the operation period used long term ones till the hand-over stage. These two broad segments encompass decisions affecting project specifications, alterations in the PPP law as well as inadvertent factors to the scheme. Ultimately, these may be covered by developers obtaining various insurances although additional capital and operational expenditure would be required for the project to be successful. For instance, respondents indicated that three of the pertinent risks to PPP projects be mitigated by three different groups i.e. by the public (for political risk),

shared (for technology risk) and the developer (for operation risk). ***Involvement of the public ameliorates difficulties of implementation when employment is offered to the populace in places projects are established.*** On the other hand, the difficulties emanating from technology were a shared responsibility. The developer is often given concessions to import machinery for use during the implementation of the project, which would become the property of the recipients once the scheme is completed. Hence, operational risk on successfully executed PPP projects attracted enormous capital as well as working expenditure from the developer.

6.2.5 Risk allocation and project success

PPPs are an off the balance sheet type of project that are aimed at saving national resources by governments. The contractually allocated risks to either the developer or the recipients require that they are prudently attended to. ***Pearson correlation indicated a weak negative relationship between the variables of risk allocation and project success. Risk allocated was negatively impacting stakeholders with substantial realisation of PPP objectives as envisaged in PPP law, Act No. 14. The few PPP projects implemented have suggested minimal commitment from investors. Therefore, the well-meaning intent of increased investment by virtue of Act No. 14 has been eroded. Stakeholders are seemingly apprehensive to embark on such projects which explain the low uptake of the listed PPP schemes by the Ministry of Finance and National Planning.*** The slow inertia is being affected mainly by an undeveloped banking sector. Financial parameters such as interest rates used for project evaluation indicated an increase in investment obligations despite assurances of high profits as against low business establishments. Contractually, developers inevitably take on many risks using the PPP mode of development being initiators of the projects. Information that forms the base for making decisions regarding such investments is inept or non-existent at all. PPP projects are therefore, likely to be approved owing to the deficit in national infrastructure even when they would be evaluated inadequately.

6.3 Recommendations

The study showed that PPP allocated risk decision-making was ***minimally influenced by critical success factors and mitigation methods for success***. It is in light of this statement that the following recommendations have been advanced from the study.

6.3.1 Risk allocation decision-making framework

The study established how that the time element prior to the implementation of the PPP projects negatively impacted developers' decision-making in undertaking the schemes. Owing to the lengthy negotiation process that have portended implemented projects, a risk allocation decision-making framework was developed aimed at fruitfully decreasing the discussion's period. The suggested framework has utilised critical success factors identified by this study. Although PPPs are an off the balance sheet type of project, risks foreseen during the life of the same, need to be prudently managed. It is the recognition of the fact that user fees to pay the developers would need to be affordable to the public. The investor's use of weighted average cost of capital (WACC) enables calibration of reasonable user fees to be charged over the concession period. On the other hand, the recipient government could scrutinise the developers' submitted financial proposals using the capital asset pricing model (CAPM). The agreed time, will therefore shorten the overall license concession period for the developer with no need of expost extension prior to ownership possession. The current use of the simple scoring method is inadequate to decipher the impact of risk in the choice of developers. It is recommended that a wide range of financial tools associated with WACC and CAPM such as the net present value, internal rate of return and payback. These could be used at the bidding stage in the 'two envelope method'. ***This will require bidders to submit technical information in the one envelope and project cost information in the other. Stringent tests could then be applied to see the technical worthiness of the developer as well as assess the required concession period resulting from financial simulations provided. It is necessary for educational institutions such as universities to incorporate training for students. Professional bodies such as the SIZ, ZIA and those connected to undertaking assessment of projects, be appraised with similar tools.***

6.3.2 Critical success factors for decision-making

The study further noted that although CSFs affected decisions made on PPP projects, these were used at a minimal level. Saving time in the delivery of the project was a major concern due to protracted PPP negotiations. These could be minimised by both parties recognising detrimental consequences to the proposed scheme. PPPs are a benefit to the local economy as governments could concentrate on other matters affecting the country. However, one CSF noted the need for realistic assessment of costs and benefits of the projects. The overriding concern had been the implementation of the projects at the expense of the unforeseen long term repercussions. Although development may be required, information given to bidders must give in-depth analysis of the pertaining political situation, the required partnership structure, the environmental impact that the project will have as well as the risks that the developer would face during the construction phase. The case studies noted how that risk associated with the total project spectrum, led to their excess evaluation of their license period. Consequently, protracted concession periods were successfully negotiated for by the bidders. User fees expected to meet recovery of invested funds by developers would therefore be increased over time and may pose to be uneconomical to users. ***It is recommended that substantial information be provided to bidders with local mitigatory measures that to cushion perceived anxieties regarding the project.*** The NCC, ZIA, SIZ, EIZ and Economic Association of Zambia (EAZ) could provide such information to bidders to logically perceive of risks that would be allocated to them contractually.

6.3.3 Risk allocation practices impacting decision-making

The majority of the respondents felt the necessity of ensuring that risk allocation for the projects be a shared matter than leaving it entirely to the investor. Only three factors out of the nine had different risk allocated to either the public or private investor while the majority felt that risk be shared. This could explain the 'greenfield' nature of PPPs in the implementation of projects in Zambia. However, the developer is always best placed to carry the construction risk due to the advantage of being on site. The need to have the project constructed on time is also critical. Risks borne by the public are easily dealt with once the project site is handed over. ***It is recommended that risks prior to the***

hand-over of the site be handled by the project recipients while those for construction are given to the developer. The project recipients take over all risks once the concession period is fulfilled. Careful monitoring of the project at hand-over must however be done. The concession must ensure that the project is handed over 'as new'. This recommendation is targeted at PPP developers who must be monitored by the NCC, SIZ, ZIA and EAZ.

6.3.4 Risk mitigation and project success

The study's second hypothesis on whether risk allocation and mitigation practices contribute to project success was rejected. The implications of this conclusion on risk mitigation are therefore worth pondering upon. Permit approvals for the project often take long as results from respondents indicated. Compensation for the costs expended may be sought failure to which other avenues would be utilised by the preferred bidder. Project developers have not been assured of ways in which risks affecting PPPs in Zambia would be mitigated. The study noted weaknesses in the banking sector that should offer services for such projects. External help is often sought in most externally multi-nationally funded projects. ***It is recommended that the Ministry of Finance and National Planning and in conjunction with the Bank of Zambia oversee the introduction of mitigatory funds that could assist foreign and local investors when such projects are undertaken.*** The net effect of this measure affects chargeable user fees and consequently the concession period for the project. Mitigatory measures consist of either treating; transferring; tolerating and terminating the risks that can be handled by the banking and insurance industries.

6.3.5 Risk allocation and project success

The study noted that risks would be allocated to the best person able to handle them. In view of the rejected hypothesis noted in **Table 4.15**, risk allocation practices need to be reviewed thoroughly. Developers have often embarked on projects where they are assured of quick returns on invested funds. Any PPP project assumes the developers taking on most of the risks. ***It is recommended that professional bodies such as ZIA could scrutinise designs of projects while others monitor adherence of the***

construction process to completion. In all this, the NCC as the umbrella body for the construction industry could superintend; bringing in other bodies as need will dictate. Contractual documentation could be scrutinised by quantity surveyors and risks associated with the project can be valued. The PPP unit in the MOFNP could work hand in hand with the professional bodies (SIZ, ZIA, ZIP) under the NCC to attain project success.

6.3.6 Training for evaluating PPP projects

Lack of experience in administering PPP projects was identified among construction industry professionals. The introduction of Act No 14 has been a welcome matter. But on the other hand, the case studies revealed over assessment of risks associated with the projects that exacerbated the concession periods. ***It is recommended that an across the board training programme for ZIA, SIZ and ZIP be initiated by the Economic Association of Zambia (EAZ) to equip construction industry professionals with tools of evaluating risks in projects.*** Since PPPs are affected by instability in financial markets in terms of exchange rates and interest rates, the EAZ should educate construction professionals regarding different types of fiscal derivatives such as futures, options and swaps. These methods would complement the simple scoring method used in evaluating bidders. The two envelope method has been recommended. However, in view of the subject of risk allocation, Capital investment Appraisal methods such as the Net Present Value (NPV), Internal Rate of Return and the Payback, should be used. Sophisticated methods such as the Kepner-Tregoe Decision analysis technique must be used. This method assesses proposals on the basis of 'musts' and 'wants'. The 'musts' are obligatory while the 'wants' would be gauged on basis of the simple scoring or two envelope methods.

6.3.7 Research implications

There are several implications that can be gleaned from a study of this nature. As PPPs are novel in the development tenure of Zambia, the most crucial points to assist their use are:

(a) the growth of strong and good private consortiums;

(b) transparent procurement processes;
(c) improving the legal framework;
(d) thorough and realistic assessments of costs and benefits;
(e) of shared public and private sector authorities;
(f) in the saving of time in the delivery of the project; and
(g) ensuring that stable macro conditions exist in the nation.

The factors above are the critical success factors that will warrant allocation of risk for the developer for the successful implementation of PPP projects.

6.3.8 Contribution to knowledge

Owing to CSF risk profiles for studies in different countries that have informed decision-making, this research sought to apply the same to PPP projects in Zambia. Aggrandizing as these factors are, the study established their minimal contribution to decision-making hence negatively affecting replication of other floated PPPs schemes in the nation. This assessment is based on the following contributory factors:

(a) implemented schemes have extended negotiation periods which have disturbed financial considerations regarding allocated risks in projects giving rise to exacerbated concession periods;
(b) lack of professional experience has militated against the stringent evaluation of the risk content in proposals for executed schemes since PPPs are a nascent phenomenon in Zambia;
(c) PPP developers therefore have had an upper hand in stanchioning against risks for the projects they have implemented in view of the prior feasibility studies undertaken during the bidding stage;
(d) allocated risk in project proposals is therefore at the center of financial evaluations and must be managed when schemes are executed;
(e) a risk allocation decision-making framework was the developed. The framework was suggested in a bid to shorten the negotiation process to the venture's implementation and operational phases. It is hoped that use of this tool would

encourage developers to undertake projects assured of a shortened conciliatory procedure; and

(f) diagnosing difficulties affecting the schemes, at their most critical underperforming stages, could aid rectification to achieve their successful implementation.

6.3.9 Limitations and areas of further research

Several limitations were noted in the course of this research. For instance, certain sensitive financial information could not be given to the researcher except for that which was deemed 'general'. That information was critical in having an in-depth examination of allocated risk for the developers. However, the mixed method research design consisting of structured interviews, questionnaires and case studies used to collect primary data achieved the intended purpose. These processes utilised the philosophical understanding of a constructionist pragmatist. Based on the themes provided by research interview participants, the ontological and epistemological establishment of the PPP phenomena was analysed. One of the crucial findings is that professionals need to have a deeper understanding of the PPP mode of development. Further research must therefore seek to address:

(a) specific risks and their impact on projects. Particular risks that this study identified such as 'political risk' and 'excessive risk evaluation', could have their repercussions evaluated on issues of cost and 'elongated concession periods'; and

(b) effective risk evaluation tools must be studied by construction industry professionals so that PPP projects benefit by having shorter negotiation periods as well as monitoring of the length of the concession.

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APPENDIX A

Papers written and published during the course of the research and Conferences attended

Conference/Organiser	Published Paper Title	Conference Date	Conference Venue
1st International Conference in Developing Countries	Understanding risks in public private partnerships construction projects in Zambia	April, 2012	Ghana
3rd Construction Management Conference, Conference Proceedings	The challenges of implementing public private partnerships – a decision-making framework for Zambia	30 November – 02 2014	Nelson Mandela Metropolitan University, Port Elizabeth, South Africa
Proceedings of the DII – 2014 on Infrastructure Investments in Africa	Risk allocation in public private partnerships – towards a decision-making framework	September 2014	Livingstone, Zambia
Proceedings of the DII – 2017 on Infrastructure Investments in Africa	Evaluating financial risks in Zambia's public private partnership projects – the case of the University of Zambia East Park Mall and Kasumbalesa Border post	September 2017	Livingstone, Zambia
Commonwealth Association of Surveying and Land Economy (CASLE) and the Surveyors Institute of Zambia (SIZ)	None	29 November 2018 to December 2	Lusaka, Zambia, Mulungushi International Conference
Proceedings of the DII – 2019 on Infrastructure Investments in Africa	Risk evaluation and monitoring challenges of Public-private partnership projects in Zambia	July 24 -26, 2019	Livingstone, Zambia
CIB W78 2019 Annual Conference	Design of an effective decision support system for the implementation and monitoring of Public-private partnership projects in Zambia	September 18 – 20, 2019	Northumbria University, Newcastle Upon-Tyne, United Kingdom

APPENDIX B

List of sampled institutions for focus group structured interviews

No.	**Name of institution**	**Position**
1	Buildings Department	Acting Director Public Investment
2	Ministry of Finance and National Planning	Director – PPP Unit
3	Buildings Department	Senior Quantity Surveyor
4	Fairface Contractors Ltd	Managing Director
5	Zambia Public Procurement Agency	Project Coordinator
6	Zambia Private Sector Association	Chairman
7	Zambia National Commercial Bank	Investment Manager
8	African Life Financial Services	Investment Analyst
9	AON Zambia Ltd	Actuarial Consultant
10	ZESCO Ltd	Senior Engineer
11	Lusaka City Council	Senior Valuation Officer

APPENDIX C

List of sampled institutions from which professionals responded administered questionnaire

No.	Institutions Visited	Questionnaire Respondent
	Corporate Institutions Visited	
1	Ministry of Finance	Finance Director
2	The University of Zambia	Senior lecturers
3	The Copperbelt University	Registrar
	Engineering Firms Visited	
1	Buildings Department	Chief Engineer
2	Airtel Zambia Ltd	Manager
3	Lusaka Water and Sewerage Company	Senior Engineer
4	National Housing Authority	Chief Quantity Surveyor
5	Road Development Agency	Chief Executive Officer
6	ZESCO	Director Engineering
7	ZAMTEL	Senior Quantity Surveyor
8	Brian Colquhoun, Hugh O Donnel and partners	Quantity Surveyor
9	ZMCK Consulting Engineers Ltd	Senior Engineer
10	JJ Lowe Zambia Ltd	Senior Engineer
11	Plessey Z Ltd	Senior Engineer
12	Bicon Zambia Ltd	Managing partner
13	J Nkhosi Technical Consultants	Managing partner
14	Orbit Engineering	Quantity Surveyor
15	Oscat Engineering Ltd	Manager
16	Rankin Engineering	Manager
17	Scott Wilson Piesold Ltd	Managing partner
18	Berimu Engineering	Manager
19	BNC Consult Ltd	Manager
20	Brunelli Construction	Manager
21	Dockland Construction	Manager
22	Just Aluminium Ltd	Quantity Surveyor
23	Million Construction Ltd	Manager
24	Wonderful Construction Z Ltd	Manager
25	ZAL Elevators	Manager
26	Incipio Construction Auditing and project Mgt	Quantity Surveyor
27	Samifran Construction Ltd	Quantity Surveyor
28	Midrand Business Systems	Quantity Surveyor
29	Norwood Enterprises Ltd	Quantity Surveyor
30	Africa Infrastructure Consultants Ltd	Quantity Surveyor

31	Civilstruts and Structural Engineers	Director
32	Dimensions Architectural Engineering Draughting	Director (Projects)
33	Stefanutti Stocks Z Ltd	Senior Quantity Surveyor
34	Technical Engineering Company Ltd	Quantity Surveyor
35	Cedrick Engineering Co. Ltd	Senior Engineer
36	Zecco Ltd	Manager
37	Piers Engineering Company	Senior Engineer
38	Inyatsi Buildings Ltd	Administrative Manager
39	Praxis Solutions Ltd	Senior Quantity Surveyor
40	Millers Construction	Manager
41	GMC Technologies Z Ltd	Senior Civil Engineer/Managing Partner
	Architectural Firms	
1	Ground Zero	Senior Quantity Surveyor
2	Buildings Department	Civil Engineer
3	Habi Consult	Senior Engineer
4	PJP Associates Ltd	Managing Architect
5	Ndilila Associates	Managing Architect
6	Archline Architects	Managing Architect
7	Timestone Architects	Managing Architect
8	Red Board Architects	Manager
9	Harmani Associates	Managing Architect
10	DB Architects	Managing Architect
11	Studio Architecture	Managing Architect
12	City Space Studios	Managing Architect
13	Katayi Associates	Senior Architect
14	Watkins Gray International	Senior Architect
15	Touchline	Senior Architect and Quantity Surveyor
16	Mutinta Sichali Architects	Managing Partner
17	Bemidak Associates	Managing Partner/Senior Architect
18	Urban Technics	Senior Architect
19	MP Consulting Services	Managing Partner/ Senior Architect
	Surveying Companies	
1	Peter Richards and Partners	Senior Quantity Surveyor
2	Buildings Branch	Senior Quantity Surveyor
3	David Mwitimwa	Senior Quantity Surveyor
4	Mwila Kafula	Senior Quantity Surveyor
5	H B Chalwa ansd Associates	Senior Quantity Surveyor
6	MLN Associates	Managing Partner/Senior Q. Surveyor
7	Bitrust Real Estate Consult	Senior Valuation Surveyor

8	Colmak Associates	Managing Partner/Senior Q. Surveyor
9	NHA	Senior Quantity Surveyor
10	GK Associates	Senior Surveyor
11	Adamhood and Partners	Managing Partner/Senior Q. Surveyor
12	CZM QS	Managing Partner/Senior Q. Surveyor
13	AMK	Managing Partner/Senior Q. Surveyor
14	City Worxs	Managing Partner/Senior Q. Surveyor
15	ACI Zambia	Managing Partner/Senior Q. Surveyor
16	Habi Consult QS	Managing Partner/Senior Q. Surveyor
17	DC QS	Senior Quantity Surveyor
18	KV Siwale	Managing Partner/Senior Q. Surveyor
19	Sherwood Green	Senior Valuation Surveyor
20	Bitrust Real Estate Ltd	Senior Valuation Surveyor
	Construction Companies	
1	Astro Works Ltd	Managing Partner/Senior Q. Surveyor
2	Earthrow Investments	Managing Partner/Senior Q. Surveyor
3	Fairface Construction	Managing Partner/Senior Q. Surveyor
4	Flame Arab Contractors	Senior Quantity Surveyor
5	Grinaker LTA	Senior Quantity Surveyor
6	Kaljee Construction	Senior Quantity Surveyor
7	MJT Construction Z Ltd	Senior Quantity Surveyor
8	PLEM Construction	Managing Partner/Senior Surveyor
9	Plinth Technical Services	Managing Partner/ Senior Surveyor
10	Savenda Management Services	Senior Surveyor
11	Velos Enterprises Ltd	Senior Surveyor
12	China Jiangxi	Senior Surveyor
13	Avic International Holding Corporation	Managing Partner/ Senior Surveyor
14	BSBK Joint Venture	Managing Partner/ Senior Valuer
15	Muso Muko Agency Ltd.	Quantity Surveyor
16	Chashi Construction	Director
17	Saloba Construction	Managing Director
18	Redpath Contractors	Managing Director
19	Belmont Construction	Senior Quantity Surveyor
20	Chimwemwe Block Making Company	Quantity Surveyor
21	Mt. Meru Construction	Manager
22	Kalulushi Clay Brick Company	Manager
23	Gelsom Quantity Surveyors	Manager
24	Group Five Contractors	Quantity Surveyor
25	Kabwe General Dealers	Senior Quantity Surveyor
26	Musenge Contractors	Senior Quantity Surveyor
27	Apollo Enterprises	Senior Quantity Surveyor

28	Osort Corporate Procurement	Senior Quantity Surveyor
29	Milestone Technical Services	Manager
30	Teddy and Rita Enterprises	Senior Quantity Surveyor
	Banking Institutions	
1	Zanaco	Risk Assessment Manager
2	Stanbic Bank	Senior Manager
3	FNB	Senior Manager
4	Barclays	Senior Manager
5	Banc ABC	Branch Manager
6	Indo Zambia Bank	Senior Manager
7	Investrust Bank	Manager – Risk Assessment

APPENDIX D

Covering letter

14th May 2014

Dear Sir/Madam,

I am a student at the University of Zambia undertaking a PhD research in 'Risk Allocation in Public Private Partnership Development Projects'. The survey questionnaire is accompanied with this letter of introduction targeting institutions that are involved in the process of implementing PPP projects. This research is being supervised by Dr Mundia Muya, in the Civil Engineering Department of the School of Engineering.

The aim of this study is to gain an understanding in the risk allocation decision-making process ensuring success of PPP projects in Zambia. Having to examine how various stakeholders understand PPPs affect decisions made for their successful implementation is the main focus of the research. Your organisation has been chosen to participate in this survey.

The questionnaire has only 18 questions, conveniently organised for your quick response. It should therefore take no more than 20 – 30 minutes of your precious time to complete answering it. As your participation in this survey is voluntary, information given will be treated as confidential and solely for this project. Please make every effort to answer the entire questionnaire. If you have any query regarding the nature of the project, do not hesitate to get in touch with me using either my email or cell phone given below. Your response to the questionnaire is a very critical component to the research project hence your comments will be greatly appreciated.

Yours faithfully,

Peter M Mukalula
Research student
Email: musomuko@yahoo.com, cell: 0976-782789

APPENDIX E

Structured Interview guide questions for selected focus group individuals

1.0 Details of interviewee and company

1.1 Company name:_____

1.2 Which of the following does your organisation represent (tick)?

Organisation	*Tick*
Government ministry	
Parastatal	
Private company	
Foreign company	
Other	

1.3 What is your position?_____

1.4 Professional background:_____

1.5 Public Private Partnerships are defined as a synergy of the public and private sectors. Are you aware of any PPP projects that have been done?

Yes ☐ No ☐ Not sure ☐

……

……

If so, why?

2.0 Critical success factors for Public Private Partnerships

2.1 Zambia has introduced Act No. 14 of 2009, the Public Private Partnership policy and Act. Do you think the introduction of this law has helped with the implementation of PPPs in Zambia?.....

……

……

2.2 PPPs have succeeded in other parts of the world. What do you think must be done to make PPPs succeed in
Zambia?.....

……

……

2.3 Do you think the concepts have been understood in Zambia?

I don't think so ☐ Yes, they have ☐ It is doubtful ☐

.....

3.0 Risk allocation

3.1 As PPPs are a new concept in Zambia, risks must be considered in the framing of any contract. Which risks, in your view, would make the implementation of PPPs a difficult task?

……

……

3.2 If PPPs are to be successful in Zambia, how should risks be allocated? And why so?

……

……

……

4.0 Risk mitigation

4.1 What is the best way to mitigate risk for PPPs in Zambia? Give reasons.

……

……

……

5.0 Risk identification

5.1 How are risks identified on
projects?.....

……

……

6.0 PPP development themes

6.1 Under what themes are PPP projects implemented?

……

……

……

……

APPENDIX F

General questionnaire to various construction industry professionals

Risk Allocation Decision-Making in Public Private Partnership Development Projects

I am grateful for your participation in this research. Please do indicate your details below:

Cell No.:_____

Email:_____

Key definitions

Risk allocation is defined as the sharing of risks associated with the project to the best party able to handle it.

Decision-making is defined as a wisely chosen course that utilises evaluation techniques to arrive at project solutions.

Public Private Partnerships are defined as a contract between a public authority and a (private) project company to design, construct, finance and operate a facility; this may be a concession agreement or project agreement.

Part 1 – General Information about respondent and project(s)

1. **Which of the following describes your organisation? (*Please tick*)**

   ☐rivate institution ☐ Public Institution ☐ Other, please specify……..

2. **How many employees are in your organisation? (*Please tick*)**

   ☐ Less than 100 ☐ Over 500 ☐ Over 1,000

3. **How many years have you worked for this organisation?**_____years

4. **Indicate your industrial experience**_____years

5. **Has your organisation been involved in PPP projects? (*Please tick*)**

   ☐ **Yes** ☐ **N**☐ **Planning to do so**

6. **Indicate your experience in PPPs. (*Please t*☐) Have done P☐s Not done any**

7. **Indicate years dealt with PPPs _____Years (*Please T*☐*k*) None**

8. **Which of the following projects has your organisation participated in?(*Please tick*)**

☐ Housing developments ☐ Roads ☐ Commercial developments

Power & Energy ☐ Telecommunications Water sanitation

☐ Other (state)……..

9. **What type of contract was the PPP project implemented under? (*Please tick*)**

☐ Build, operate, transfer ☐ Design, finance, build, and maintain

☐ Build, own, operate, transfer Design, finance, build, operate and maintain

☐ Lease, develop, operate ☐ Rehabilitate, operate, transfer

☐ Other (state)……

10. **What was the project's planning period? (*Please tick*)**

☐ Within 1 year ☐ 1 – 3 years More than 3 years

11. **What was the construction period? (*Please tick*)**

☐ Within 1 year ☐ 1 – 3 years More than 3 years

12. **Who carries out your financial risk evaluation on projects?**

☐ Banks ☐ External consultants

☐ PPP Unit from Ministry of Finance ☐ In-house consultancy group

☐ Other (specify)……
……..

……

……

……

……

……

……

……

13. Risk Identification (variable one)

How important are the following approaches in identifying risks in PPP Projects?

Please mark your chosen option with √ to indicate the **degree to which a factor is applicable**. Scale: 1 – Strongly Disagree; 2 – Disagree; 3 – Neutral; 4 – Agree; 5 – Strongly Agree.

S/N	FACTOR	Scale Options				
		1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Site visit					
2	Experience					
3	Case studies					
4	Brain storming					
5	Data bases					
6	Workshops					
7	Check lists					
8	External consultants					
9	Intuition					
10	Allied organisation input					
11	Risk rating matrix					
12	Feasibility study					

14. Critical Success Factors (variable 2)

Critical success factors have encouraged the introduction of PPPs as well as the implementation of such projects. **This section explores the significance of these factors in making the decision to use the PPP mode of procurement.** Please mark your chosen option with √ to indicate the degree of significance. Scale: 1 – Strongly Disagree; 2 – Disagree; 3 – Neutral; 4 – Agree; 5 – Strongly Agree.

S/N	FACTOR	Scale Options				
		1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Favourable legal framework					
2	Sound economic policy					
3	Stable macro condition					
4	Strong and good private consortium					
5	Shared authority for public and private sectors					
6	Social support					
7	Thorough and realistic assessment of costs and benefits					
8	Technology transfer to local enterprise					
9	Save time in delivering the project					
10	Benefit to local economic development					
11	Transparent procurement process					
12	Good governance					

15. Risk Allocation (variable 3)

Risk Allocation. **How were risks allocated on projects you participated in?** (1) Please mark your chosen option with √ to indicate the degree of significance. Scale: 1 – Strongly Disagree; 2 – Disagree; 3 – Neutral; 4 – Agree; 5 – Strongly Agree.

S/N	FACTOR	Scale Options				
		1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Pre-investment risk is managed by private companies					
2	Political risk are shared					
3	Permit approval risk is handled by the public					
4	Technology risk is shared					
5	Completion risk is managed by the public and the private					
6	Cost overrun risk is managed by the private					
7	Operation risk is managed by the private					
8	Regulatory risk is managed by the public					
9	Political risk is managed by the public					
10	Financial risk is managed shared					
11	Debt servicing risk is shared					
12	Partnering risk is shared					

16. Risk Mitigation (variable 4)

Risk Mitigation. **How were risks mitigated on projects you participated in?** (1) Please mark your chosen option with √ to indicate the degree of significance. Scale: 1 – Strongly Disagree; 2 – Disagree; 3 – Neutral; 4 – Agree; 5 – Strongly Agree.

S/N	FACTOR	Scale Options				
		1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Permit approval risk is mitigated by treatment					
2	Resettlement and rehabilitation risk is mitigated by transfer					
3	Delay in financial closure risk is mitigated by transfer					
4	Design and latent defect risk is mitigated by termination					
5	Traffic revenue risk is mitigated by transfer					
6	Financial risk is mitigated by transfer					
7	Completion risk is mitigated by transfer					
8	Cost overrun risk is mitigated by treatment					
9	Political risk is mitigated by termination					
10	Legal risk is mitigated by treatment					
11	Debt servicing risk is mitigated by transfer					
12	Operation risk is mitigated by treatment					

17. PPP Projects Success (variable 5)

PPP Projects Success: This part shows the indicators of success for PPP projects. For each indicator, tick (√) the appropriate option. Scale: 1 – Strongly Disagree; 2 – Disagree; 3 – Neutral; 4 – Agree; 5 – Strongly Agree.

S/N	FACTOR	Scale Options				
		1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	PPP Projects are completed within Budget					
2	PPP Projects are completed within the scheduled time					
3	PPP Projects are produced according to the specifications – High quality					
4	PPP Projects stakeholders are satisfied					
5	PPP Projects generates profits in the operation phase					
6	Risk management decisions in PPP Projects leads to Cost savings					
7	PPP Projects provide integrated solutions for public infrastructure services					
8	PPP Projects contribute to local economic development					
9	PPP Projects bring about technology transfer to local people					
10	PPP Project Risk management decisions leads to realizing value for money					
11	PPP Project Risk management decisions leads to employment creation					

18. **Which phase of the project bears more risks? (**Please tick the degree of risk importance during project phases) Scale: 0 – not applicable; 1 – not risky; 2 – fairly risky; 3 – risky; 4 – very risky; 5 – extremely risky.

Project phase	**Importance**
Pre-construction (negotiation)……	☐ ☐1 ☐2 ☐3 ☐4 ☐5
Construction……	☐0 ☐1 ☐2 ☐3 ☐4 ☐5
Commissioning……..….	☐0 ☐1 ☐2 ☐3 ☐4 ☐5
Hand-over of project to client……..	☐0 ☐1 ☐2 ☐3 ☐4 ☐5
Other (specify)…….	☐0 ☐1 ☐2 ☐3 ☐4 ☐5

THANK YOU VERY MUCH FOR YOUR ASSISTANCE

APPENDIX G – CASE STUDY FINANCIAL INFORMATION

1. Kasumbalesa Border Post PPP Construction

2. Case Study UNZA East Park Mall Construction

Case Study 1 - Kasumbalesa Border Post PPP Construction Net present values and Payback financial figures

CAPITAL INVESTEMENT			**(187,044,870.24)**			
Year	**Present Values**	**Taxation**	**Interest Rates**	**Inflation**	**NPV**	**Payback Period**
1	8,220,504.60	2,877,176.61	-	6,576,403.68	5,343,327.99	(181,701,542.25)
2	10,519,218.60	3,681,726.51	(4,676,121.76)	8,415,374.88	6,837,492.09	(174,864,050.16)
3	7,214,462.20	2,525,061.77	(4,676,121.76)	5,771,569.76	4,689,400.43	(170,174,649.73)
4	5,694,063.10	1,992,922.09	(4,676,121.76)	4,555,250.48	3,701,141.02	(166,473,508.71)
5	4,350,494.50	1,522,673.08	(4,676,121.76)	3,480,395.60	2,827,821.43	(163,645,687.29)
6	3,166,308.20	1,108,207.87	(4,676,121.76)	2,533,046.56	2,058,100.33	(161,587,586.96)
7	2,125,655.40	743,979.39	(4,676,121.76)	1,700,524.32	1,381,676.01	(160,205,910.95)
8	3,159,026.20	1,105,659.17	(4,676,121.76)	2,527,220.96	2,053,367.03	(158,152,543.92)
9	3,317,540.60	1,161,139.21	(4,676,121.76)	2,654,032.48	2,156,401.39	(155,996,142.53)
10	3,442,204.70	1,204,771.65	(4,676,121.76)	2,753,763.76	4,159,791.05	(151,836,351.48)
11	3,536,841.00	1,343,999.58	(4,676,121.76)	778,105.02	6,090,858.16	(145,745,493.32)
12	3,604,904.60	1,369,863.75	(4,676,121.76)	793,079.01	6,118,083.60	(139,627,409.73)
13	3,649,521.70	1,386,818.25	(4,676,121.76)	802,894.77	6,135,930.44	(133,491,479.29)

14	3,673,511.60	1,395,934.41	(4,676,121.76)	808,172.55	6,145,526.40	(127,345,952.89)
15	3,679,418.60	1,398,179.07	(4,676,121.76)	809,472.09	6,147,889.20	(121,198,063.70)
16	3,669,536.20	1,394,423.76	(4,676,121.76)	807,297.96	6,143,936.24	(115,054,127.46)
17	3,645,926.90	1,385,452.22	(4,676,121.76)	802,103.92	6,134,492.52	(108,919,634.95)
18	3,610,449.70	1,371,970.89	(4,676,121.76)	794,298.93	6,120,301.64	(102,799,333.31)
19	3,564,768.90	1,354,612.18	(4,676,121.76)	784,249.16	6,102,029.32	(96,697,303.99)
20	3,510,382.70	1,333,945.43	(4,676,121.76)	772,284.19	6,080,274.84	(90,617,029.16)
21	3,448,628.70	1,379,451.48	(4,676,121.76)	758,698.31	5,986,600.66	(84,630,428.50)
22	3,380,705.90	1,352,282.36	(4,676,121.76)	743,755.30	5,960,790.00	(78,669,638.50)
23	3,307,685.70	1,323,074.28	(4,676,121.76)	727,690.85	5,933,042.32	(72,736,596.18)
24	3,230,520.70	1,292,208.28	(4,676,121.76)	710,714.55	5,903,719.62	(66,832,876.55)
25	3,150,059.00	1,260,023.60	(4,676,121.76)	693,012.98	5,873,144.18	(60,959,732.38)
26	2,906,795.10	1,162,718.04	(4,676,121.76)	639,494.92	5,780,703.89	(55,179,028.48)
27	2,829,335.30	1,131,734.12	(4,676,121.76)	622,453.77	5,751,269.17	(49,427,759.31)
28	2,750,245.30	1,100,098.12	(4,676,121.76)	605,053.97	5,721,214.97	(43,706,544.34)
29	2,670,059.70	1,068,023.88	(4,676,121.76)	587,413.13	5,690,744.44	(38,015,799.90)

30	2,589,251.50	1,035,700.60	(4,676,121.76)	569,635.33	5,660,037.33	(32,355,762.58)
31	2,508,229.90	1,053,456.56	(4,676,121.76)	551,810.58	5,579,084.52	(26,776,678.06)
32	2,427,357.90	1,019,490.32	(4,676,121.76)	534,018.74	5,549,970.60	(21,226,707.46)
33	2,346,947.90	985,718.12	(4,676,121.76)	516,328.54	5,521,023.00	(15,705,684.46)
34	2,267,272.70	952,254.53	(4,676,121.76)	498,799.99	5,492,339.93	(10,213,344.53)
35	2,188,564.40	919,197.05	(4,676,121.76)	481,484.17	5,464,004.94	(4,749,339.59)
36	2,111,022.10	886,629.28	(4,676,121.76)	464,424.86	5,436,089.71	686,750.12
37	2,034,815.20	854,622.38	(4,676,121.76)	447,659.34	5,408,655.23	6,095,405.35
38	1,960,085.60	823,235.95	(4,676,121.76)	431,218.83	5,381,752.57	11,477,157.92
39	1,886,951.00	792,519.42	(4,676,121.76)	415,129.22	5,355,424.12	16,832,582.04
40	1,815,507.10	762,512.98	(4,676,121.76)	399,411.56	5,329,704.31	22,162,286.35

NOTES

1. Taxation risk

Government policies toward taxation was inconsistent as such a provision of taxation provided for the computation was up to 42% of profits generated.

2. Interest Rates risk

Interest rates had risen by half from the time the project was started .The Initial borrowing rates was at 17% but By the time project computations were done, the borrowing rate stood at 30%. Therefore, there was need for a provision has been provided in the projection up to 35%.

3. Inflation

Due to continuing economic instability, inflation had gone up from the time the project started. Inflation rate in Zambia averaged 9.86 percent from 2005 until 2016, reaching an all-time high of 22.90 percent in February of 2016 . There is a projected possibility of the rate reaching 35 by year 40 thereby affecting the profitability of the project.

4. Currency Exchange risk

Shareholders return are expected to be in dollars although the cash flow projection was presented in kwacha. Due to the increase in the dollar rate The profits of the project has dwindled when compared to the original projects. Dollar rate at the beginning of the project was USD$ 5.4 it has increased to USD$14.2 as of 2016 there is a possibility of
the rate going up in the next few year due to the current shortage of dollar currency in the country.

Political risk

The political risk was considered when the change of government took place in the country. As a result of the change in government, economic policies were changed. Government policies therefore became inconsistent. Depending on the current government's decisions, the project would be affected or not. If policies affected the project, then the lease agreement would in turn be affected.

Payback period

The project is expected to payback its investment in **36 years** with reserves of US $ 686,750.

IRR

IRR for the project was projected at 10.13% however from the arising factors its very clear that the IRR has reduced to 8.9% though the project is still profitable.

2. Case Study 2. The University of Zambia East Park Mall Construction net present values Payback financials.

CAPITAL INVESTEMENT			(129,645,000.00)			
Year	**Present Values**	**Taxation**	**Interest Rates**	**Inflation**	**NPV**	**Payback Period**
1	7,473,186.00	2,615,615.10	(3,241,125.00)	597,854.88	7,500,841.02	(122,144,158.98)
2	9,562,926.00	3,347,024.10	(3,241,125.00)	765,034.08	8,691,992.82	(113,452,166.16)
3	6,558,602.00	2,295,510.70	(3,241,125.00)	524,688.16	6,979,528.14	(106,472,638.02)
4	5,176,421.00	1,811,747.35	(3,241,125.00)	414,113.68	6,191,684.97	(100,280,953.05)
5	3,954,995.00	1,384,248.25	(3,241,125.00)	316,399.60	5,495,472.15	(94,785,480.90)
6	2,878,462.00	1,007,461.70	(3,241,125.00)	230,276.96	4,881,848.34	(89,903,632.56)
7	1,932,414.00	676,344.90	(3,241,125.00)	154,593.12	4,342,600.98	(85,561,031.58)
8	2,871,842.00	1,005,144.70	(3,241,125.00)	229,747.36	4,878,074.94	(80,682,956.64)
9	3,015,946.00	1,055,581.10	(3,241,125.00)	241,275.68	4,960,214.22	(75,722,742.42)
10	3,129,277.00	1,095,246.95	(3,241,125.00)	250,342.16	5,024,812.89	(70,697,929.53)
11	3,215,310.00	1,221,817.80	(3,241,125.00)	321,531.00	4,913,086.20	(65,784,843.33)
12	3,277,186.00	1,245,330.68	(3,241,125.00)	327,718.60	4,945,261.72	(60,839,581.61)
13	3,317,747.00	1,260,743.86	(3,241,125.00)	331,774.70	4,966,353.44	(55,873,228.17)
14	3,339,556.00	1,269,031.28	(3,241,125.00)	333,955.60	4,977,694.12	(50,895,534.05)
15	3,344,926.00	1,271,071.88	(3,241,125.00)	334,492.60	4,980,486.52	(45,915,047.53)

16	3,335,942.00	1,267,657.96	(3,241,125.00)	333,594.20	4,975,814.84	(40,939,232.69)
17	3,314,479.00	1,259,502.02	(3,241,125.00)	331,447.90	4,964,654.08	(35,974,578.61)
18	3,282,227.00	1,247,246.26	(3,241,125.00)	328,222.70	4,947,883.04	(31,026,695.57)
19	3,240,699.00	1,231,465.62	(3,241,125.00)	324,069.90	4,926,288.48	(26,100,407.09)
20	3,191,257.00	1,212,677.66	(3,241,125.00)	319,125.70	4,900,578.64	(21,199,828.45)
21	3,135,117.00	1,254,046.80	(3,241,125.00)	376,214.04	4,745,981.16	(16,453,847.29)
22	3,073,369.00	1,229,347.60	(3,241,125.00)	368,804.28	4,716,342.12	(11,737,505.17)
23	3,006,987.00	1,202,794.80	(3,241,125.00)	360,838.44	4,684,478.76	(7,053,026.41)
24	2,936,837.00	1,174,734.80	(3,241,125.00)	352,420.44	4,650,806.76	(2,402,219.65)
25	2,863,690.00	1,145,476.00	(3,241,125.00)	343,642.80	4,615,696.20	2,213,476.55
26	2,642,541.00	1,057,016.40	(3,241,125.00)	317,104.92	4,509,544.68	6,723,021.23
27	2,572,123.00	1,028,849.20	(3,241,125.00)	308,654.76	4,475,744.04	11,198,765.27
28	2,500,223.00	1,000,089.20	(3,241,125.00)	300,026.76	4,441,232.04	15,639,997.31
29	2,427,327.00	970,930.80	(3,241,125.00)	291,279.24	4,406,241.96	20,046,239.27
30	2,353,865.00	941,546.00	(3,241,125.00)	282,463.80	4,370,980.20	24,417,219.47
31	2,280,209.00	957,687.78	(3,241,125.00)	319,229.26	4,244,416.96	28,661,636.43
32	2,206,689.00	926,809.38	(3,241,125.00)	308,936.46	4,212,068.16	32,873,704.59
33	2,133,589.00	896,107.38	(3,241,125.00)	298,702.46	4,179,904.16	37,053,608.75
34	2,061,157.00	865,685.94	(3,241,125.00)	288,561.98	4,148,034.08	41,201,642.83
35		835,633.68	(3,241,125.00)	278,544.56	4,116,550.76	

	1,989,604.00					45,318,193.59
36	1,919,111.00	806,026.62	(3,241,125.00)	268,675.54	4,085,533.84	49,403,727.43
37	1,849,832.00	776,929.44	(3,241,125.00)	258,976.48	4,055,051.08	53,458,778.51
38	1,781,896.00	748,396.32	(3,241,125.00)	249,465.44	4,025,159.24	57,483,937.75
39	1,715,410.00	720,472.20	(3,241,125.00)	240,157.40	3,995,905.40	61,479,843.15
40	1,650,461.00	693,193.62	(3,241,125.00)	231,064.54	3,967,327.84	65,447,170.99

NOTES

Taxation risk

Government policies toward taxation is inconsistent as such a provision of taxation has been provided up to 42%

of profits generated.

Interest Rates risk

Interest rates has risen by half from the time the project was started .The Initial borrowing rates was at 17% but

now the borrowing rate is standing at 30% a provision has been provided in the projection up to 35%.

Inflation

Due to continuing economic instability inflation has gone up from the time the project was started. Inflation Rate in

Zambia averaged 9.86 per cent from 2005 until 2016, reaching an all-time high of 22.90 per cent in February of 2016

There is a possibility of the rate reaching 35 by year 40 thereby affecting the profitability of the project.

Currency Exchange risk

Shareholders return are expected to be in dollars although the cash flow projection was presented in kwacha.

Due to the increase in the dollar rate The profits of the project has dwindled when compared to the original projects.

Dollar rate at the beginning of the project was USD$ 5.4 it has increased to USD$14.2 as of 2016 there is a possibility of the rate going up in the next few year due to the current shortage of dollar currency in the country.

Political risk

The political risk was considered in the computation of the above figures as it involves sovereign risk. In the intervening period, political risk was evidenced in having the ruling party

change. With the change in government came the change in policies. Policy inconsistency hence affected the computations for the project. This was a risk that the investor considered and factored in the computations of the project. This affected the lease agreement in terms of having to recover invested monies in the project. Invariably, break-even and hand-over time were affected for the lease agreement.

Payback period

The payback period for the project is anticipated to be at 25 year.

IRR

IRR for the project was projected at 13.56% however from the considered risk factors, the IRR would be reduced to 10.3% since the project was profitable.

APPENDIX H

ZAMBIA NATIONAL TENDER BOARD INVITATION FOR EXPRESSIONS OF INTEREST IN THE UNIVERSITY OF ZAMBIA DEVELOPMENTS BORDER POSTS

ZAMBIA NATIONAL TENDER BOARD

GENERAL PROCUREMENT NOTICE

TB/ORD/003/08: EXPRESSIONS OF INTEREST TO PARTICIPATE IN PUBLIC PRIVATE PARTNERSHIPS (PPPS) TYPE PROJECTS IN ZAMBIA

Introduction

The Government of the Republic of Zambia, through the Ministry of Works and Supply, in association with the National Council for Construction is inviting expressions of interest from the private sector, both local and international, to consider participating in PPP type projects as will be identified in Zambia, through a PPP framework that is currently being developed in terms of establishing a PPP legal and institutional framework.

The expressions of interest will act as a guide for the Government to assess the potential of engaging the private sector in PPP Projects. Prospective investors should indicate which sectors they would be interested in; what kind of institution/organization they are in; and, their contact details and persons. It would also be necessary to make it clear that parties may provide details of their consortiums to form part of detailed information.

The Government of the Republic of Zambia has embarked on a comprehensive reform programme through the Private Sector Development Programme (PSD), which is a platform by which the Government dialogues with the private sector on various issues with particular focus on reducing the cost of doing business in Zambia and also to effectively allow the private sector to be the main driver of the economic activity in the country.

Through this initiative, and as part of the broader reform strategy, the Government has identified Public Private Partnerships (PPPs) model as an option that will help to address infrastructure development, rehabilitation and maintenance and also the economy. PPPs have been identified as an effective way to attract private sector investment in Government programmes that are aimed at delivering good quality assets that link economic activity in a cost effective manner and quality delivery of essential services to the citizens of the country.

The importance of infrastructure development, maintenance and rehabilitation, coupled with improved delivery of services, has been recognized by the Zambian Government as outlined in the 5th National Development Plan (FNDP) for the country. The Government is determined to implement its policy to ensure that an enabling environment is created for active private sector participation in the direct provision of goods and services; thus the infrastructure sector is required to play a facilitative role in order to stimulate socio economic growth. The vision and goal of the Government is therefore to develop and maintain quality social economic infrastructure for sustainable national development by 2030, to enhance delivery of public infrastructure and achieve increased adherence to set standards and regulations on construction and maintenance in order to contribute effectively to national development. As part of this programme of infrastructure development PPPs have been identified in the FNDP as a key strategy that will help to develop and implement an appropriate policy framework that would facilitate private sector participation in infrastructure development, rehabilitation and maintenance and also the development of effective service delivery. The overall strategy for the Government as per FNDP is to develop and implement mechanisms for PPPs particulary in the infrastructure sector.

Objective

The objective of Government policy is to facilitate the provision of infrastructure development and maintenance and related services through PPP procurement as a viable means of infrastructure development and maintenance, and delivery of related services by ensuring that efficiency and accountability are attained.

PPP Framework in Zambia

In an effort to ensure that a legislative and institutional framework that guides the administering of PPPs is in place, the Government in collaboration with key stakeholders is in the process of soon approving a PPP policy document and PPP draft bill. Additionally, capacity building and awareness raising initiatives are currently ongoing. This is aimed at ensuring that PPP project identification and implementation is effectively and efficiently done.

PPP Projects in Zambia

It is envisaged that PPP projects in Zambia will be implemented according to agreed project structure in terms of technical aspects and financial implications. However PPP types will include but not limited to Build Own Operate Transfer (BOOT), Build Operate Transfer (BOT), Lease, Build Transfer (BT) and Concession. Some of the sectors that will be identified include the following;

A) Infrastructure

1. **Roads-**Expansion of the road network linking Lusaka Province to Copperbelt Province through the development of dual carriage ways/toll

fee roads. These could include the Kitwe/Chingola road, Lusaka/Ndola and Lusaka/Kabwe roads. Development of new road networks linking the North-Western Province with Katanga Province of the Congo DR, and the North-Western Province through to the Western and Southern Provinces of Zambia, eventually linking this network to Namibia and other key ports within the sub region.

2. **Border Posts-**Expansion of border posts such as the Kasumbalesa border post bordering Zambia with Congo DR, Nakonde border post bordering Zambia with Tanzania and Mwami border post with Malawi. The idea would be to create on stop border posts.

3. **Railway System-**Development of new railway lines that would provide key linkages aimed at regional integration. This coupled with development of railway lines that would provide rail transport for local commuters within a key city like Lusaka.

4. **Expansion Programme for Institutions of Higher Learning-**This would include expanding existing institutions through the construction, maintenance and rehabilitation of student hostels and lecture theatres.

5. **Hospitals-**Construction and expansion of facilities of general hospitals particularly in urban areas.

6. **Power Generation Projects-**Development and construction of power generation projects

7. **Irrigation Projects-**Development and construction of irrigation projects

8. **National Parks/Game Reserves-**Management of national parks through development of key infrastructure that would attract tour operators in the game reserves

9. **Buildings-**Office and residential buildings, etc

10. **Any other projects as may be identified by the Zambian Government**

B) Related Services

1. Management of the procurement and distribution chain in areas such as pharmaceuticals/essential medical drugs and agriculture inputs.
2. Collection of tariffs/fees/rates on behalf of the Government as would be prescribed.
3. Management of public assets such as airports, harbors and other public institutions as would be identified.

If two or more applicants associate themselves each one must include their own information documentation as stipulated above in the consortium submission. Interested firms are advised to provide any other additional information. All the information provided must be in English.

The Expression of Interest must be submitted in a sealed envelope clearly marked **"Expressions Of Interest to Participate in Public Private Partnerships (PPPs) Type Projects in Zambia".**

Interested firms must submit one (1) original and sealed in one envelope. The Expressions of Interest must be deposited in the tender box situated on the 2nd floor, Red Cross House not later than **Friday 11 April, 2007** at **14:00** hours local time. The Expressions of Interest shall then be opened immediately there after in the conference room in the presence of bidder's/representatives who shall choose to attend.

All queries must be addressed to the Director General, Zambia National Tender Board, P.O. Box 31009, Lusaka, Zambia and must be in writing. The telephone numbers are 260 – 211 – 250683/4 or 260 – 211 -250632 and telefax is 260 - 211 250687.

James K. Njolomba
Acting Director General
Zambia National Tender Board